UNITED STATES AIR FORCE

SEYMOUR JOHNSON AIR FORCE BASE
Goldsboro, North Carolina
and
FORT FISHER RECREATION AREA
Kure Beach, North Carolina

PRELIMINARY DRAFT

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

July 2015

Integrated Natural Resources Management Plan

Seymour Johnson Air Force Base, North Carolina
4th Civil Engineer Squadron
Environmental Management Flight

4 CES/CEIE
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In accordance with the Sikes Act Improvement Act of 1997, and subsequent amendments, this plan was prepared in cooperation with the US Fish and Wildlife Service and the North Carolina Wildlife Resources Commission

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EXECUTIVE SUMMARY

1.1 PURPOSE OF THE INRMP

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to ensure that natural resource management at Seymour Johnson AFB (SJAFB) and Fort Fisher Recreation Area (FFRA) is implemented in a manner that supports military mission readiness by ensuring lands are available for sustained use. The INRMP provides for: the conservation and rehabilitation of natural resources at SJAFB and FFRA; the sustainable multipurpose use of those resources; and, subject to safety requirements and military security, public access for recreational use. To ensure frequent and continued use of land for military training, now and into the future, natural resource utilization must be (1) sustainable, (2) in accordance with federal and state laws and regulations, and (3) optimally integrated with existing plans and mission requirements

1.2 SCOPE

This INRMP guides implementation of the natural resources management program by the 4th Fighter Wing (4 FW) Civil Engineer Squadron, Environmental Element (4 CES/CEIE). This INRMP reflects the US Air Forces' (USAF) approach to natural resources management and stewardship and summarizes baseline information and agreements through which compliance with regulatory and planning processes, such as those required by the Sikes Act Improvement Act (SAIA) of 1997, National Environmental Policy Act (NEPA), Endangered Species Act (ESA) and the Clean Water Act (CWA) is accomplished. Further, this INRMP helps maintain the quality of training lands to accomplish SJAFB's critical military mission on a sustained basis and to ensure that natural resources conservation measures and Air Force activities on mission land are integrated and consistent with federal stewardship requirements. This INRMP focuses on natural resources management within the boundaries of SJAFB and FFRA.

Total land acreage for SJAFB is approximately 3,220 acres (USAF 2008). A majority of the land use of the Base is devoted to the airfield and supporting airfield operations and maintenance. Other major facilities at the Base include industrial operations, Base housing, open space, and outdoor recreation. A minor portion of the Base is devoted to commercial and community services, administrative, and medical uses.

The FFRA is approximately 98 acres, and is entirely designated for recreational use and classroom training. In addition to the facilities utilized for NCNGTC purposes, recreational amenities include a Recreational Vehicle (RV) camping area with full-service hook-ups, a rental center, the Beach House Bar and Grill, 27 ocean-side cottages, a mobile home park, tent camping area, volleyball court, playground, pool, recreation center, basketball court, tennis court, and an outdoor stage for summer concerts (USAF 2008). In 2005, an estimated 47,000 recreational visitors and 15,000 trainees used the facility. Revenue is generated through leasing of lodging and dining halls, which can accommodate up to 250 persons.

This INRMP also fulfills responsibilities under Air Force Instruction (AFI) 32-7064, 18 November 2014 – Integrated Natural Resources Management, Air Force Policy Directive (AFPD) 32-70 – Environmental Quality, Department of Defense Instruction (DODI) 4715.03, Natural Resources Conservation Program, and Air Force policies for natural resources planning, conservation, management, and rehabilitation in support of the SJAFB military training mission.

1.3 BENEFITS OF INRMP IMPLEMENTATION

Implementation of the INRMP will ensure future mission capacity through good stewardship of natural resources, ecosystem management, and addressing mission priorities for SJAFB. The primary goals of the INRMP are as follows:

Maintain the quality of the limited remaining natural resources to ensure and sustain the military mission at SJAFB.

Comply with federal, state, and county laws and regulations that pertain to management of natural resources.

Manage natural resources at SJAFB and FFRA to ensure good stewardship of public lands entrusted to the care of the US Air Force.

These goals are a continuation of management direction with respect to integrated natural resources management.

The INRMP will describe natural resources management actions and activities in compliance with applicable laws, regulations, policy, and directives. This INRMP will provide benefits to species, the public, and the military mission by outlining proper management, prioritizing management activities, and ensuring activities are integrated and compatible with military readiness activity.

CHAPTER 2
GENERAL INFORMATION

2.1 PURPOSE

The Seymour Johnson Air Force Base (SJAFB) and Fort Fisher Air Force Recreation Area (FFAFRA) INRMP is based on an interdisciplinary approach to ecosystem management.

This INRMP incorporates the provisions of AFI 32-7064, *Integrated Natural Resources Management*, and guides the activities of the natural resources management program and its interaction with the military mission. Key installation decision makers will be informed of the condition of SJAFB's natural resources, the objectives of natural resources management, and potential or actual conflicts between mission activities and this management plan.

The purpose of this INRMP is to serve as a planning tool for future activities at SJAFB as a road map for the stewardship of natural resources found on SJAFB and FFRA. This stewardship is based on an *ecosystem management approach* as defined in AFI 32-7064, *Integrated Natural Resources Management* and in Department of Defense Instruction (DODI) 4715.03.

The INRMP is prepared in cooperation with the US Fish and Wildlife Service (USFWS), North Carolina Wildlife Resources Commission (NCWRC), Air Force Civil Engineer Center (AFCEC) and SJAFB natural resources office. The natural resources manager at SJAFB also communicates with these groups and agencies regularly throughout the year. The goal of these communications is to promote conservation initiatives throughout the installation and encourage input from state and federal partners.

2.2 AUTHORITY

This INRMP is prepared in accordance with the Sikes Act (16 United States Code [USC] 670) as amended by the Sikes Act Improvement Act (SAIA). The Sikes Act mandates not only that each military base with significant natural resources prepare an INRMP but also that they implement the management activities contained in the plan. The SAIA requires that, where appropriate with the military mission, INRMPs provide for:

- Fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation;
- Fish and wildlife habitat enhancement or modifications;
- Wetland protection, enhancement, and restoration where necessary for support of fish and wildlife;
- Integration of, and consistency among, the various activities conducted under the INRMP;
- Establishment of specific natural resources management objectives and time frames for proposed action;
- Sustained use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management;
- Public access to the military installation that is necessary or appropriate for sustained use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security
- Enforcement of natural resource laws and regulations;

- No net loss in the capability of military installation lands to support the military mission of the installation.

Department of Defense Manual (DODM) 4715.03, Integrated Natural Resources Management Plan Implementation Manual 2013; Air Force Policy Directive (AFPD) 32-70, Environmental Quality; and AFI 32-7064, Integrated Natural Resources Management provide guidance and serve as key components in the process.

Other federal and state laws and regulations that impact the management of natural resources at SJAFB and that were considered during the preparation of this INRMP include:

- Federal Water Pollution Control Act of 1977 (the Clean Water Act)
- Endangered Species Act of 1973
- Bald and Golden Eagle Protection Act of 1940, as amended
- Federal Noxious Weed Act of 1974
- Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act)
- National Environmental Policy Act of 1969
- Noxious Plant Control Act
- Soil Conservation Act of 1935
- Archaeological Resources Protection Act of 1979
- Multiple-use and Sustained Yield Act of 1960
- Federal Land Policy and Management Act of 1976
- Fish and Wildlife Coordination Act
- Migratory Bird Treaty Act
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
- Title 10 USC 2665 Forest Management
- Title 10 USC 2667 Agricultural Outleasing
- Executive Order (EO) 11990 Protection of Wetlands
- EO 12608 Protection of Wetlands (amends EO11990)
- EO 11987 Exotic Organisms
- EO 11989 Off-road Vehicles on Public Land
- EO 11988 Floodplain Management
- EO 13045 Protection of Children from Environmental Health and Safety Risks
- EO 13112 Invasive Species
- EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds

DODI 4715.03, Natural Resources Conservation Program, is the overarching instruction for Department of Defense (DoD) natural and cultural resource management, and is the primary agent for implementing policy (including the Sikes Act), assigning responsibilities, and prescribing procedures for the integrated

management of natural and cultural resources on DoD property. This Instruction also establishes the DoD Conservation Committee that reports to the Environmental Safety and Occupational Health (ESOH) Council Policy Board, and designates "DoD Executive Agents" to lead DoD implementation of primary conservation issues.

AFPD 32-70, Environmental Quality, establishes policies to: responsibly manage natural and cultural resources on U.S. Air Force properties, clean up past environmental damage, meet current environmental standards, plan future activities to minimize impacts, and eliminate pollution from U.S. Air Force activities whenever possible. Under this directive, an Air Force Environmental Quality Program was developed, which includes activities such as cleanup, compliance, conservation, and pollution prevention. Additionally, this directive states that the Air Force will pursue adequate funding to meet environmental legal obligations.

AFI 32-7064, Integrated Natural Resources Management, implements AFPD 32-70 and DODI 4715.03. This Instruction provides details on how to manage natural resources on U.S. Air Force installations so that they comply with applicable federal, state, and local laws and regulations. The INRMP facilitates compliance with federal, state, and local environmental requirements. Potential impacts to water and air quality, wetlands, endangered species, marine mammals, migratory birds, and other wildlife, forest, and fire management, and public access are all analyzed under these requirements. The relevant statutes and executive orders listed in this document show the applicability of various natural resources program components to significant laws and regulations.

2.3 RESPONSIBILITY

Multiple installation organizations play a role in managing, protecting, and supporting SJAFB's natural resources. To ensure that the two missions—military training and environmental conservation—are compatible and mutually supportive, it is essential that these organizations work together to promote the overall U.S. Air Force mission. Various organizations and committees are involved in the stewardship of SJAFB's natural resources. These groups meet on a quarterly or semi-annual basis to discuss any issues that may impact natural resources on and adjacent to the installation. Table 1. Describes the internal stakeholders and their role in INRMP development and implementation.

Table 1. Air Force Natural Resource Management Responsibilities

Group	Unit	Flight/Staff	Responsibilities
Wing	Commander	Vice Wing Commander	Chairman, ESOHC
		Judge Advocate	Regulatory Interpretation and Legal Representation
		Wing Safety	BASH Monitoring and Minimization
Operations Support Squadron	Airfield Operations	Airfield Management	BASH Monitoring and Minimization
Mission Support Group	4 CES/CEN	Engineering	Storm Water/Erosion Control and Landscaping Specifications for New Construction

	4 CES/CEO	Operations	Oil/Water Separator Maintenance General Grounds Maintenance Environmental Controls Airfields Grounds Maintenance
	4 CES/CEIE	Environmental	Natural/Cultural Resources BASH Monitoring and Minimalization Hazmat/Hazwaste Management Installation Restoration Program Air Quality Monitoring/Compliance Environmental Impact Assessment Storm Water Management Pollution Prevention Clear Zone Tree Removal

On behalf of the Secretary of the Air Force, the Air Force Civil Engineer Center (AFCEC) maintains centralized control of budgeting, planning, plan development and assists the base with expertise and guidance as it relates to all aspects of civil engineering, environmental compliance and specifically the execution of the installation INRMP.

2.3.1 Wing Commander

The 4 FW Commander is directly responsible for accomplishing the mission. In addition, the Commander is responsible for ensuring that base-assigned and tenant units comply with the laws and requirements associated with the management of natural resources and that funding and staffing are sufficient to accomplish the projects and objectives outlined in this INRMP. The 4 FW Commander is responsible for the following aspects of the SJAFB INRMP:

- Approves the INRMP by signature on all revised INRMPs, or re-delegates signature authority to a lower level provided that the signatory has control over all aspects and management objectives addressed within the subject INRMP.
- Certifies the annual review of the INRMP as valid and current; or delegates the certification of the annual INRMP review authority to no lower than the Civil Engineer Squadron Deputy Commander.
- Provides appropriate staffing to ensure implementation of the INRMP.
- Controls access to and use of installation natural resources.
- Signs Findings of No Practicable Alternative (FONPA) for actions within a floodplain or wetland.
- Signs cooperative agreements entered into pursuant to the Sikes Act, 16 U.S.C. § 670c-1, so long as the individual exercising the authority is a General Officer or a member of the Senior Executive Service.
- Approve and sign the installation Wildland Fire Management Plan (WFMP) or re-delegates signature authority to a lower level provided that the signatory has control over all aspects of WFMP implementation.

The 4 FW Commander will ensure implementation of this INRMP upon review and approval. The USFWS and NCWRC will endorse the INRMP after review.

2.3.2 ESOH Council

Installation leadership is connected to base level environmental management through the Environmental, Safety, and Occupational Health (ESOH) Council. Assigned squadrons and tenant units are represented on this Council and are responsible for unit-specific oversight of operations that may impact environmental resources. The ESOH Council reviews the overall environmental management system at scheduled intervals to ensure its continuing suitability, adequacy and effectiveness. The ESOH Council ensures that 4 FW organizations comply with the plan.

2.3.3 Environmental Element

The 4 CES/CEIE Compliance and Analysis Element Leader has primary responsibility for natural resources management and is the principal point-of-contact for determining consistency of proposed actions and projects within the INRMP. 4 CES/CEIE, which includes Natural Resources, Compliance and NEPA staff at Seymour-Johnson AFB, is responsible for the revision, update and monitoring of the SJAFB INRMP as follows:

- Review Air Force (AF) Form 813, *Request for Environmental Impact Analysis*, to determine natural resource impacts which would result from a proposed action.
- Act in accordance with 32 Code of Federal Regulations Part 989, Environmental Impact Analysis Process. Documented on AF Form 813, Request for Environmental Impact Analysis.
- Attend the Work Request Review Board to ensure an AF Form 813, Request for Environmental Impact Analysis has been or will be submitted for proposed projects that have the potential to impact the environment.
- Collaborate with Natural Resources Manager to address any proposed activity that has the potential to negatively impact natural resources.
- Participate on BASH Team and review BASH Plan annually
- Provide a status of the natural resources management program to the ESOH Council upon request.
- Coordinate with the U.S. Fish and Wildlife Service (USFWS) and the North Carolina Wildlife Resources Commission (NCWRC) on an annual basis.
- Prepare an update to the SJAFB/FFRA INRMP as needed in coordination with AFCEC, the USFWS and the NCWRC.
- Project 5 years of goals for the implementation of the SJAFB/FFRA INRMP
- Identify objectives which will support each goal.
- Identify requirements to AFCEC that require funding to achieve each objective.
- Manage funding for projects.
- Manage available manpower to implement the SJAFB/FFRA INRMP.

2.3.4 External Stakeholders

In accordance with Executive Order 13352 (Aug 26, 2004), Facilitation of Cooperative Conservation, SJAFB natural resources staff will promote cooperative conservation with an emphasis on collaborative

activities among Federal, State, local, and tribal governments, private for-profit and nonprofit institutions, other nongovernmental entities and private citizens.

The SAIA requirement that INRMPs be prepared in cooperation with, and reflect mutual agreement of, the USFWS and NCWRC, and affords them signatory authority of SJAFB's INRMP. Cooperation and coordination with the USFWS and NCWRC is an integral part of the USAF's natural resources management program.

This INRMP meets consistency requirements of the Coastal Area Management Act of 1974 for the preservation of natural land and water resources. The DCM will be contacted for any action requiring a Consistency Determination. The US Army Corps of Engineers (USACE) has jurisdiction over waters of the US and requires permits for projects in wetlands.

The SAIA mandates that the public be provided a meaningful opportunity to comment on SJAFB's INRMP. The public was afforded a 30-day comment period on the INRMP. Copies of the INRMP were placed in libraries throughout Goldsboro, NC. Notification of the availability of the INRMP and the public review and comment period was made via publication in local newspapers and by letters mailed to state, federal, and local agencies, as well as individuals and organizations who expressed an interest in natural resources management on SJAFB. Copies of all comments received during the 30-day comment period were documented and addressed. The final INRMP will be posted on the Seymour Johnson AFB website.

2.4 MANAGEMENT PHILOSOPHY

2.4.1 Interdisciplinary Approach

The primary objective of the U.S. Air Force natural resources program is to ensure continued access to land and airspace required to accomplish the military mission while maintaining these resources in a healthy condition. Natural resource management and other mission activities are integrated and in agreement with federal mandates. SJAFB's INRMP is designed to guide mission activities in an attempt to minimize and avoid impacts and to maintain a balance between resources conservation and mission objectives. Procedures to evaluate whether a proposed AF mission-critical project will negatively impact the environment and to identify associated necessary mitigation measures have been established within the INRMP. The plan ensures long-range resources are available for the mission. Guided by AFI 32-7064, DoD directives, and current scientific literature, the INRMP balances the military mission with restoration of ecological functions by emphasizing the conservation and enhancement of biological diversity.

2.4.2 AF Principles for Ecosystem Management

Ecosystem management is a land management system that seeks to protect viable populations of native species, perpetuate natural disturbance regimes on a regional scale, adopt long-term planning timelines, and allow human use at levels that do not result in long-term ecological degradation. As outlined by the DoD Under Secretary of Defense–Installations and Environment, DODI 4715.03, *Natural Resources Conservation Program*, ecosystem-based management will:

- Avoid single-species management and implement an ecosystem-based multiple species management approach, that is consistent with the requirements of the Endangered Species Act (ESA);
- Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP;

- Use the best available scientific information in decision-making and adaptive management techniques in natural resource management; and
- Foster long-term sustainability of ecosystem services.

An ecosystem is defined as a dynamic and natural complex of living organisms interacting with each other and with their associated non-living environment. The USAF's overall approach to managing natural resources on SJAFB reflects the principles of ecosystem management, consistent with DoD and Air Force policy. This approach seeks to balance the two goals of maximizing land use for military readiness and maintaining native habitats. Such an approach is intended to facilitate maximum support of the Base's military training mission and infrastructure, while simultaneously promoting both the sustainability of native species and habitat diversity and compliance with applicable laws and regulations.

DoDI 4715.03 further states that biodiversity conservation on DoD lands and waters should be followed whenever practicable to:

- Maintain or restore remaining native ecosystem types across their natural range of variation;
- Maintain or reestablish viable populations of native species on an installation, when practical;
- Maintain ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles, to the extent practicable; and
- Manage and monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics.

In accordance with DoDI 4715.03, it is DoD policy that the principal purpose of DoD lands, waters, airspace, and coastal resources is to support mission-related activities. All DoD natural resources conservation program activities shall work to guarantee DoD continued access to its land, air, and water resources for realistic military training and testing and to sustain the long-term ecological integrity of the resources base and the ecosystem services it provides, in accordance with the Sikes Act.

The USAF goal with regard to ecosystem management is to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long term, that approach shall maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies, human use, and the environment required for realistic military training operations.

4 CES/CEIE will use ecosystem management principles to guide its natural resources program. Adaptive integrated management is an important component of ecosystem management and will result in the best option being implemented, evaluated, and modified.

4 CES/CEIE practices responsible stewardship of its lands and natural resources, while maintaining an interest in regional conservation and management planning. SJAFB is working to ensure that its land use planning efforts, and those of the region, are complementary, and together meet the region's species and habitat needs so that SJAFB's land can continue to be used in support of the Air Force's mission.

2.4.3 Integration with Other Management Plans

The INRMP is a key component plan of the Base Comprehensive Plan as detailed in the AFI 32-7062, Air Force Comprehensive Planning. The INRMP identifies natural resource features that need to be

considered and incorporated into the Base Comprehensive Plan, General Plan, Installation Development Plan, Air Installation Compatible Use Zone, BASH Plan, Installation Pest Management Plan, and Range Management Plan.

The purpose of this INRMP is to document and assist, as required, the development, integration, and coordination of natural resource management programs with other plans and programs. Moreover, this INRMP is intended to facilitate the integration of existing natural resource management actions (plans and programs) with SJAFB's primary military mission of training and support.

This INRMP is complementary to the Integrated Cultural Resources Management Plan (ICRMP), which address the National Historic Preservation Act and other cultural resources law and policies.

2.5 CONDITIONS FOR IMPLEMENTATION AND REVISION

2.5.1 Implementation

The 4th Civil Engineer Squadron/Installation Management Environmental Element (4 CES/CEIE) is primarily responsible for developing and implementing the INRMP, but the INRMP is a management plan that pertains to all actions and all personnel as they intersect with natural resources. All installation personnel are required to address natural resources conservation in their daily activities, special projects, and training missions IAW with INRMP.

2.5.2 Revisions

Natural resource management is a fluid process that requires frequent reviews and updates to management plans. Mandatory annual reviews and updates will be conducted to account for changes in the military mission, condition of natural resources, the ecosystem and regulatory requirements once the INRMP has been completed. SJAFB's natural resources manager and the AFCEC Installation Support Teams will coordinate and support the installation review process. In order to comply with regulations and ensure the continued usefulness of this INRMP, reviews will be conducted as follows:

Annual Review - Annually, the INRMP continuous updates will be formally coordinated with the cooperating partners through notification of updates and acknowledgement of guidance. 5-year funding projections will be key to the annual updates. Unmet and new requirements are difficult to add in the current or planning year budgets, so a significant look forward to successfully and accurately project funding needs is required.

Five-Year Review - Formal submission for review and comment by the Major Command, the USFWS, and the FWC will be accomplished. As of 2014 AFCEC will be utilizing continuous updates on e-Plans website with the goal of reducing the five year review to a much less burdensome process for all signatory parties. If annual updates are approved and signed, the five-year review becomes obsolete.

Management of natural resources is a dynamic process and this INRMP will be developed so that frequent evaluation and revision is easily accomplished. Section 101(b) (2) of SAIA requires that each plan be reviewed "on a regular basis, but not less often than every five years." Consistent with Air Force and DoD guidance, CEV will review the INRMP annually in cooperation with the USFWS and NCWRC and revise the INRMP when necessary.

The continuous involvement of the USFWS and NCWRC, as well as other state agencies, such as the NC Department of Natural Resources (DENR), Division of Forest Resources (DFR), Division of Coastal Management (DCM), Non-governmental Organizations (NGOs), and the public (through ongoing availability of this INRMP on the website), is expected to assist in future reviews and revisions. During

these reviews, natural resources management objectives, planned actions, and proposed actions will be reviewed with the appropriate managers to document progress, identify additional actions required or desired, and revise implementation schedules and priorities. As part of these reviews, the USFWS and NCWRC will be involved in the evaluation of processes, results, and implementation of established milestones and timelines for specific projects and programs, and a review of species, habitat, and ecosystem goals established in conservation management plans. New projects, data, understanding of natural processes and species, and lessons learned from completed and ongoing projects and practices will be incorporated as appropriate following these reviews.

CHAPTER 3
INSTALLATION OVERVIEW

3.1 LOCATION AND AREA

Seymour Johnson Air Force Base

SJAFB is approximately 3,220 acres in size, and is located in the southeastern portion of the City of Goldsboro, Wayne County, North Carolina. The primary land uses at the Base support the airfield and other military operations (1,549 acres), military housing (475 acres), and outdoor recreation (314 acres) (Figure 3-1). The flight line and airfield complex covers most of the southern half of the Base. Approximately 5,276 personnel are employed at the airfield, of which 4,298 are active military (Secretary of Defense Environmental Awards 2009). Residential areas, larger buildings including barracks, the commissary, and other office complexes occupy the central and northeastern sectors of the Base. Recreational facilities and training areas are located in the east central and northwestern areas of the Base. Small fringes of forested habitat are located along the north and west boundaries, and riparian corridors are associated with Neuse River along the southwest boundary and Stoney Creek along the northwest boundary.

Outside of the boundaries of the main Base, SJAFB also manages 47,926 acres of land, which includes 1,065 acres of easements, the 46,606-acre Dare County Bombing Range (DCBR) (located approximately 125 northeast of SJAFB), and the FFRA. Natural resources management for DCBR can found found in the DCBR INRMP.

Fort Fisher Recreation Area

FFRA is located in the Town of Kure Beach, New Hanover County, North Carolina, and is approximately 98 acres. The Recreation Area provides off-Base outdoor recreation opportunities to DoD personnel, their guests, and retirees. Recreational facilities include 27 beach cottages, two 26-room lodges, a 16-site RV park, eight suites, 13 mobile homes, a 3-acre tent camping area, a restaurant, a recreation center, an equipment rental facility, an athletic court, a swimming pool, a store and gift shop, and a kennel (USAF 2002a) (Figure 3-2).

A majority of the Recreation Area is developed for recreational use (87 acres), and also contains approximately 10 acres of undeveloped land. Less than 1.5 acres of the Recreation Area consist of a right of way, housing, and a utility corridor. The east side of FFRA contains cottages and mobile homes, with a large open lawn located to the southwest of these structures. West of the lawn is a series of large buildings, parking lots, sports fields, and various recreational facilities. On the west side of FFRA is a boat dock that crosses a fringe of tidal wetlands along the river. Upland areas that adjoin FFRA to the north and south are managed by Military Ocean Terminal at Sunny Point (MOTSU) and have intact forests crossed by roads and utility corridors.

3.2 INSTALLATION HISTORY

Seymour Johnson Air Force Base

Prior to its development as a military facility in 1942, SJAFB and surrounding lands likely supported logging and agricultural activities, and included vegetation and habitats associated with the North Carolina Coastal Plain (USAF 1995 and TNC and NCNHP, Division of Parks and Recreation 1994a). SJAFB was established on June 12, 1942, 5 months after the U.S. entered World War II (WW II), for the purpose of establishing the technical school headquarters for the Army Air Forces Technical Training

Command (USAF 2010). The Base was named in honor of U.S. Navy Lieutenant Seymour A. Johnson, a Goldsboro, North Carolina native who was killed in an airplane crash while performing his duties as a test pilot. In June 1943, the Base expanded its military mission to include the Provisional Overseas Replacement Training Center for preparing officers and enlisted men for overseas duty, and in September that same year the Base mission expanded further to provide basic military training for cadets training to become technical officers in the Army Air Corps. To facilitate the cadet training, the 75th Training Wing was established at SJAFB as part of the Aviation Cadet Pre-Training School. In October 1943, the 326th Fighter Group arrived at SJAFB, and by April 1944 the basic training of P-47 Thunderbolt aircraft pilots became the primary mission.

At the end of WW II in Europe and up until September 1945, SJAFB was designated as a Central Assembly Station for processing and training military personnel that were to be reassigned throughout the continental U.S. and the Pacific theater of operations. In September 1945, SJAFB again modified its mission to become an Army Air Force Separation Center, up until it was deactivated and deeded to the City of Goldsboro in 1946.

Between 1950 and the end of 1952, Piedmont Airlines conducted commercial flights to the Seymour Johnson Air Field, and during this time, the facilities of the Base were leased to private interests for warehouse storage, temporary residence, light manufacturing, family housing, and special presentations. In December 1952, the City of Goldsboro transferred the Base to the federal government, and the USACE proceeded to renovate and repair the Base.

SJAFB was reactivated in April 1956 as a Tactical Air Command Base, with the 83rd Fighter-Day Wing being assigned to the Base as the primary, host unit. The 4th Fighter-Day Wing replaced the 83rd Fighter-Day Wing in December 1957. In 1958, the 4241st Strategic Wing was formed on the Base, and the Wing was redesignated as the 68th Bombardment Wing, operating B-52 and KC-135 aircraft until 1982. In 1985 the Base was redesignated as the 68th Air Refueling Wing, with the unit accepting its first KC-10. In 1991, the 68th Air Refueling Wing was inactivated and the personnel and aircraft assigned to the 4th FW. On June 1, 1992, the USAF was reorganized and SJAFB became an ACC installation. Under ACC, the host unit at SJAFB is the 4th FW, operating F-15Es. This wing consists of the 334th, 335th, and 336th Fighter Squadrons. Fighter groups and other personnel from SJAFB have participated successfully in numerous engagements in WW II, the Korean conflict, Vietnam, and the Persian Gulf War.

Fort Fisher Recreation Area

The site upon which FFRA is located has a relatively long and somewhat significant history. Military presence in the area dates back to 1862, when the FFRA site was included within the fortifications of the Civil War Fort Fisher (Reed-Hoffman 1996). After defeat of the Confederacy in the Civil War, Fort Fisher remained unattended for a number of decades and slowly the remnants of the Civil War Fort were altered and reduced by natural forces as the surrounding land space evolved into its current configuration. In 1955, the USAF established the 701st Radar Squadron at Fort Fisher Air Force Station. The radar station was operated by the USAF until 1988 when various facilities on the property were converted to a Recreation/Conference Center for military and state government personnel (the NCNGTC). The Fort Fisher Historic Site lies approximately 0.5 miles to the south of FFRA and terminates at Federal Point, which was called Confederate Point until 1865. Much of the Civil War fort has eroded into the sea, and what remains is limited to remnants of the original fort walls.

A preliminary survey of FFRA for archeological and cultural sites and artifacts was completed in 1995 and at least three sites on the property were identified as having potential value for further investigation and possible excavation (Phase I Cultural Resource Survey, USAF 1995). A complete assessment of the

cultural resources of FFRA is documented in the Integrated Cultural Resources Management Plan (ICRMP) that is being prepared for SJAFB and FFRA (USAF 2010).

3.3 CURRENT MILITARY MISSION

Seymour Johnson Air Force Base

The 4th FW is based at SJAFB, and falls under the Air Combat Command (ACC), the mission of which is to provide the world's best combat Air Force, by delivering rapid, decisive, and sustainable airpower. SJAFB has about 4,300 combat ready, active duty members capable of responding to a crisis anywhere in the world. The 4th FW accomplishes its operational mission with 98 F-15E Strike Eagles (F-15E). The 4th FW's mission includes maintaining the capability to perform a variety of counter air strikes and deliver weapons in support of air and ground forces. Major groups within the 4th FW include the 4th Operations Group, 4th Maintenance Group, 4th Mission Support Group, and 4th Medical Group.

The 916th Air Refueling Wing is a reserve unit and major tenant at SJAFB consisting of approximately 1,000 personnel and 16 KC-135R "Stratotanker" aircraft.

Fort Fisher Recreation Area

FFRA is categorized as an off-base outdoor recreation area, and is operated under the direction of the 4th Force Support Squadron (4th FSS) of SJAFB (Fort Fisher Recreation Area 2010). The mission of the Recreation Area is to provide a pleasant, relaxing retreat for authorized Department of Defense (DoD) personnel. Although primarily used for recreational purposes, the facility is also home of the North Carolina National Guard Training Center (NCNGTC), which has the primary mission of providing administrative and logistical support for conferences, schools, and workshops conducted by the North Carolina National Guard during the non-summer months. When facilities are available, the National Guard Bureau and DoD also provide space to North Carolina State government.

3.4 SURROUNDING COMMUNITIES

SJAFB is located in the heart of Wayne County and FFRA is located along the coast in southeast North Carolina, approximately 108 miles south of SJAFB. Both installations are located in the Coastal Plain region of North Carolina; however, the regional landscape and land uses differ substantially between the two locations.

Figure 3-1. Site Details for Seymour Johnson AFB, Goldsboro, North Carolina

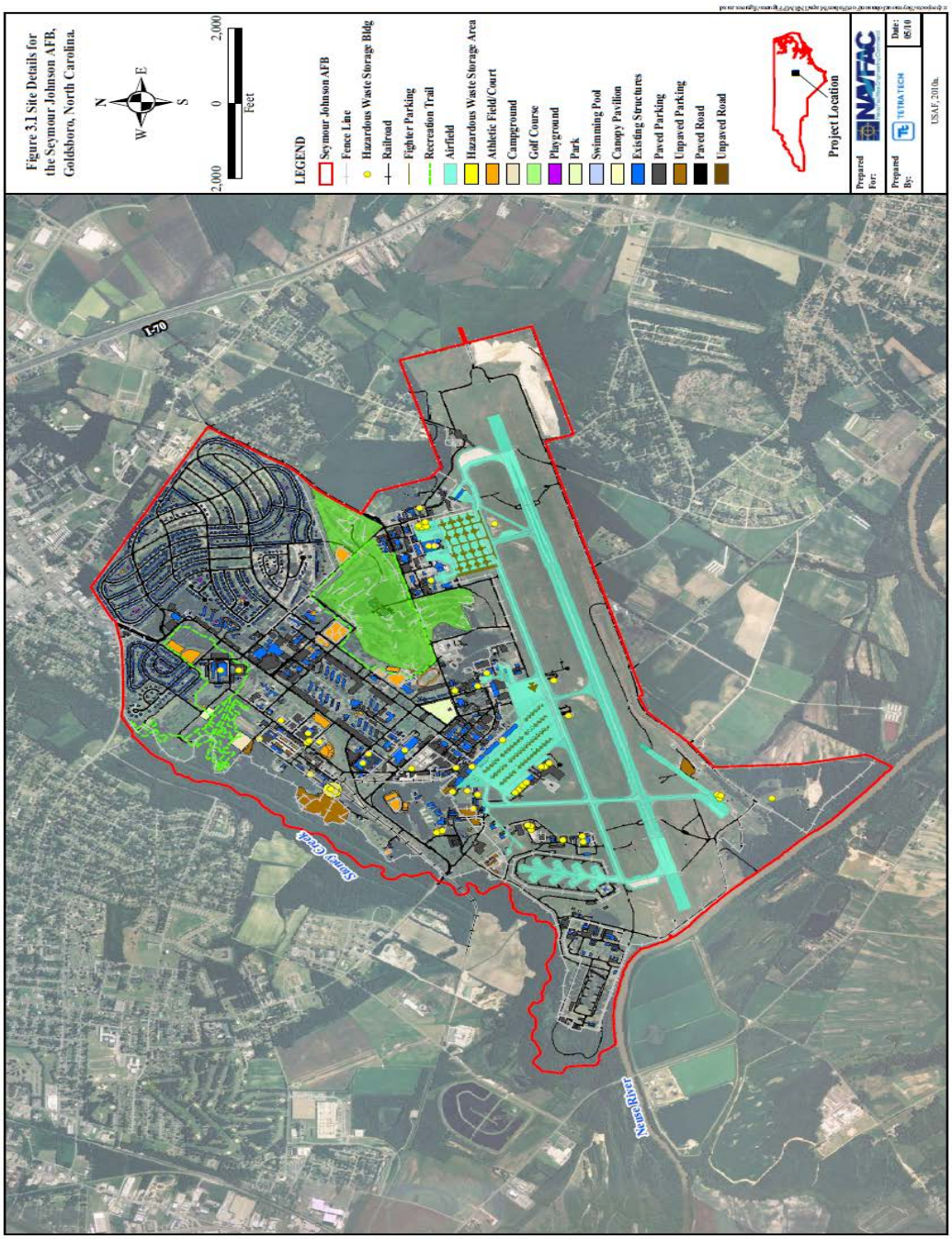
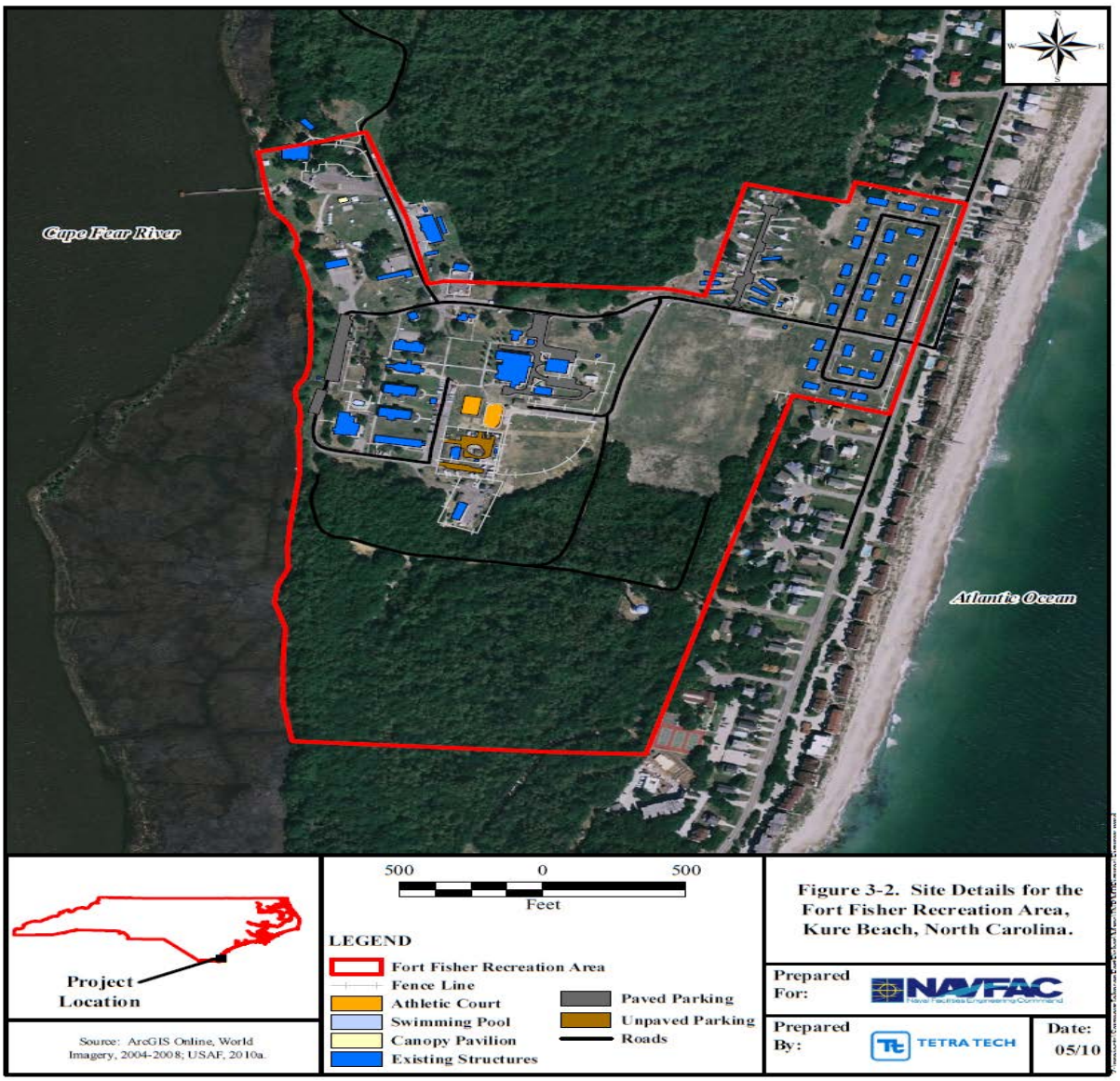


Figure 3-2. Site Details for the Fort Fisher Recreation Area, Kure Beach, North Carolina.



Seymour Johnson Air Force Base

The Base is bordered by the Neuse River along the southwest boundary, and by Stoney Creek, a small tributary of the Neuse River, along its northwest boundary (Figure 3-3). SJAFB lies entirely within the Neuse River-Stoney Creek watershed, which is a part of the larger Albemarle-Pamlico estuarine system (North Carolina Office of Environmental Education 2010). Commercial, residential, and agricultural areas surround SJAFB, with the Neuse River being a focal point of the natural community. Urban lands lie adjacent to the north and northeast of the Base and regionally to the northwest (TNC and North Carolina Natural Heritage Program [NCNHP], Division of Parks and Recreation 1994a). To the east and southeast of the Base are rural agricultural and forested lands, populated occasionally by residential areas.

Fort Fisher Recreation Area

FFRA is located in southeastern North Carolina in southern New Hanover County, approximately 18 miles from the City of Wilmington, North Carolina (Figure 3-4). The Cape Fear River system and Atlantic Ocean habitats dominate the regional landscape. FFRA is located on the southern end of a peninsula that is bounded by the Atlantic Ocean on the east, and the estuarine system of the Cape Fear River on the west. The portion of the outer banks where FFRA is located is rather narrow and FFRA occupies roughly 0.55 miles of the 0.70 mile width of the peninsula at its location on the outer banks. A narrow strip of dunes located to the east of FFRA is privately owned and has been developed.

FFRA is contiguous with an area of publicly owned land that serves as a buffer to the MOTSU located across the Cape Fear River. The undeveloped area of the MOTSU buffers the property borders of FFRA to the north and south. Approximately 0.7 miles to the south of FFRA is the Fort Fisher Historic Site, which includes the remnants of a Civil War fort and is managed by the State of North Carolina. Approximately 1 mile to the south of FFRA is Fort Fisher State Recreation Area and Zeke's Island Estuarine Research Reserve.

3.5 LOCAL AND REGIONAL NATURAL AREAS

The NCNHP is part of the Office of Natural Resources Planning and Conservation within NCDENR. This program has conducted inventories and catalogued the most rare and significant elements of natural diversity of North Carolina (NCDENR Natural Heritage Program 2010), including plants, animals and natural communities. Over the past 25 years the Natural Heritage Program has conducted inventories of Significant Natural Heritage Areas (SNHA) for most of the counties located throughout the State, utilizing approved methodologies developed by The Nature Conservancy (TNC), and shared by the Natural Heritage Network and NatureServe. The NCNHP Biennial Protection Plan, List of Significant Natural Heritage Areas (NCDENR Natural Resources Planning and Conservation 2009) was reviewed to identify SNHA located nearby SJAFB and FFRA. SNHAs were described for each county and associated with the U.S. Geological Survey (USGS) quadrangle maps they were associated with. Results for SNHA listings for the USGS Southeast Goldsboro quadrangle (SJAFB) and USGS Kure Beach (FFRA) quadrangle are described below.

Figure 3-3 Site Location for Seymour Johnson AFB, Goldsboro, North Carolina.

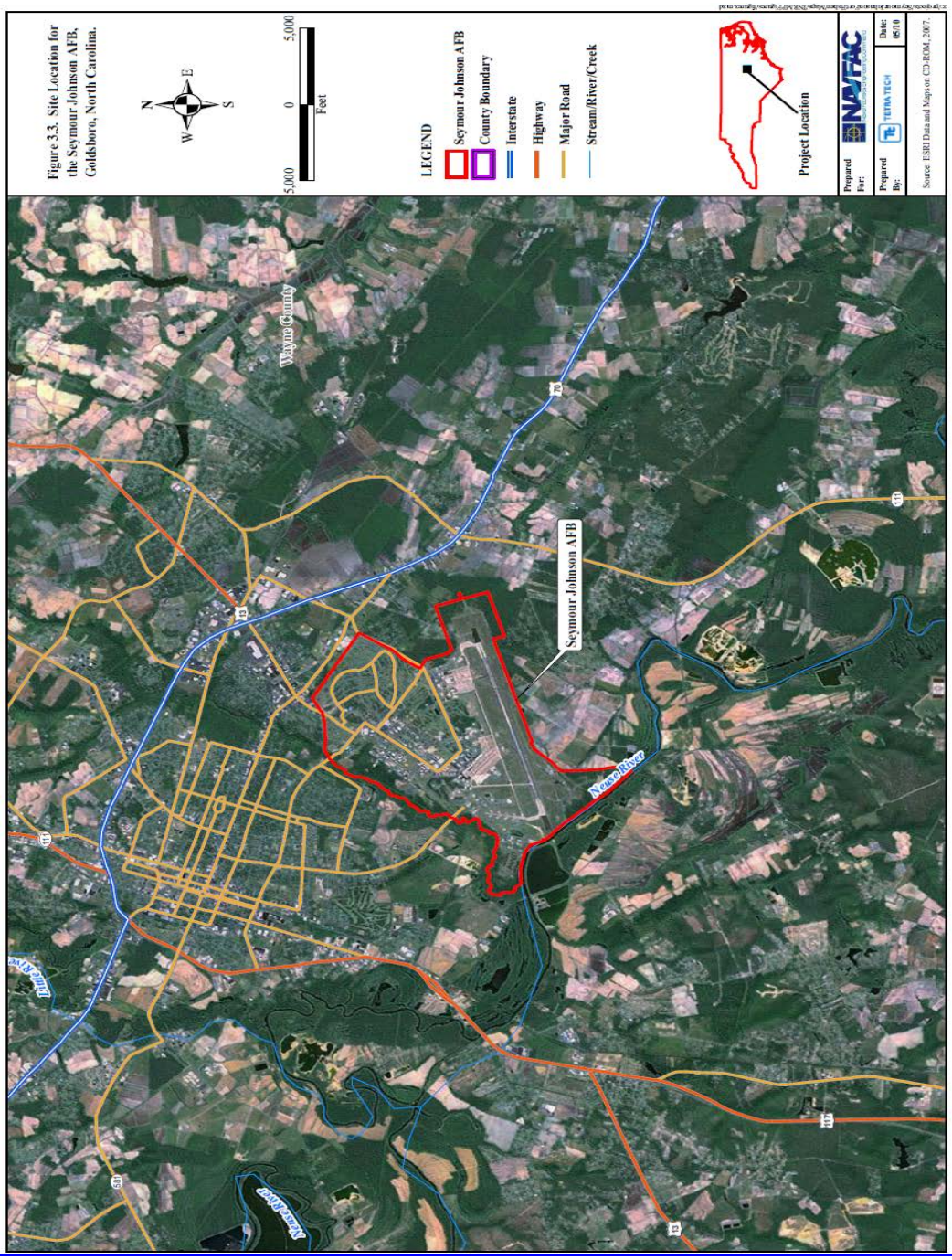
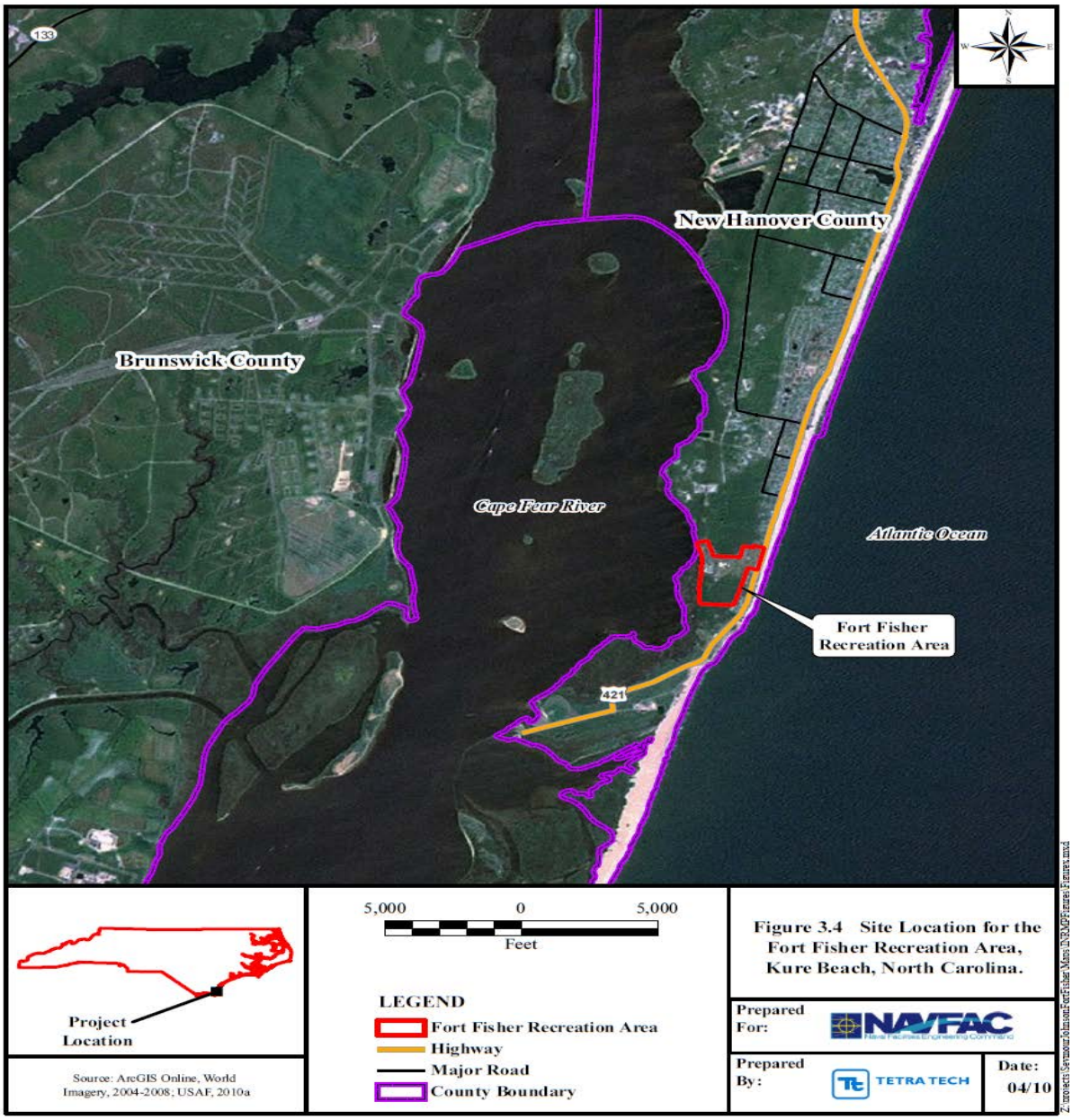


Figure 3-4. Site Location for the Fort Fisher Recreation Area, Kure Beach, North Carolina.



Seymour Johnson Air Force Base

No SNHAs were identified in the NCNHP Biennial Protection Plan, List of Significant Natural Heritage Areas for the USGS Southeast Goldsboro quadrangle map, in which SJAFB is located (NCDENR Natural Resources Planning and Conservation 2009).

Fort Fisher Recreation Area

Six SNHAs were identified in the Natural Heritage Program report for the USGS Kure Beach quadrangle, in which FFRA is located. These include five SNHAs that are of statewide importance (Significance B) because they contain similar ecological resources that are among the best in the State (NCDENR Natural Resources Planning and Conservation 2009). One SNHA listed for the Kure Beach area is considered to be of regional significance (Significance C) as it contains natural elements that may be represented elsewhere in the State by better quality examples. No nationally significant SNHAs (Significance A) were identified within the FFRA region, which are those natural areas that contain examples of natural communities, rare plant or animal populations, or geologic features that are among the highest quality, most viable or best of their kind in the nation; or clusters of such elements that are among the best in the nation. The statewide and regional SNHAs located in proximity to FFRA are described below.

SNHAs of Statewide Significance (Significance B)

Fort Fisher Coquina Outcrop

The coastal area of FFRA is situated in the Coastal Plain province of southeastern North Carolina, which is considered a low-relief plain that is underlain by beds of shallow-marine, estuarine, shoreline, and fluvial sediments (Florida Department of State, Division of Historical Resources 2000). These beds were formed as a result of numerous episodes of sea level rise and fall, associated with the late Pliocene and early Pleistocene eras. The coast along FFRA is host to a hard rocky outcrop of coquina rock. Coquina is classified as a medium to very coarsely grained fossiliferous sand to arenaceous fossiliferous limestone composed of an aggregate of broken shells, corals, and other organic debris (Florida Department of State, Division of Historical Resources 2000). Coquina has very limited distribution in southeastern North Carolina. Historically this type of rock was used in building homes and forts as it was able to sufficiently absorb cannon fire.

Lower Cape Fear River Aquatic Habitat

The Cape Fear River has an extensive drainage basin that represents the largest river basin in North Carolina, containing approximately 9,324 square miles, and 6,204 miles of streams (North Carolina State University 2010). The western boundary of FFRA represents a fractional part of the shoreline of the Cape Fear River (approximately 0.1 mile), and a small portion of a large, brackish marsh associated with the shore of the Cape Fear River is contained within the western boundary of FFRA.

The lower reach of the Cape Fear River is rich and diverse in terms of both habitat and wildlife. Abundant salt marsh habitat and lowland swamp forests are associated with the region located at the mouth of the estuary (Mallin 2010). The fresh-to-oligohaline tidal areas contain the only significant amount of tidal freshwater marsh in North Carolina. The estuary and freshwater tidal basin are important nursery areas for fish, and are considered to have good water quality. The Cape Fear River and Estuary serve as a migratory route for several anadromous fish populations, including the endangered shortnose sturgeon (*Acipenser brevirostrum*), striped bass (*Morone saxatilis*), American shad (*Alosa sapidissima*), and herring (*Clupea* spp.). Freckled blennies (*Hypsoblennius ionthas*), marked gobies (*Ctenogobius stigmaticus*), spinycheek sleepers (*Eleotris pisonis*), and opossum pipefish (*Microphis brachyurus*

lineatus) are other rare fish species associated with the Lower Cape Fear River system. The endangered West Indian manatee (*Trichechus manatus*) is an occasional visitor, especially in summer, and American alligators (*Alligator mississippiensis*) are present mainly in tributary streams.

Lower Cape Fear River Bird Nesting Islands

The islands that populate the lower reaches of the Cape Fear River, to the northeast, east, and southeast of FFRA, are home to many nesting bird species. Battery Island, a 100-acre National Audubon Society Sanctuary for example, supports North Carolina's largest colony of wading birds, including a large nesting colony of white ibis (*Eudocimus albus*) that represent approximately 10 percent of North America's white ibis population (North Carolina Audubon 2010). In response to the decline in the number of nesting sites for wading birds and seabirds, North Carolina Audubon established the North Carolina Coastal Islands sanctuary system to protect and restore vital nesting habitats for these birds. Initially the sanctuary was established at two islands in the lower Cape Fear River, and has since increased to include 19 islands that support thousands of nesting pairs of pelicans (*Pelacanus* spp.), herons and egrets (family Ardeidae), ibises (family Threskiornithidae), gulls (family Laridae), terns (family Sternidae), and black skimmers (*Rhynchops niger*).

Military Ocean Terminal at Sunny Point (MOTSU) Buffer Zone Natural Area

The 1,100-acre MOTSU is the largest ammunition port in the nation, and is the only port capable of handling containerized ammunition. Buffer areas associated with MOTSU border FFRA on the north and south and include occurrences of Coastal Fringe Evergreen Forest (CFEF).

Zeke's Island Estuarine Sanctuary

Zeke's Island Research Reserve (ZIRR or Reserve) is located in Brunswick and New Hanover counties, approximately 1 mile south of FFRA. ZIRR is part of the lower Cape Fear River region, which is associated with exemplary estuarine and ocean resources that have a long history of supporting the locally important commercial fishing industry.

ZIRR is a component of the North Carolina National Estuarine Research Reserve (NCNERR), which manages representative estuarine natural areas for research, education, and compatible recreational uses to improve coastal management decision-making. The Reserve also provides facilities and natural outdoor laboratories for use by scientists, educators, and the public. Participating agencies include National Oceanic and Atmospheric Administration (NOAA), Sanctuaries and Reserves Division (SRD) for federal funding and program oversight and the University of North Carolina at Wilmington for office space.

The Zeke's Island component of the NCNERR includes three islands: the Reserve site encompassing 42 acres of high ground located on Zeke's Island; 138 acres of upland on North Island; and 3 acres on No Name Island. All three of these islands have extensive marsh and tidal flat systems. The dune habitat located on the islands is dominated by sea oats (*Uniola paniculata*) that occur from the upper beach drift line back to the secondary dunes where they mix with other grasses and forbs to form a stable grassland. Shrub thicket and maritime forest consisting of live oak (*Quercus virginiana*), loblolly pine (*Pinus taeda*), wax myrtle (*Morella cerifera*), yaupon (*Ilex vomitoria*), and eastern red cedar (*Juniperus virginiana*) occur where salt spray and sea water flooding do not prohibit woody plant growth. The Reserve's extensive salt marshes are dominated by a mixture of cordgrass (*Spartina* spp.), saltgrass (*Distichlis spicata*), needlegrass rush (*Juncus roemerianus*), bushy seaside tansy (*Borrichia frutescens*), Virginia glasswort (*Salicornia depressa*), and sea lavender (*Limonium* sp.).

Fish, shrimp, crabs, clams, and oysters use the estuary as a nursery ground, and Atlantic populations of the federally threatened loggerhead sea turtle (*Caretta caretta*) occasionally nest on the beaches of the Reserve. The expanse of intertidal flats in the Zeke's Island area is one of the most important shorebird habitats in southeastern North Carolina. Seaside amaranth (*Amaranthus pumilus*), a federally threatened plant species, occurs on the upper beach and foredune habitat of ZIRR, and piping plover (*Charadrius melodus*), a federal and State threatened species, is also known to occur here.

SNHAs of Regional Significance (Significance C)

Fort Fisher State Recreation Area

Fort Fisher State Recreation Area (FFSRA) is located approximately 1 mile south of FFRA. FFSRA is operated by NCDENR Division of Parks and Recreation and receives over 100,000 visitors annually. FFSRA provides public access to the Atlantic Ocean and protects 16 threatened and endangered species (NCDENR, Division of Parks and Recreation 2010). During the warmer months of the year loggerhead sea turtles nest on ocean beaches, and seabirds including terns, plovers (family Charadriidae), and oystercatchers (*Haematopus* spp.) nest and forage within the sandy beach and salt marsh habitats. Large expanses of salt marshes dominated by *Spartina* spp. also provide food and shelter for a variety of fish, shellfish, and shorebirds. During the fall migration, warblers (family Parulidae), hawks (family Accipitridae), and peregrine falcons (*Falco peregrinus*) can be observed at the recreation area, and many species of ducks can be observed in the winter.

Environmental education programs provided by the recreation area offer information about protected species and other features of the park. The 4 miles of beach associated with the recreation area represents one of the few remaining undeveloped stretches of shoreline on North Carolina's coast where licensed four wheel drive vehicles are allowed access for surf fishing.

CHAPTER 4
PHYSICAL ENVIRONMENT

Seymour Johnson Air Force Base

SJAFB is located in the Coastal Plain region of North Carolina. The Coastal Plain river valley consists of a river floodplain and relict terraces of the river. In appearance and in practice SJAFB is much like a small, urbanized, and industrial town. Most of the land space at SJAFB has been developed to support the military mission and to support a variety of other human uses for the personnel stationed there. Aside from the developed area of the Base, small forested areas are present on the periphery of the Base on the north and west, and along the Neuse River and Stoney Creek along the northern boundary.

Fort Fisher Recreation Area

FFRA also is located in the Coastal Plain region of North Carolina. Natural and man-made features of the region include the following: the Cape Fear River estuarine system; the Atlantic Ocean; forests; Civil War archeological and historical sites; and developed tourist, recreational and residential areas. FFRA is relatively small in size and has been subject to active human use throughout its history (TNC and NCNHP, Division of Parks and Recreation 1994b).

4.1 CLIMATE

General climate and weather information was obtained from existing reports and from NOAA online resources.

Seymour Johnson Air Force Base

SJAFB is located in an area of North Carolina that has hot, humid summers and cool winters. Extreme annual variations in temperature are possible at SJAFB. Climate data collected by the NOAA National Environmental Satellite, Data, and Information Service for the period of 1971–2000 for the Goldsboro 4 SE Weather Station, North Carolina, are summarized in Table 2 (NOAA National Environmental Satellite, Data, and Information Service 2004). The lowest daily temperatures occur during December and January, and the hottest months are June, July and August. On average, January is the coldest month of the year with a daily mean temperature of 43.4 degrees Fahrenheit (°F), and July is the hottest month with a daily mean temperature of 81.2 °F (NOAA National Environmental Satellite, Data, and Information Service 2004). Normal rainfall in the area is approximately 51.5 inches per year. The wettest month is July with an average precipitation of 5.7 inches. The driest month is October with a mean precipitation of 3.1 inches.

Table 2. Weather Data Recorded at the Goldsboro 4 SE Weather Station, North Carolina for the Period of 1971–2000

Data Source	Jan	Feb	Mar	Apr	May	June	July
Daily Mean High Temp. (°F)	53.7	57.6	65.6	75.0	82.1	88.4	91.4
Daily Mean Low Temp. (°F)	33.0	35.4	41.6	49.7	58.4	66.4	71.0

Mean Precipitation (inches)	4.5	3.6	4.5	3.4	3.8	4.0	5.4
Mean Snowfall (inches)	1.2	1.4	0.4	0.0	0.0	0.0	0.0
Data Source	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	
Daily Mean High Temp. (°F)	89.3	84.3	74.9	66.3	57.1	73.8	
Daily Mean Low Temp. (°F)	69.6	63.5	50.7	42.6	35.5	51.5	
Mean Precipitation (inches)	5.7	5.3	3.1	3.2	3.4	49.8	
Mean Snowfall (inches)	0.0	0.0	0.0	Trace	0.5	3.5	

°F degrees Fahrenheit

Source: NOAA National Environmental Satellite, Data, and Information Service 2004.

Fort Fisher Recreation Area

The area of New Hanover County in which FFRA is located is hot and humid in the summer, although cool sea breezes frequently moderate the temperature. Winter is cool with brief occasional cold spells.

Climate data collected by the NOAA National Weather Service Forecast Office for Wilmington, North Carolina for the period of 1971-2000 are summarized in Table 3 (NOAA 2010). The lowest daily temperatures occur during December and January, and the hottest months are June, July and August. On average, January is the coldest month of the year with a daily mean temperature of 46.1 °F, and July is the hottest month with a daily mean temperature of 81.1 °F (NOAA 2010). Normal rainfall in the area is approximately 49.8 inches per year, and the wettest months are July and August, each with over 7 inches of rainfall on average. The driest month is October with a mean precipitation of 3.2 inches.

Table 3. Weather Data Recorded for Wilmington, North Carolina for the period of 1971–2000

Data Source	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**
Mean High Temp. (°F)	56.3	59.5	66.2	74.1	80.6	86.4	89.9
Mean Low Temp. (°F)	35.8	37.5	43.7	51.2	59.8	67.6	72.3
Mean Precipitation (inches)	4.5	3.7	4.2	2.9	4.4	5.4	7.6
Data Source	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	
Mean High Temp. (°F)	88.3	84.1	75.6	67.8	59.6	74.0	
Mean Low Temp. (°F)	71.0	65.9	53.9	45.1	38.1	53.5	

Mean Precipitation (inches)	7.3	6.8	3.2	3.3	3.8	57.1

°F degrees Fahrenheit

Source: NOAA 2010

4.1.1 Climate Change

Adaptive management strategies will be adopted, when developed, to address projected impacts of climate change as addressed in the most current National Climate Assessment (NCA3) for the Southeastern United State. At this time NCA3 lists only sea level rise as an impact of climate change in the southeast and adaptive strategies have not been fully developed.

4.2 TOPOGRAPHY

SJAFB and FFRA topography information was obtained from existing reports and online topography resources.

Seymour Johnson Air Force Base

Topography on the Base primarily is flat to gently rolling with elevations ranging from 48 feet to 121 feet above MSL; the highest areas occur in the central portion of the Base (Figure 2.5). The greatest relief within the perimeter of the Base is along Stoney Creek, which is a small, winding stream that defines the northwestern boundary. The SJAFB landscape includes the floodplain of the Neuse River, a higher relict terrace of the river, and an even higher terrace that is likely of riverine origin (TNC and NCNHP, Division of Parks and Recreation 1994a). The Neuse River forms the southwest boundary of the Base, and the valley associated with the river is asymmetric. Headwaters of the Neuse River originate near Danville, Virginia, and the river drains a very large watershed that extends from the upper Piedmont area of North Carolina to the Coastal Plain. The Neuse River eventually empties into Pamlico Sound, and periodically floods the south end of the flight line even though floods are now regulated by the Falls Dam, located in Raleigh, North Carolina.

Fort Fisher Recreation Area

FFRA is located in the Atlantic Coastal topographic province. The Recreation Area is located on a narrow north-south oriented peninsula located between the Cape Fear River and the Atlantic Ocean (Figure 2.6). FFRA is relatively flat, with elevations ranging between 2 and 20 feet above MSL, which is generally lower than the rest of New Hanover County with general elevations ranging between 20 and 40 feet above MSL.

Parts of the peninsula have high relict dunes that form irregular sandhills, whereas the topography in other areas has a more subdued topography consisting of irregular low ridges and swales (TNC and NCNHP, Division of Parks and Recreation 1994b). Landscape features within this topographic province include relic sand ridges, coastal bottom lands and uplands, and some small, shallow sinks within the interior of the province. Coastal areas consist of beaches, tidal marshes, and shallow sounds lying between barrier beaches and the mainland. Interior portions of FFRA near the FAA radar facility are poorly drained and flat, while the southern portion of FFRA is well drained and has greater topographic relief.

4.3 GEOLOGY AND SOILS

Geology information for SJAFB and FFRA was obtained from existing reports and from online resources.

Seymour Johnson Air Force Base

SJAFB is located in the Coastal Plain Province geologic unit of North Carolina (TNC and NCNHP, Division of Parks and Recreation 1994a). Sediments of the Coastal Plain comprise mainly Quaternary and Tertiary sediments overlying about 130 feet of Cretaceous marine sediments (USAF 1995). Surficial deposits in the area consist of the Holocene Goldsboro Sands and Pliocene Sunderland Formation.

Fort Fisher Recreation Area

Fort Fisher is located in the Southern Coastal Plain of North Carolina, which has a general southeastern sloping topography, with a wedge of thickening sediments and rocks that date from the Cretaceous period and overlie a complex of Paleozoic rocks (NCDENR 2006). The sediment wedge includes layers of sand, clay, silt, limestone, gravel, shell material, or combinations of these ranging in thickness from 0 to more than 1,515 feet thick.

Soils information for SJAFB and FFRA was obtained from existing reports and from U.S. Department of Agriculture, (USDA NRCS).

Seymour Johnson Air Force Base

A total of 23 soil types are present at SJAFB, and are dominated by Rains sandy loam, Johns sandy loam, Wagram loamy sand (0–6% slopes), and Norfolk loamy sand (0–2% slopes) (Figure 4.1). A summary of these soil types, including drainage class, acreage, and % total of SJAFB acreage, is provided in Table 4. Total soils acreage does not agree with the total site acres due to the presence of water not accounted for in the table. Table 4 reports the percent total of soils based on 3192.5 acres of soils.

Table 4. USDA NRCS Soil Types for Seymour Johnson AFB, Goldsboro, North Carolina

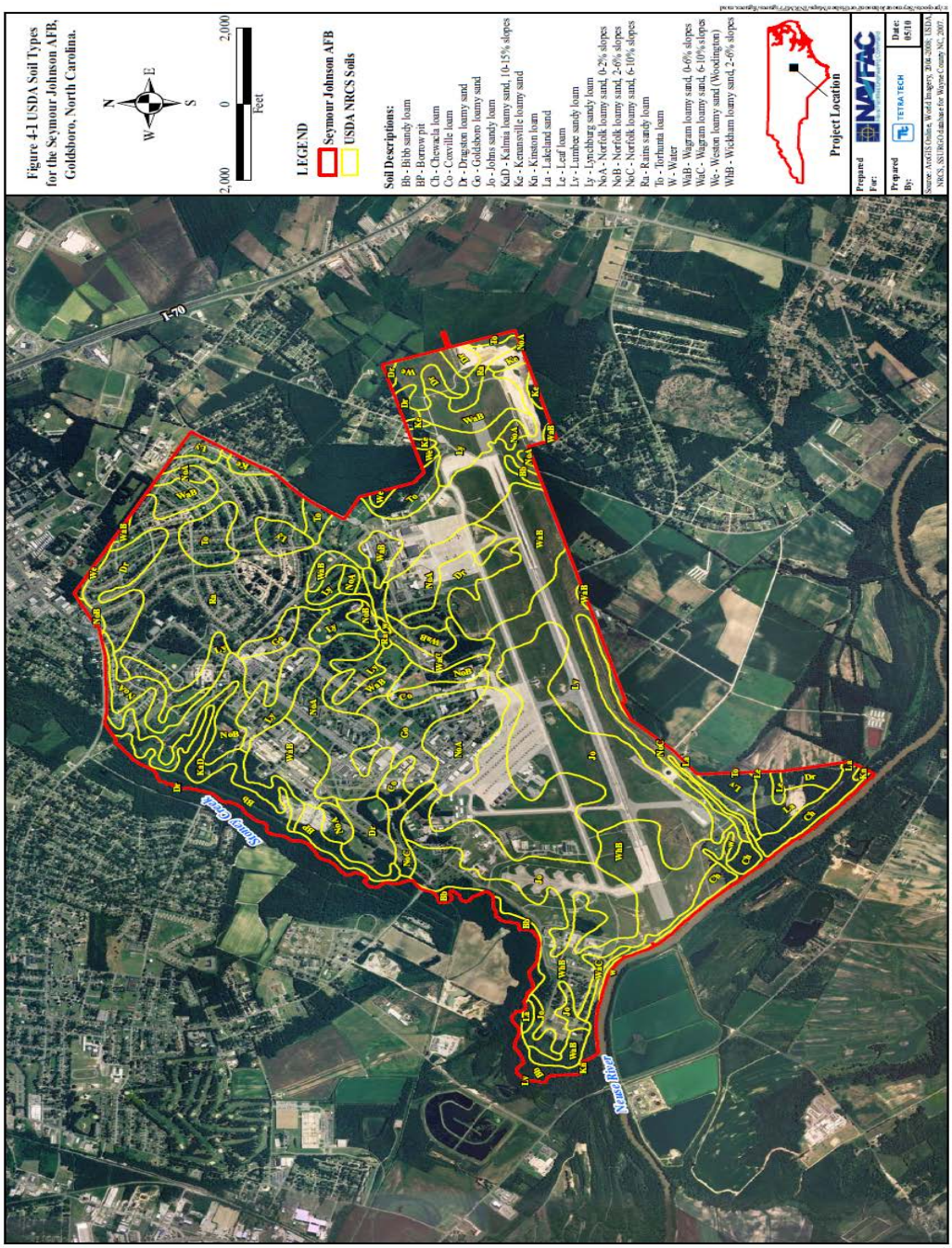
Map Unit Symbol	Soil Series	Drainage Class	Area (Acres)	Percent Total
Ra	Rains sandy loam	Poorly drained	489.8	15.3
Jo	Johns sandy loam	Somewhat poorly drained	392.6	12.3
WaB	Wagram sandy loamy sand, 0–6% slopes	Well drained	341.5	10.7
NoA	Norfolk loamy sand, 0–2 % slopes	Well drained	318.4	10.0
Lv	Lumbee sandy loam	Poorly drained	306.6	9.6
WhB	Wickham loamy sand, 2–6 % slopes	Well drained	231.5	7.3

Map Unit Symbol	Soil Series	Drainage Class	Area (Acres)	Percent Total
Ly	Lynchburg sandy loam	Somewhat poorly drained	185.2	5.8
Dr	Dragston loamy sand	Somewhat poorly drained	182.2	5.7
Bb	Bibb sandy loam	Poorly drained	100.3	3.1
NoB	Norfolk loamy sand, 2–6 % slopes	Well drained	95.5	3.0
Go	Goldsboro loamy sand	Moderately well drained	85.9	2.7
To	Torhunta loam	Very poorly drained	72.1	2.3
NoC	Norfolk loamy sand, 6–10 % slopes	Well drained	66.7	2.1
Ch	Chewacla loam	Somewhat poorly drained	64.1	2.0
KaD	Kalmia loamy sand,10–15% slopes	Well drained	59.8	1.8
WaC	Wagram loamy sand, 6–10 % slopes	Well drained	45.0	1.4
We	Weston loamy sand (Woodington)	Poorly drained	39.4	1.2
La	Lakeland sand	Excessively drained	34.4	1.0
Co	Coxville loam	Poorly drained	31.6	1.0
Ke	Kenansville loamy sand	Well drained	22.3	1.0
BP	Borrow pit	Well drained	21.5	1.0
Le	Leaf loam	Poorly drained	4.9	< 1.0
Kn	Kinston loam	Poorly drained	1.2	< 1.0
Total			**3192.5**	**100%**

1

2

Figure 4-1 USDA Soil Types for the Seymour Johnson AFB Area, Goldsboro, North Carolina.



Fort Fisher Recreation Area

A total of six soil types are present at FFRA, with Urban land representing the dominant soil type (Figure 4-2). A summary of these soils types, including drainage class, acreage, and % total of FFRA acreage is provided in Table 5.

Over 53% of FFRA soils are identified as Urban land (Ur), which defines areas where the original soil has been cut, filled, graded, or paved so that most soil properties have been altered to the extent that a soil series is not recognized. Soils classified as Urban land are associated with a majority of the actively used

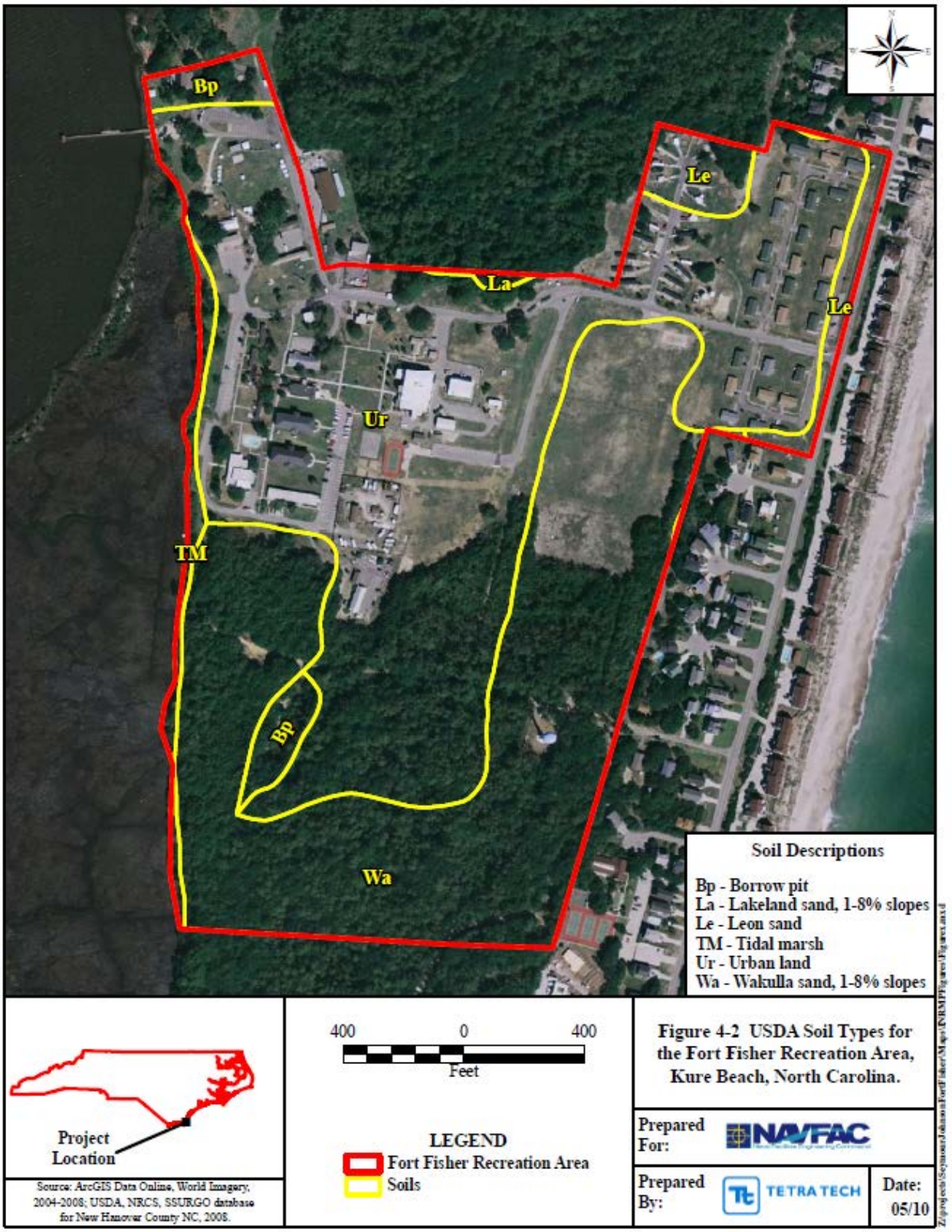
portion of the Recreation Area. Approximately 38% of FFRA soils are Wakulla sand (1–8% slopes), and this soil type is located in a wide band adjacent to the eastern, southern, and southwestern boundary. The remaining soil types, which comprise 3.5% or less of the soils at FFRA, include Leon sand, Borrow pit, Tidal marsh, and Lakeland sand (1–8 % slopes).

Table 5. USDA NRCS Soil Types for Fort Fisher Recreation Area.

Map Unit Symbol	Soil Series	Drainage Class	Area (Acres)	Percent Total
Ur	Urban land	~	53.2	53.8
Wa	Wakulla sand, 1–8% slopes	Somewhat excessively drained	37.8	38.2
Le	Leon sand	Poorly drained	3.5	3.5
Bp	Borrow pit	Well drained	2.6	2.7
TM	Tidal marsh	Very poorly drained	1.68	1.7
La	Lakeland sand, 1–8% slopes	Excessively drained	< 1.0	< 1.0
Total			**98.9**	**100**

Source: USDA NRCS 2008.

Figure 4-2 USDA Soil Types for the Fort Fisher Recreation Area, Kure Beach, North Carolina.



4.4 HYDROLOGY

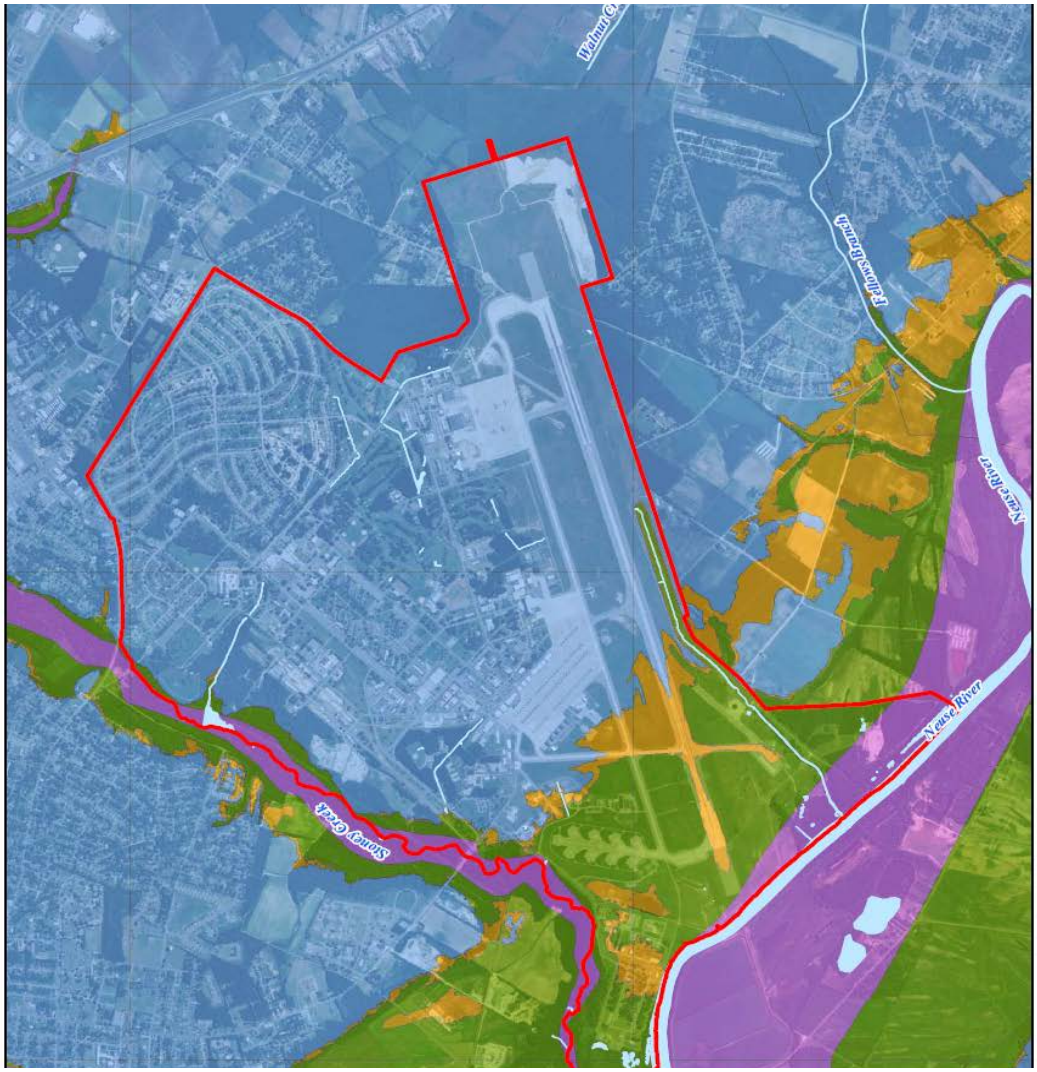
Water resources described in this section include surface waters and stormwater runoff, groundwater and floodplains. Information provided was obtained from existing reports or from USGS and NCDENR online resources.

Surface Waters and Stormwater Runoff

Seymour Johnson Air Force Base

SJAFB is located within the Neuse River–Stoney Creek watershed. Stormwater runoff from the Base is received by Stoney Creek, the Neuse River, and an unnamed tributary of the Neuse River (Figure 4-3). Narrow drainages and stormwater collection basins are located north of the airfield, south of the Base housing area, and near the northwestern boundary. No stormwater flow or water quality data for waters discharged into these waterbodies have been collected for SJAFB. The Base also contains several wetland areas along the northwestern and southwestern boundaries that are described in Section 5.4, and an impoundment associated with the Base golf course that is described in Section 5.5.

Figure 4-3 FEMA Flood Zone and Water Resources for the Seymour Johnson AFB, Goldsboro, North Carolina.



The SJAFB Stormwater Pollution Prevention Plan (SWP3) describes 15 drainage basins and their outfalls, and states that there are no "significant run-on points" of water entry at SJAFB (USAF 2009a). The SJAFB General Plan describes the SJAFB stormwater drainage system as consisting of an extensive series of swales and ditches, pipes, and other structures (USAF 2008).

The CWA (55 Federal Register 48062-48901) and 40 Code of Federal Regulations (CFR) Parts 122, 123, and 124 requires owners of "facilities that discharge storm water associated with industrial activity" to apply for a National Pollution Discharge Elimination System (NPDES) permit if storm water is discharged to: (1) waters of the U.S., or (2) separate storm sewer systems. The Base currently has a NPDES permit (#NC0063177) for discharging stormwater into the Neuse River, Stoney Creek, and an unnamed tributary to Stoney Creek. The following categories of facilities have been identified at SJAFB that are considered to engage in industrial activity, and are subject to the requirements of the CWA and 40 CFR 122:

- Hazardous waste treatment, storage, or disposal facilities;
- Landfills, land application sites, and open dumps;

- Recycling facilities; and,
- Transportation facilities with vehicle maintenance shops, equipment cleaning operations, or airport de-icing operations.

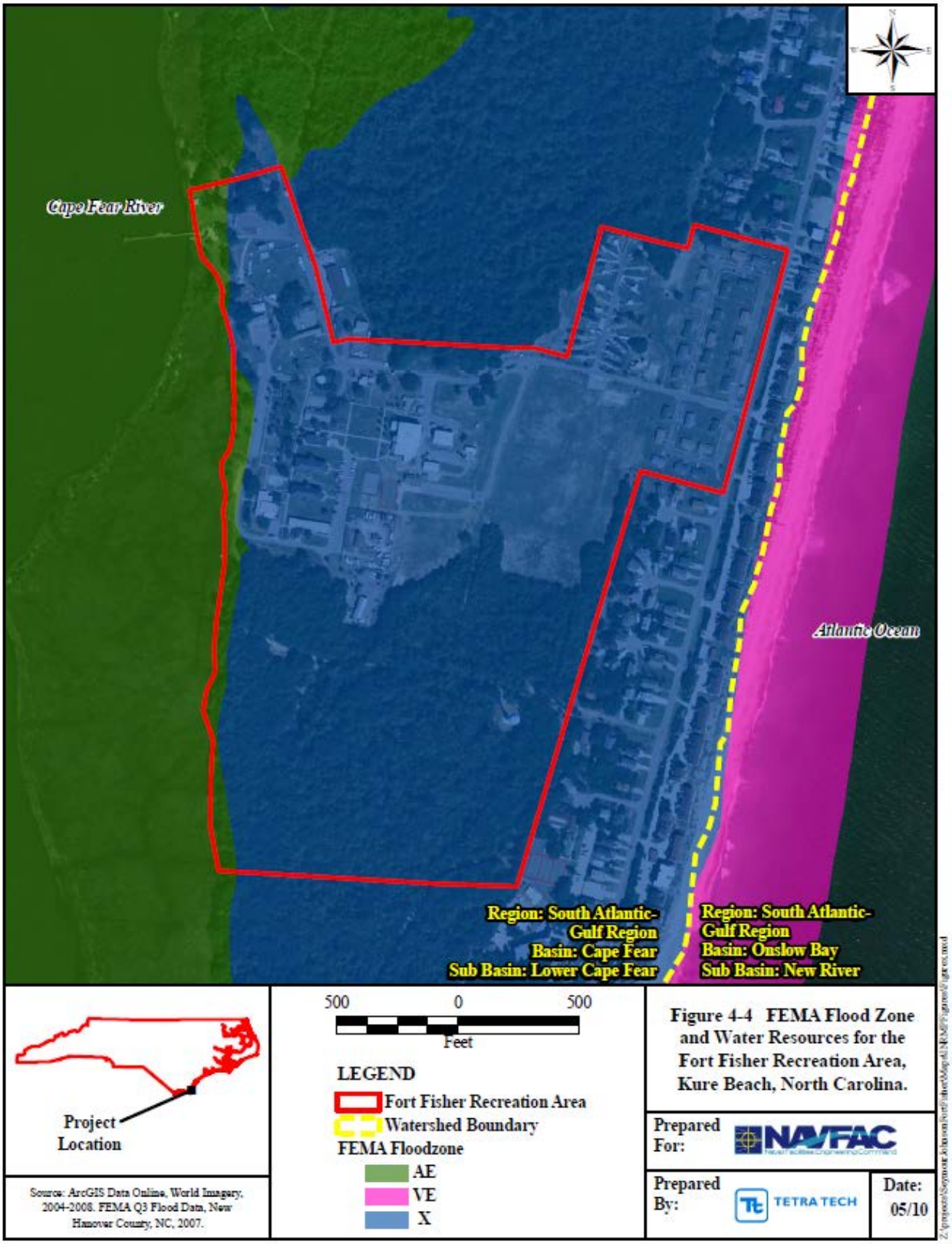
The SJAFB SWP3 reports that most of the regulated activities at SJAFB fall under transportation facilities (USAF 2009a), and examples include refueling, aircraft maintenance, vehicle maintenance, materials handling, and fire protection training exercises. Monitoring requirements of the NPDES permit include sampling for flow, oil and grease, and turbidity.

Fort Fisher Recreation Area

FFRA is located in the Lower Cape Fear subbasin of the Cape Fear Watershed, and is bounded on the west by the Cape Fear River (Figure 4-4). The Atlantic Ocean is located less than 500 feet west of FFRA. There are no streams or ponds within the Recreation Area boundaries, and surface water is limited to a few wetland areas. Several small streams and the intracoastal waterway Snow's Cut are located north of the installation.

A SWP3 has not been prepared for FFRA due to the lack of stormwater facilities that are present. There is no industrial activity or point sources of water pollution at FFRA that are associated with the discharge into waters of the U.S. that would require coverage by an NPDES permit. Wastewater at the Recreation Area is collected and treated by the City of Kure Beach, North Carolina.

Figure 4-4 FEMA Flood Zone and Water Resources for the Fort Fisher Recreation Area, Kure Beach, North Carolina.



4.4.1 Groundwater

Seymour Johnson Air Force Base

Water used for industrial activities and domestic uses on the Base is provided by the City of Goldsboro.

There are three principal aquifers located beneath SJAFB (USAF 1995). Surficial deposits of the Goldsboro sand and Sunderland formation contain the uppermost aquifer. These sediments rest unconfined atop the Black Creek Aquifer. The Cape Fear formation, which contains the Cape Fear Aquifer, is located beneath the Black Creek formation.

Flow in the surficial aquifer is influenced primarily by topography. The overall direction of flow in the surficial aquifer on the Base is from the higher central portion of the installation northwest into Stoney Creek, west-southwest into the Neuse River, or south into the southern drainage ditch. Groundwater occurs at shallow depths within the surficial deposits (USAF 1995).

The nearest USGS groundwater monitoring well is located in Wayne County near Grantham, North Carolina, approximately 15 miles west of the Base (USGS 2010). This well is associated with a surficial aquifer system, and has been monitored by USGS since 1980 as part of their climatic-effects network. The highest level of water recorded at this station was 0.04 feet above the land surface in 1989, and the lowest water level recorded was approximately 8.7 feet below the land surface in 1997 (USGS 2009a). The mean water level in this well for water year 2009 (i.e., October 2008 – September 2009) was 2.42 feet below the land surface.

Fort Fisher Recreation Area

The area of New Hanover County where FFRA is located contains the surficial water table and the Castle Hayne Aquifer (NCDENR 2006). The surficial aquifer is not confined between bedrock layers, and groundwater levels in this aquifer fluctuate much more than the lower underlying Castle Hayne Aquifer. The barrier island area region in which FFRA is located is estimated to have a groundwater recharge rate of between 17 and 20 inches per year (NCDENR 2006). Based on ground well monitoring data, the underlying Castle Hayne Aquifer is thought to have a similar rate of groundwater recharge. Municipal supplies of water are pumped from the Castle Hayne Aquifer, which supplies waters to many of the beach towns of the FFRA area.

A groundwater well associated with the surficial aquifer is located in Brunswick County near Southport, North Carolina, approximately 8 miles southwest of FFRA (USGS 2009b). This well has been monitored by NCDENR since 1970 as part the Brunswick County groundwater monitoring program. The highest level of water recorded at this station was 0.13 feet below the land surface in 1999, and the lowest water level recorded was approximately 11.36 feet below the land surface in 1977. The mean water level in this well for water year 2009 (i.e., October 2008 – September 2009) was 6.41 feet below the land surface.

4.4.2 Floodplains

Floodplains are defined in AFI 32-7064 as lowland or flat areas adjoining inland and coastal waters that have a 1 percent or greater chance of flooding in any given year. The floodplains associated with SJAFB and FFRA are described below, and additional floodplain information and maps can be obtained online from the North Carolina Floodplain Mapping Information System (http://www.ncfloodmaps.com).

Seymour Johnson Air Force Base

SJAFB is located in the Neuse River Watershed, which includes Stoney Creek. The western end of the airfield is located in the Neuse River Floodplain, and this area is subject to periodic floods, with floodwaters inundating the western end of the airfield and surrounding alert apron.

A majority of the Base (3,242 acres) is located in Federal Emergency Management Association (FEMA) flood zone X (Figure 4-3), which is defined as an "area of minimal flood hazard, usually depicted on flood insurance rate maps (FIRMs) as above the 500-year flood level," and defines the area determined to be outside the 500-year flood zone and protected by levees from 100-year floods (FEMA 2007). Much of the area subject to periodic flooding from the Neuse River is located in flood zone AE, which are floodplain areas for which FEMA provides base flood elevations on FIRM maps. The area located near the northwestern boundary and Stoney Creek is also located in flood zone AE. Approximately 557 acres of SJAFB is located in flood zone AE. Small pockets of flood zone Shaded X, totaling approximately 146 acres, are located in the southwestern section of the Base. Shaded X are flood zone areas defined by FEMA as having a moderate flood hazard, and are usually located between the limits of the 100-year and 500-year floods. Much of the area of SJAFB located immediately adjacent to the Neuse River and Stoney Creek (approximately 174 acres) are located in flood zone AEFW, which are 100-year floodway areas that include the channel of a river or other watercourse and adjacent land areas that must be reserved for discharging the base flood without cumulatively increasing the water-surface elevation by more than a designated height (North Carolina Flood Mapping Program Definitions 2010).

Fort Fisher Recreation Area

A majority of the Recreation Area (approximately 94 acres) is located in FEMA flood zone X (Figure 4-4), which is defined as an "area of minimal flood hazard, usually depicted on flood insurance rate maps (FIRMs) as above the 500-year flood level," and defines the area determined to be outside the 500-year flood zone and protected by levees from 100-year floods (FEMA 2007; see map reference). The potential for flooding at FFRA exists from both the Cape Fear River and the storm surges from the Atlantic Ocean. The area along the coastline of the Atlantic Ocean is designated as flood zone VE, which is defined as coastal areas with a 1 percent or greater chance of flooding, which also have the additional hazard associated with storm waves. The approximately 4-acre strip of FFRA land located along the Cape Fear River is designated as flood zone AE, which is a floodplain areas for which FEMA provides base flood elevations on FIRM maps.

CHAPTER 5
ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 VEGETATION

Natural community and vegetation information was obtained from the natural resources survey conducted at both installations in 1994 USAF 1994a and 1994b), and from other existing reports and online resources.

5.1.1 Natural Communities

TNC and the NCNHP, Division of Parks and Recreation conducted a natural resource survey of SJAFB and FFRA in 1994, which included identification and mapping of the natural community types present at each installation (USAF) (1994a and 1994b). Although the 1994 surveys mapped the natural communities at each installation, geographic information systems (GIS) data were not available for the purpose of creating natural community maps for inclusion in this INRMP, and the general descriptions provided in this section are based on the species and location information as described in the 1994 reports.

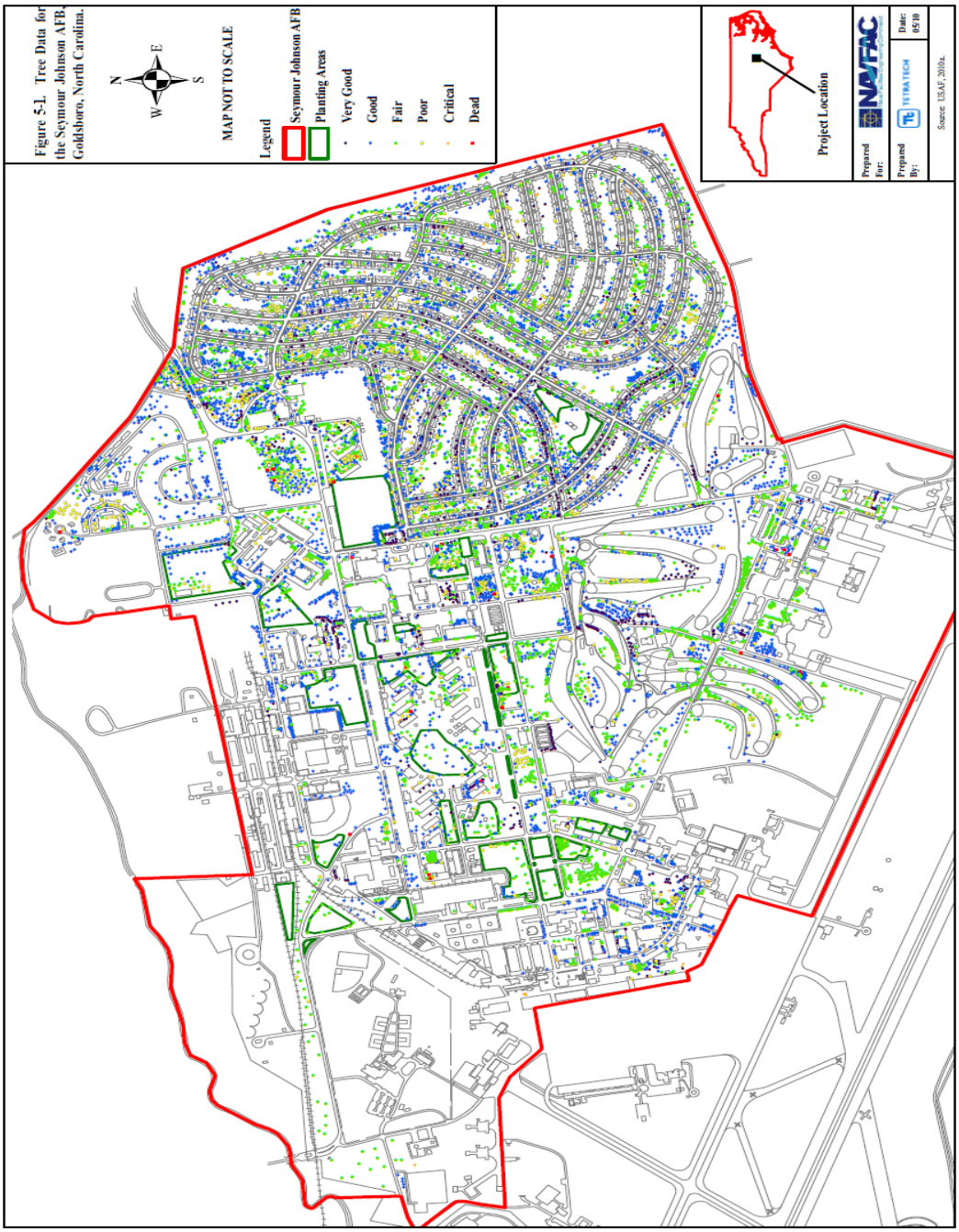
Seymour Johnson Air Force Base

SJAFB is located in the Southeastern Plains ecoregion of North Carolina (Griffith *et al*. 2002). The Southeastern Plains ecoregion consists of irregular shaped plains with broad interstream areas that contain agricultural lands and pastures, woodlands, and forests

Surveys of the natural communities occurring on the Base are limited to a natural resources survey conducted in 1994 (USAF 1994) and a tree survey conducted as part of the Urban Forest Management Plan (UFMP) that was prepared for the Base (USAF 1999). The 1994 survey focused on mapping the natural communities present at the Base, and the Urban Forest Management Plan was limited to an inventory of tree species. As such a comprehensive list of all plants, to include aquatic, herbaceous, and shrub vegetation, occurring at SJAFB is not available.

A total of 10,307 trees were inventoried as part of preparation of the UFMP (USAF 1999 and Figure 5-1). The most common tree species identified was loblolly pine (39 percent), followed by sweetgum (*Liquidambar styraciflua*) (8 percent), crapemyrtle (*Lagerstroemia indica*) (7 percent), willow oak (*Quercus phellos*) (6 percent), and ornamental pear (*Pyrus* sp.)

Figure 5-1 Tree Data for the Seymour Johnson AFB, Goldsboro, North Carolina.



(5 percent). Other species documented include flowering dogwood (*Cornus florida*), red maple (*Acer rubrum*), water oak (*Quercus nigra*), longleaf pine (*Pinus palustris*), and southern red oak (*Quercus falcata*); the survey also documented 29 dead trees and three stumps.

Tree data shown in Figure 5-1 includes the following classification of each of the trees surveyed as provided in the UFMP (USAF 199).

- Very Good: No significant structural problems or evidence of damage due to disease, pests, or mechanical and chemical conflicts. Exhibits superior growth characteristics with a full balanced crown.

- Good: No major structural problems, or significant damage due to diseases, pests, or mechanical damage. Full balanced crown and normal twig elongation and vitality for the species.

- Fair: Exhibits some of the following characteristics:
    - Minor structural problems and/or mechanical damage,
    - Significant damage from non-fatal or disfiguring diseases,
    - Minor canopy imbalance or a thin crown,
    - Minor structural imbalance, or
    - Stunted growth compared to adjacent plants.

  This condition also includes trees that were inappropriately topped or headed-back, but currently show reasonable vitality and no obvious signs of decay.

- Poor: Appears unhealthy or has a serious structural defect, significant mechanical or chemical damage, extensive decay, and/or crown dieback. May respond to appropriate intensive management procedures.

- Critical: Appears very unhealthy, or has a severe structural defect, very serious chemical or mechanical damage, advanced wood decay, total crown dieback, or failing life processes. Will not respond to maintenance procedures.

- Dead: Refers only to dead trees.

The 1994 natural resources survey of SJAFB identified the remnants of five natural community types (USAF 1994a), described below. All of the natural communities associated with SJAFB were listed as degraded, with the exception of a portion of the Coastal Plain Bottomland Hardwoods (Brownwater Subtype), which was listed to be of fair quality. The natural community descriptions used in the following summaries follows NCDENR Natural Heritage Program classification (Schafale and Weakley 1990).

Coastal Plain Bottomland Hardwoods (Brownwater Subtype)

Coastal Plain Bottomland Hardwoods of the Brownwater Subtype are associated with abandoned levees and point bar ridges, terraces, and other relatively high parts of the floodplain, and are located away from the active channel area of brownwater rivers (Schafale and Weakley 1990 and USAF 1994a). This palustrine community is seasonally to intermittently flooded, and is characterized with a closed forest canopy of a mixture of bottomland oak species. This natural area is dominated by a willow oak, laurel oak (*Quercus laurifolia*), and other hardwoods. Bald cypress (*Taxodium distichum*) is abundant, and with the occasional loblolly pine, sweetgum, red maple, and water hickory (*Carya aquatica*) present. The understory is comprised of American hornbeam (*Carpinus caroliniana*), common persimmon (*Diospyros virginiana*), red mulberry (*Morus rubra*), and canopy species. Possumhaw (*Ilex decidua*) is the dominant shrub, with smallspike false nettle (*Boehmeria cylindrica*), cypress swamp sedge (*Carex joorii*), cattail sedge (*C. typhina*), and whitegrass (*Leersia virginica*) present within the herbaceous layer.

A small area of relatively intact Coastal Plain Bottomland Hardwoods occurs in the southeastern corner of SJAFB, and is associated with Chewacla soils, with small inclusions of Bibb soils (Figure 4-1 and USAF 1994a).

Coastal Plain Small Stream Swamp (Blackwater Subtype)

The Coastal Plain Small Stream Swamp of the Blackwater Subtype is a palustrine system associated with floodplains of small brownwater streams that have separate fluvial features (Schafale and Weakley 1990). The associated vegetation zones are typically too small or poorly developed to be distinguished at the natural community level. The vegetative composition of this natural community type is a closed forest typically dominated by a mixture of wetland oaks, other hardwoods, loblolly pine, and bald cypress. At SJAFB this community is dominated by red maple and sweetgum, with water oak abundant. Understory species is dominated by swamp bay (*Persea palustris*), and the shrub layer is dominated by switchcane (*Arundinaria gigantea* ssp. *tecta*). Herbs are sparse.

Some degraded examples of Coastal Plain Small Stream Swamp of the Blackwater Subtype are present at SJAFB (TUSAF 1994a).

Coastal Plain Levee Forest (Brownwater Subtype)

This natural community type is associated with natural levee and point bar ridge deposits that are located adjacent to channels of brownwater (alluvial) rivers (Schafale and Weakley 1990). Brownwater rivers, in comparison to blackwater rivers, generally have a heavy sediment load, have higher pH, have relatively low concentrations of total organic carbon, and have high concentrations of dissolved organic material. This palustrine community type is seasonally to intermittently flooded and is dominated by a closed forest canopy consisting of various bottomland hardwood species.

The vegetative composition of this natural community is dominated by a diverse mixture of hardwoods, with the occasional loblolly pine (USAF 1994a). Characteristic species include American sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), laurel oak, sweetgum, green ash, (*Fraxinus pennsylvanica)* and sugarberry (*Celtis laevigata*). Understory species typically include box elder (*Acer negundo*), red maple, pawpaw (*Asimina triloba*), and American holly (*Ilex opaca*).

A small degraded area of Coastal Plain Levee Forests of the Brownwater Subtype is located in the southeastern corner of SJAFB, and is associated with Chewacla soils (Figure 4-1 and USAF1994a).

Cypress–Gum Swamp (Brownwater Subtype)

Cypress–Gum Swamp of the Brownwater Subtype is associated with backswamps, sloughs, and other areas that are flooded for long periods, occurring within the floodplain of brownwater rivers (Schafale and Weakley 1990). This palustrine community is seasonally to semipermanently flooded, and consists of a closed canopy forest dominated by bald cypress, water tupelo (*Nyssa aquatica*), and swamp tupelo (*Nyssa biflora*). Water ash is generally the dominant understory species, with a sparse layer of shrubs and herbs present.

A small degraded area of this natural community is present at SJAFB (USAF 1994a).

Mesic Mixed Hardwood Forest (Coastal Plain Subtype):

Mesic Mixed Hardwood Forests of the Coastal Plain Subtype are associated with mesic upland areas that are protected from fire (Schafale and Weakley 1990). This low elevation mesic forest type primarily occurs on north facing river bluffs and ravine slopes, and less commonly is found on upland flats or islands surrounded by peatland or swamps. The closed canopy forests within this community at SJAFB are dominated by loblolly pine, sweetgum, water oak, and southern red oak. The understory includes water oak and sweetgum, and shrubs include common sweetleaf (*Symplocos tinctoria*) and wax myrtle. Japanese honeysuckle (*Lonicera japonica*), an invasive species, is also abundant within this natural

community at the Base. Weedy herbaceous species are present as well as the occasional woodland species such as moccasin flower (*Cypripedium acaule*).

Small degraded areas of this natural community occur along Stoney Creek near the northwestern boundary, with another area of occurrence tentatively identified on the middle terrace located in the southeastern corner of the Base (USAF 1994a). At SJAFB this natural community is associated with Kalmia soils (Figure 4-1).

Fort Fisher Recreation Area

FFRA is located in the Middle Atlantic Coastal Plain ecoregion of North Carolina (Griffith *et al.* 2002). This ecoregion encompasses portions of North and South Carolina and other states to the north (Griffith *et al*. 2008). Topography of the ecoregion generally consists of flat plains, containing many swamps, marshes and estuaries, located at low elevations. The historical forest cover of the region was dominated by longleaf pine in North and South Carolina, but is now mostly dominated by loblolly pine, some shortleaf pine (*Pinus echinata*), and with patches of oak, gum, and cypress along major streams. The low terraces, marshes, dunes, barrier islands, and beaches of the ecoregion are underlain by unconsolidated sediments. Poorly drained soils are common, with a mix of coarse and finer textured soils occurring regionally.

All of the upland area of FFRA essentially is developed, with very little natural vegetation remaining. Development of the FFRA installation was associated with the bulldozing and clearing of the natural vegetation, and the vegetative cover that does exist is primarily associated with landscaping of building areas, parking lots, and lawns, with some minor associations of natural vegetation occurring in roadside ditches. Much of the developed area that is vegetated consists of mowed grass and ground cover such as turkey tangle fogfruit (*Phyla nodiflora*). Fogfruit is the host plant for the phaon crescent butterfly (*Phyciodes phaon*) (USAF 1994b), a species formerly listed as rare species in North Carolina.

A tree survey of the developed area of FFRA categorized trees according to size (Figure 5-2). A total of 87 trees were documented within the developed portion of FFRA, including a few extra large trees located in the central portion of the Recreation Area (USAF 2010a). Extra-large (>30 inches), large (18–30 inches), medium (6–18 inches), and small (<6 inches) trees were relatively evenly distributed throughout the study area.

The 1994 survey of FFRA identified one community type, Brackish Marsh, at FFRA (USAF 1994b). Although CFEF habitat does not occur within the Recreation Area boundary, this habitat is located adjacent to the northern and southern boundaries, and is described in this section due to its close proximity to FFRA, its significance regionally, and to identify the need to consider how Recreation Area activities and proposed development may impact this habitat.

Brackish Marsh:

Brackish Marsh habitat at FFRA is located along the western boundary near the Cape Fear River (USAF 1994b). Extensive areas of Brackish Marsh habitat are located throughout northeastern North Carolina, however in the southeastern section of North Carolina where FFRA is located, the extent of Brackish Marsh habitat tends to be smaller and more localized. Brackish marshes normally grade inland to swamp, pocosin, or upland communities.

The 1994 survey identified the small area of Brackish Marsh habitat at FFRA to be of fair quality, despite its proximity to development along the upland edge (USAF 1994b). Historically this marsh habitat

bordered the CFEF habitat to the north, but is now bordered by developed land. The marsh has estuarine hydrology and is regularly flooded by brackish tidal waters. This regular flooding by brackish water can input nutrients from seawater and river sediment, however the occasional storm surges may cause natural disturbance to vegetation, resulting in the deposition of mats of dead plant material, which may impact or kill underlying vegetation.

The Brackish Marsh habitat at FFRA consists of dense, herbaceous vegetation dominated by black needlerush (*Juncus roemerianus*), with smaller patches along the inland edge and adjacent to the river dominated by big cordgrass (*Spartina cynosuroides*). A few high areas located adjacent to the river contain clumps of southern red cedar and loblolly pine.

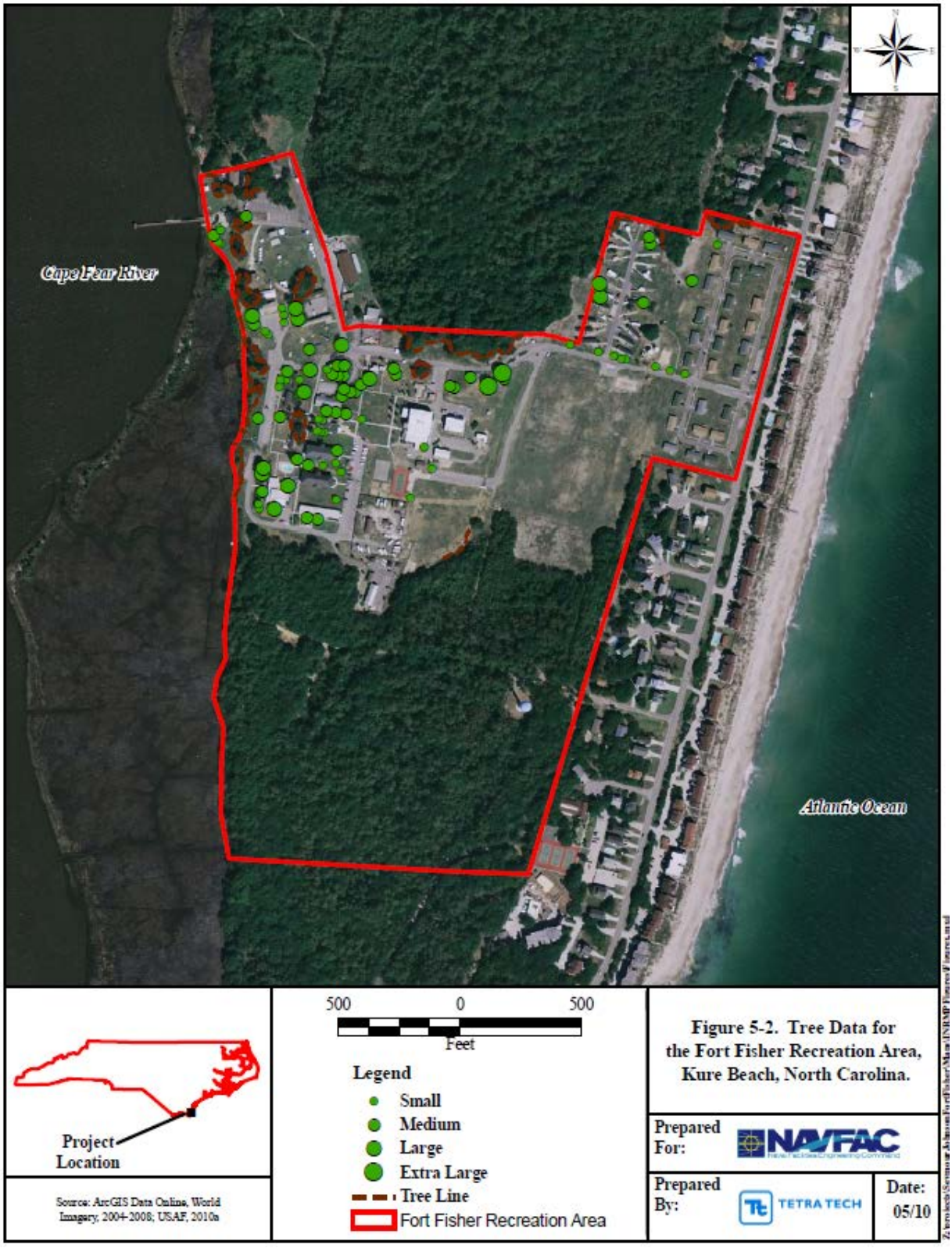
Coastal Fringe Evergreen Forest (CFEF):

Although CFEF habitat does not occur within the FFRA boundary, it does occur adjacent to FFRA on both the north and the south ends of the site, within the buffer properties managed by MOTSU. Due to the rarity of CFEF, all examples larger than a few acres, and even young maturing examples, are regarded as significant (USAF 1994b). The two occurrences of CFEF located adjacent to FFRA are among the best examples in the State and likely contain habitat that would support rare species.

The occurrence of the CFEF located to the south of FFRA appears to be transitional between CFEF and Maritime Evergreen Forest, with a gradient observed extending across the peninsula (USAF 1994b). This transitional association is not known to exist elsewhere in the State. The occurrence of CFEF adjacent to the northern boundary is located farther from the ocean, and is a more typical example of CFEF, with the habitat exhibiting a transition to Coastal Fringe Sandhills within the higher sandy areas located about 1 mile to the north, and to Brackish Marsh habitat located along the Cape Fear River Estuary.

The CFEF habitat associated with the MOTSU buffer lands consist of a dense forest dominated by live oak, sand laurel oak (*Quercus hemisphaerica*), and loblolly pine (USAF 1994b). Small numbers of red oak, post oak (*Quercus stellata*), and red hickory (*Carya ovalis*) occur. The understory is sparse, containing devilwood (*Osmanthus americanus*) and yaupon as the primary species. The shrub layer is moderate to dense, dominated by yaupon. Woody vines, particularly roundleaf greenbrier (*Smilax rotundifolia*) and saw greenbrier (*Smilax bona-nox*), and Munson's grape (*Vitis rotundifolia*) are common. Herbs are very sparse in this natural community type.

1 **Figure 5-2 Tree Data for the Fort Fisher Recreation Area, Kure Beach, North Carolina.**



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5.1.2 Invasive Species

Introduced plant species are non-native species that do not naturally occur within the region, and have either accidentally or purposefully become established. Although not all introduced species become invasive, many introduced species that become established outside of their native area are not subject to normal predation pressures, and will spread, often times forcing out or replacing native species. Invasive species are those that persist, proliferate, and cause economic or environmental harm (Ecological Society of America 2004). EO 13112 (February 1999) requires federal agencies to prevent the introduction of invasive species, to detect and control invasives in a cost-effective manner, and to monitor invasives and provide for restoration of native species.

An invasive species survey has not been conducted at either installation, and available information on the presence of invasive species is limited, as described below.

Seymour Johnson Air Force Base

During the months of June and July 2002, a Red Cross summer youth volunteer completed a survey for the presence of the kudzu vine (*Pueraria montana* var. *lobata*) on SJAFB (USAF 2002c). Results of the survey determined that approximately 2.5 acres in the McColpin Road area were infested with kudzu vine. The kudzu vine present in this area was eradicated via a combination of control methods, including use of herbicide, grubbing and removal of root system. Herbicide applications are completed annually as necessary to control this species.

Japanese honeysuckle is abundant within the Mesic Mixed Hardwood Forest at the Base (USAF 1994a).

Fort Fisher Recreation Area

Existing survey reports did not identify an invasive species at the Recreation Area (USAF 1994b).

5.1.3 Rare Plant Species

The presence of rare plant species and their potential to occur is based on information provided in natural resource surveys of the installations (USAF 1994a and 1994b).

Seymour Johnson Air Force Base

No rare plant species were identified during the 1994 natural resources survey (USAF 1994a). TNC has documented three rare plant species within a 10 mile radius of SJAFB, however none of these have been observed within the last 30 years or more. In general, Wayne County and adjacent counties have a poor representation of rare plant species compared to most other parts of North Carolina.

Fort Fisher Recreation Area

No rare plants were identified during the 1994 natural resources survey of FFRA (USAF 1994b). The habitats most likely to support rare plants in the vicinity of FFRA are ocean beach and open sand dunes, neither of which is present at FFRA. Furthermore, the potential for rare plants to occur at FFRA is low due to the developed nature of the site. There is some potential, however, for rare plants to occur in the isolated depressional wetlands in the northern section of the Recreation Area, and within the adjacent forested habitats located north of FFRA (USAF 1994b).

5.2 FISH AND WILDLIFE

A formal survey to identify the fish and wildlife species occurring at the installations has not been conducted. The information provided in the following sections is based on existing survey reports (USAF 1994a and 1994b, and USAF 2009b).

Seymour Johnson Air Force Base

SJAFB contains fragments of woodland and forest habitat within its boundaries, most of which is located in the southwestern section of the Base, near the Neuse River. A few other woodland patches are present along the northwestern boundary, along Stoney Creek. Common mammal species that are expected to occur include, white-tailed deer (*Odocoileus virginianus*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), and gray squirrels (*Sciurus carolinensis*). Various amphibian and reptile species also are expected to occur.

There are many resident and breeding migratory birds that are known or likely to occur at SJAFB (Table 6). Wood thrush (*Hylocichla mustelina*) and red-eyed vireo (*Vireo olivaceus*) are likely to nest on the Base (TNC and NCNHP, Division of Parks and Recreation 1994a). Additionally, neotropical species may occur that do not require extensive forests for breeding, such as gray catbird (*Dumetella carolinensis*), white-eyed vireo (*Vireo griseus*), northern cardinal (*Cardinalis cardinalis*) Carolina chickadee (*Poecile carolinensis*), woodpeckers (Picidae family), and grasshopper sparrow (*Ammodramus savannarum*). SJAFB is located within the breeding range of uncommon warbler species such as Swainson's warbler, (*Limnothlypis swainsonii*) and Kentucky warbler (*Oporornis formosus*), however, these species are not likely to nest at SJAFB because of the fragmented habitat on the Base.

Table 6. Bird Species Observed or Expected to Occur at Seymour Johnson AFB, Goldsboro, North Carolina

Common Name	Scientific Name
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American pipit	*Anthus rubescens*
American robin	*Turdus migratorius*
Bald eagle	*Haliaeetus leucocephalus*
Barn swallow	*Hirundo rustica*
Belted kingfisher	*Ceryle alcyon*
Blue grosbeak	*Passerina caerulea*
Blue jay	*Cyanocitta cristata*
Brown thrasher	*Toxostoma rufum*
Brown-headed cowbird	*Molothrus ater*

Common Name	Scientific Name
Canada goose	*Branta canadensis*
Carolina chickadee*	*Poecile carolinensis*
Carolina wren**	*Thryothorus ludovicianus*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerina*
Cliff swallow	*Petrochelidon pyrrhonota*
Common grackle	*Quiscalus quiscula*
Common snipe	*Gallinago gallinago*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco**	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Eastern bluebird	*Sialia sialis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern meadowlark	*Sturnella magna*
Eastern phoebe	*Sayornis phoebe*
Eastern towhee	*Pipilo erythrophthalmus*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Fish crow	*Corvus ossifragus*
Grasshopper sparrow**	*Ammodramus savannarum*
Gray catbird	*Dumetella carolinensis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*

Common Name	Scientific Name
Green heron	*Butorides virescens*
Herring gull	*Larus argentatus*
Horned lark**	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
Indigo bunting	*Passerina cyanea*
Kentucky warbler*	*Oporornis formosus*
Killdeer	*Charadrius vociferus*
Least sandpiper	*Calidris minutilla*
Loggerhead shrike	*Lanius ludovicianus*
Mallard	*Anas platyrhynchos*
Mississippi kite	*Ictinia mississippiensis*
Mourning dove	*Zenaida macroura*
Northern bobwhite	*Colinus virginianus*
Northern cardinal**	*Cardinalis cardinalis*
Northern flicker	*Colaptes auratus*
Northern harrier*	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Osprey	*Pandion haliaetus*
Red-eyed vireo*	*Vireo olivaceus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*

Common Name	Scientific Name
Ring-billed gull	*Larus delawarensis*
Rock pigeon	*Columba livia*
Savannah sparrow	*Passerculus sandwichensis*
Song sparrow	*Melospiza melodia*
Summer tanager	*Piranga rubra*
Swainson's warbler*	*Limnothlypis swainsonii*
Tufted titmouse	*Baeolophus bicolor*
Turkey vulture	*Cathartes aura*
Upland sandpiper	*Bartramia longicauda*
White-eyed vireo*	*Vireo griseus*
Wood thrush*	*Hylocichla mustelina*
Yellow-rumped warbler*	*Dendroica coronata*

* Species identified in 1994 natural resources survey only

** Species identified in both the 1994 natural resources survey and BASH survey

Source: USAF 2009b and USAF 1994a and 1994b.

The interior of the North Carolina Coastal Plain does not receive much visitation by migrating landbirds, with the heaviest flights of migrating songbirds passing to the west of SJAFB (USAF 1994a). However, the woodlands at SJAFB may provide suitable forage and resting habitat for the few common and widespread neotropical migrant bird species that pass through Wayne County.

Extensive grasslands that support wintering habitat for birds is scarce throughout the upper Coastal Plain, however the grassland area associated with the airfield may provide wintering habitat for a few species such as horned lark (*Eremophila alpestris*) and northern harrier (*Circus cyaneus*). Additionally, the open areas adjacent to the airfield likely provide foraging habitat for other raptors, which pose a potential danger for aircraft taking off and landing at the Base.

The BASH biologist conducts a methodical weekly bird survey as part of the BASH program at SJAFB, which includes monitoring all bird species and their activities at 10 selected plots located in the vicinity of the airfield. According to data collected from January 2005 through December 2009, the primary nuisance species requiring removal from the airfield area include blackbirds (Emberizidae family), ring-billed gull (*Larus delawarensis*), and turkey vulture (*Cathartes aura*). Data collected as part of the BASH program have identified 60 bird species in and around the airfield (Table 6). Additional migratory species identified in the natural resources survey as present or likely to occur at some time throughout the

year are included in Table 6. Species identified in both the BASH survey and the 1994 natural resources survey are identified with two asterisks (**), and species identified only in the natural resources survey are identified with one asterisk (*). This bird species list is not meant to be all-inclusive of the Base, as the BASH data is limited to the airfield area.

No information on fish species that inhabit the golf course pond or adjacent reaches of Stoney Creek and the Neuse River is available.

Fort Fisher Recreation Area

Common mammal species that are expected to occur include white-tailed deer, Virginia opossum, raccoon, gray squirrels, and various snake and turtle species.

The Cape Fear River is considered an important spawning ground for many marine fish including anchovies (family Engraulidae), bluefish (*Pomatomus saltatrix*), mullet (family Mugilidae), weakfish (*Cynoscion regalis*), silver perch (*Diapterus rhombeus*), American shad, Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and Atlantic tarpon (*Megalops atlanticus*). Avian species are abundant and include Canada goose (*Branta canadensis*), snow goose (*Chen caerulescens*), duck species (*Anas* spp., *Aix sponsa*, and *Bucephala* spp.), great egret (*Ardea alba*) and double-crested cormorants (*Phalacrocorax auritus*).

Natural habitat to support nesting birds at FFRA is limited to the Brackish Marsh habitat located along the Cape Fear River. Other areas that birds may nest in include lawns, buildings, and other man-made structures such as parking lots. The only bird species in North Carolina that nest on lawns is the killdeer (*Charadrius vociferus*), which tends to nests where bare ground and debris are found. Killdeers and common nighthawks (*Chordeiles minor*) will also breed on flat topped roofs that are graveled. Nesting of these two species at FFRA is suspected (TNC and NCNHP, Division of Parks and Recreation 1994b).

Bird species known to nest in brackish marshes along the North Carolina coast include clapper rail (*Rallus longirostris*), seaside sparrow (*Ammodramus maritimus*), saltmarsh sparrow (*A. caudacutus*), and sedge wren (*Cistothorus platensis*). The scattered trees located at FFRA could also be used for nesting. The majority of the fall-migrating and wintering birds would most likely utilize the dense maritime shrub thickets and the forests located adjacent to FFRA for foraging and resting. The Brackish Marsh habitat is suitable habitat for migrating shorebirds and wintering waterfowl.

5.3 THREATENED AND ENDANGERED SPECIES, AND SPECIES OF CONSERVATION CONCERN

The presence or potential occurrence of federal and state listed threatened and endangered species was evaluated based on historical surveys conducted at the Base and Recreation Area, and agency consultation.

Seymour Johnson Air Force Base

Due to small and fragmented condition of the forests on SJAFB, no rare or protected insect or vertebrate species are likely to occur (TNC and NCNHP, Division of Parks and Recreation 1994a). No rare or protected insects are known to occur within the vicinity of SJAFB. There is some possibility that the Neuse River waterdog (*Necturus lewisi*), a large salamander that is a North Carolina species of special concern and occurs only in the Neuse and Tar river drainages (North Carolina Wild 2010), may occur in the Neuse River habitat of SJAFB (USAF 1994ba). Although the Neuse River waterdog has been documented in regional sections of the Neuse River, focused surveys for this species in the river habitat located immediately adjacent to the Base have not been conducted (USAF 1994a). The closest location on the Neuse River where the Neuse River waterdog has been identified is 10 miles upstream, with the

closest site downstream located approximately 15 miles away. Threats to this species include degradation of water quality and development, including channelization, degradation of aquatic habitat, agricultural pollution (i.e., run-off of farm waste and pesticides), and industrial and urban development.

A survey for the presence and potential habitat to support the red-cockaded woodpecker (RCW) (*Picoides borealis*), a federally endangered species, was conducted at the Base in 2002 (USAF 2002b). All longleaf pines present on Base were closely inspected for signs of RCW presence. Groups of loblolly pines were inspected by walking through the area and observing signs of RCW presence either close by or at a distance. No signs of RCW presence were identified. Numerous mature loblolly pines provide for appropriate nesting habitat, but the availability of foraging habitat is very low, and the intact forested areas are small and fragmented. It is very unlikely that the Urban Forest habitat of the Base represents appropriate habitat for RCWs. Results of the RCW survey were submitted to USFWS (USAF 2002d), and the USFWS responded with a letter of concurrence, that RCW is unlikely to utilize SJAFB for nesting or foraging (USFWS 2002).

As part of the 1988 amendment to the Fish and Wildlife Conservation Act (Public Law 100-653), the USFWS is required to identify species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973. The goal envisioned by the USFWS in identifying these species of conservation concern is to stimulate the implementation of coordinated, proactive management and conservation actions among federal, state, tribal, and private partners. Additionally, the lists are intended to assist federal land-managing agencies and their partners in their efforts to abide by the bird conservation principles embodied in the Migratory Bird Treaty Act (MBTA) and Executive Order 13186 titled "Responsibilities of federal agencies to protect migratory birds" (USFWS 2008). Birds species are listed according to Bird Conservation Regions (BCRs) developed by USFWS, with SJAFB located in BCR 27, Southeastern Coastal Plain. Of the 53 species listed by USFWS for BCR 27, six species are known or expected to occur at SJAFB (Table 7).

Table 7. U.S. Fish and Wildlife Birds of Conservation Concern, Bird Conservation Region 27 (Southeastern Coastal Plain) Known or Expected to Occur at Seymour Johnson AFB, Goldsboro, North Carolina and Fort Fisher Recreation Area, Kure Beach, North Carolina

Common Name	Scientific Name	Comments
American kestrel	*Falco sparverius*	Observed in SJAFB airfield area during BASH monitoring.
Bald eagle	*Haliaeetus leucocephalus*	Observed in SJAFB airfield area during BASH monitoring.
Kentucky warbler	*Oporornis formosus*	Observed at SJAFB during 1994 natural resources survey.
Loggerhead shrike*	*Lanius ludovicianus*	Observed in SJAFB airfield area during BASH monitoring.
Seaside sparrow	*Ammodramus maritimus*	Potential to nest in Brackish Marsh habitat at FFRA.
Sedge wren	*Cistothorus platensis*	Potential migrant or winter resident of Brackish Marsh

		habitat at FFRA.
Swainson's warbler	*Limnothlypis swainsonii*	Observed at SJAFB during 1994 natural resources survey.
Wood thrush	*Hylocichla mustelina*	Observed at SJAFB during 1994 natural resources survey.

* North Carolina Species of Special Concern

Source: USFWS 2008, USAF 2009b, and USAF 1994a and 1994b.

Fort Fisher Recreation Area

No threatened or endangered species, or species of special concern have been identified at FFRA (TNC and NCNHP, Division of Parks and Recreation 1994b). Furthermore, there is little likelihood of rare or protected species occurring at FFRA due to the developed nature of the site. Two birds species listed by USFWS for BCR 27, seaside sparrow and sedge wren, could potentially utilize the Brackish Marsh habitat of FFRA (Table 7). Additionally, Cape Fear River Estuary is an important area for migrating birds, and there is some potential for rare migrants to visit FFRA. A focused bird survey of FFRA has not been conducted, therefore other USFWS BCC species could occur at FFRA. However the potential for rare species to occur within the Brackish Marsh habitat is low because of its narrow width and because of the presence of adjacent development. No rare species have been documented within the more extensive and intact marshes to the south (TNC and NCNHP, Division of Parks and Recreation 1994b).

Observations made during UV-light trapping for moths in the adjacent forests identified two rare moth species in the forests to the south of FFRA, and nine rare moth species in the open sandhill habitat of Peters Point, located about one mile north of FFRA (USAF 1994b). The southern survey site has habitat that is similar to the forest habitat that borders FFRA, making it likely that the rare forest moth species also utilize the habitats located immediately south of the Recreation Area.

5.4 WETLANDS

Wetland habitat present at SJAFB and FFRA was evaluated based on National Wetland Inventory (NWI) data available from USFWS (2009). A formal wetland delineation has not been conducted at either installation.

Seymour Johnson Air Force Base

A review of NWI data for SJAFB identified approximately 188 acres of palustrine and riverine wetlands. A majority of the Base wetlands are associated with the Neuse River and Stoney Creek waterways, and are located along the northwestern and southwestern boundaries (Figure 5-3). Palustrine wetlands are also located in the vicinity of the airfield, with a few pockets of palustrine wetlands located in the interior section of the Base.

Table 8 lists the acreages for the five wetland types present, which include palustrine forested wetlands (PFO), palustrine scrub-shrub wetlands (PSS), palustrine emergent (PEM), riverine lower perennial unconsolidated wetlands (R2U), and palustrine unconsolidated bottom wetlands (PUB). The dominant wetland type is palustrine wetlands, which make up approximately 97 percent of the wetlands at SJAFB. The most dominant type of palustrine wetlands is PFO wetlands, which comprise about 82 percent of the palustrine wetlands, and approximately 80 percent of Base wetlands.

Table 8. Wetlands, Seymour Johnson AFB, Goldsboro, North Carolina

Wetland Type	Wetland Code	Acres at SJAFB
Palustrine forested	PFO	149.8
Palustrine scrub-shrub	PSS	17.5
Palustrine emergent marsh	PEM	13.2
Riverine lower perennial unconsolidated	R2U	5.5
Palustrine unconsolidated bottom	PUB	2.5
Total		**188.5**

Source: USFWS 2009.

Fort Fisher Recreation Area

A review of NWI wetlands at FFRA identified approximately 3.6 acres of wetlands (Figure 5-4 and Table 9), including estuarine and palustrine wetlands. Most wetlands in the Recreation Area are estuarine intertidal emergent (persistent irregularly flooded) (E2EM1P) wetlands (3.3 acres), and are associated with the tidal marsh habitat of the Cape Fear River. The remaining wetlands comprise less than 1 acre, and include palustrine forested broad-leaved deciduous (temporarily flooded) (PFO1A) wetlands (0.3 acres) located along the northern boundary, and estuarine subtidal unconsolidated bottom (E1UBL) wetlands (<0.01 acres), which are also associated with the marsh habitat of the Cape Fear River.

Table 9. Wetlands, Fort Fisher Recreation Area, Kure Beach, North Carolina

Wetland Type	Wetland Code	Acres at FFRA
Estuarine intertidal emergent (persistent irregularly flooded)	E2EM1P	3.3
Palustrine forested broad-leaved deciduous (temporarily flooded)	PFO1A	0.3
Estuarine subtidal unconsolidated bottom	E1UBL	<0.01
Total		**3.6**

Source: USFWS 2009.

Figure 5-3 NWI Wetlands for the Seymour Johnson AFB, Goldsboro, North Carolina.

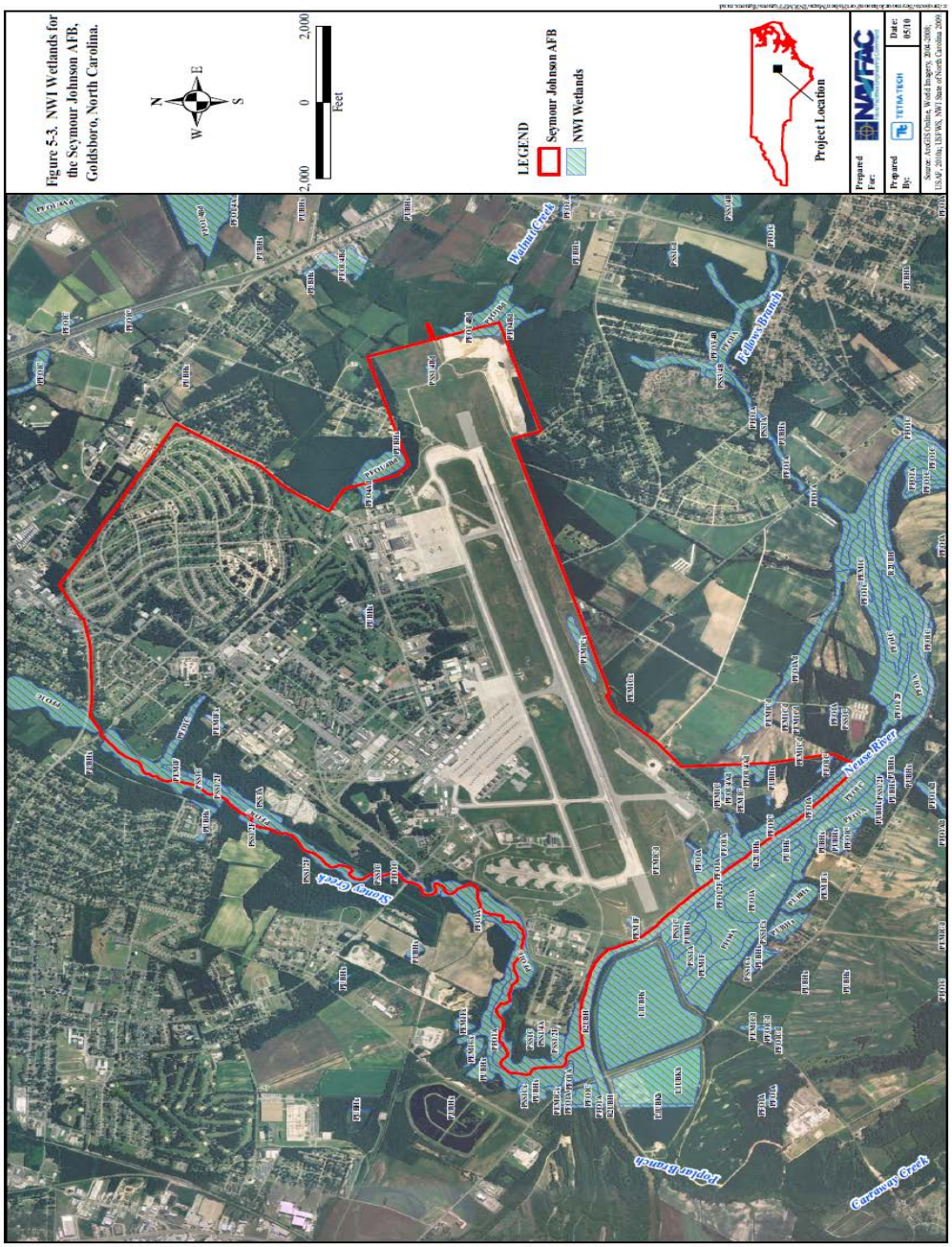
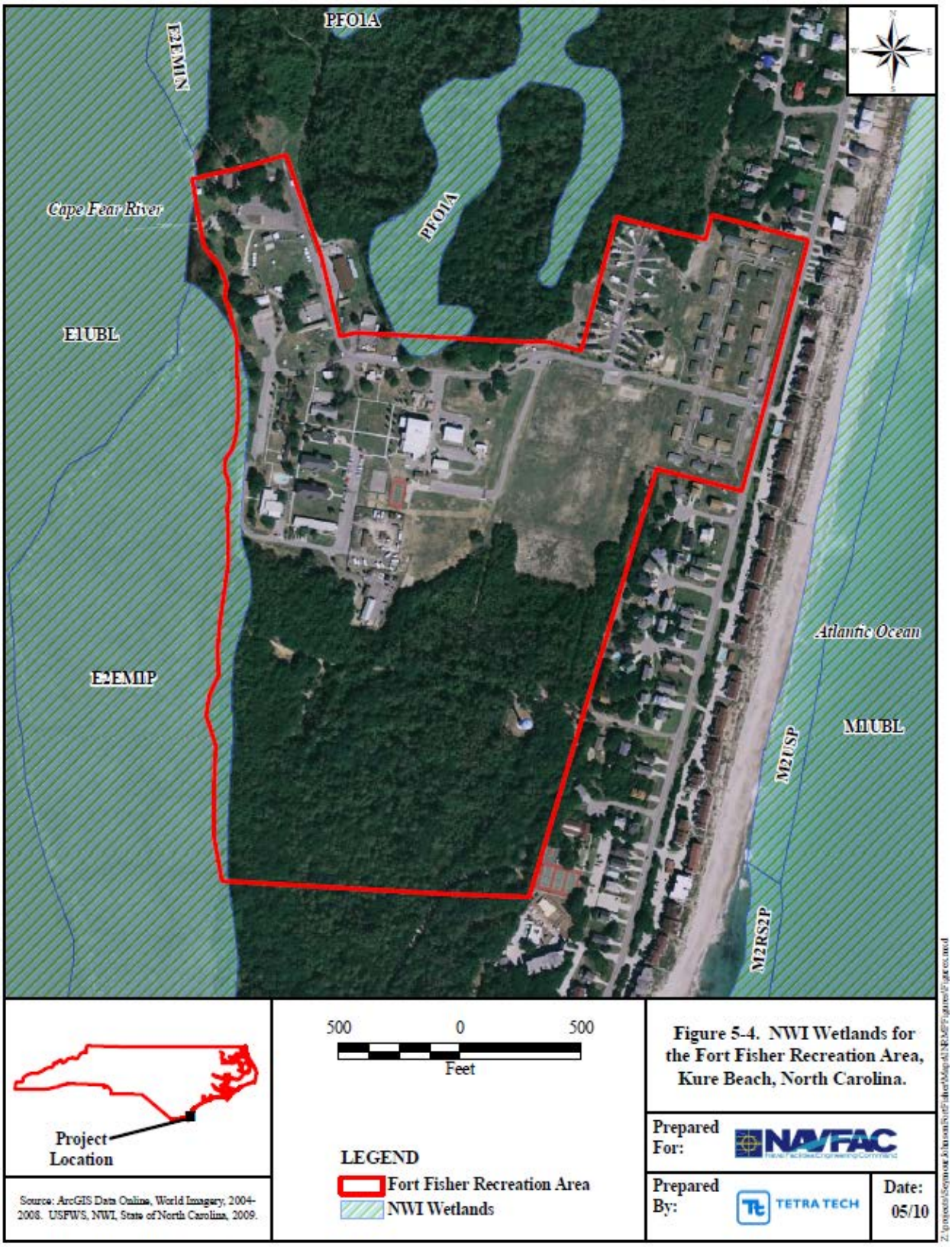


Figure 5-4 NWI Wetlands for the Fort Fisher Recreation Area, Kure Beach, North Carolina.



5.5 IMPOUNDMENTS

Information on impoundments located at the installations was obtained from existing reports.

Seymour Johnson Air Force Base

The lake associated with Three Eagles Golf Course at SJAFB is the only impoundment on SJAFB. This lake is the primary water source for the golf course irrigation system, and estimated monthly water requirements for irrigation is approximately 720,000 gallons (USAF 1998b).

Fort Fisher Recreation Area

FFRA does not contain any impoundments.

CHAPTER 6
MISSION IMPACTS ON NATURAL RESOURCES

The use and management of lands that support military training and readiness, and the decision-making associated with such land use, directly affect the sustainability of the ecosystem. Specific components of land management include forest management, wetlands management, threatened and endangered species programs, invasive and exotic species control, soil conservation and erosion control, water quality control, and floodplain management. To protect and maintain natural resources while ensuring the continuation of the military mission, SJAFB and FFRA have implemented an ecosystem management approach for environmental stewardship of the installation natural resources that is based on DoD guidance and recommendations. The management strategy maximizes land use that supports military training (SJAFB) and outdoor recreation (FFRA) while minimizing impacts to natural resources.

6.1 NATURAL RESOURCES CONSTRAINTS TO MISSIONS AND MISSION PLANNING

There are relatively few constraints or restrictions on training or the military mission due to natural resource issues at SJAFB and FFRA. Neither installation contains essential habitat for species of concern that are protected by the ESA, as described in Sections 5.1.3 Rare Plant Species and 5.3 Threatened and Endangered Species, and Species of Conservation Concern. SJAFB is almost entirely developed (predominantly with buildings and grassy recreational areas), and contains minimal natural habitat. The management of the limited natural resources present on SJAFB does not interfere with the training and operation of the Base. FFRA is reserved for recreational and facility training services, and is very small in size. The USAF mission of providing recreation and education may be carried out throughout the facility without threatening the ecosystem and its extant species, as long as the measures and guidance laid out in this INRMP are respected and followed.

Seymour Johnson Air Force Base

The major environmental constraints on development at SJAFB are:

- The floodplain along the Neuse River and Stoney Creek;
- Protection of surface water quality resulting from potential pollutant discharge from surface water runoff;
- Groundwater recharge and protection of groundwater quality resulting from potential pollutant discharge to groundwater;
- The appropriate location of functions using hazardous materials, and the collection and disposal of hazardous wastes; and
- The preservation and enhancement of the remnant natural communities present.

None of these constraints appear to present severe limitations to the expansion of the military mission at SJAFB. Long-range planning will address floodplain and other water quality issues without requiring any dramatic changes in water management. Hazardous materials handling and hazardous waste disposal issues also reflect the need for long term planning and gradual changes rather than any immediate and drastic need for action.

Fort Fisher Recreation Area

Environmental constraints from current use and potential future development of facilities at FFRA include:

- Preservation of the health of wetlands contained within and surrounding the Brackish Marsh habitat;
- Monitoring of potential pollutants from surface water runoff;
- Attention to groundwater recharge and protection against potential pollutants in groundwater;
- Appropriate location of functions using hazardous materials and the collection and disposal of hazardous wastes; and,
- Preservation and enhancement of the remnant natural communities present.

Constraints to the military mission associated with preservation of potential historical and cultural artifacts and structures that remain unexcavated at FFRA are described in the ICRMP prepared for FFRA (USAF 2010).

6.2 LAND MANAGEMENT

It is DoD policy that air, land, and water resources under their jurisdiction be managed and sustained to support the military mission and readiness. A balance between meeting mission requirements and maintaining ecosystem health can be achieved through integration of the military mission with environmental requirements and sound land management practices.

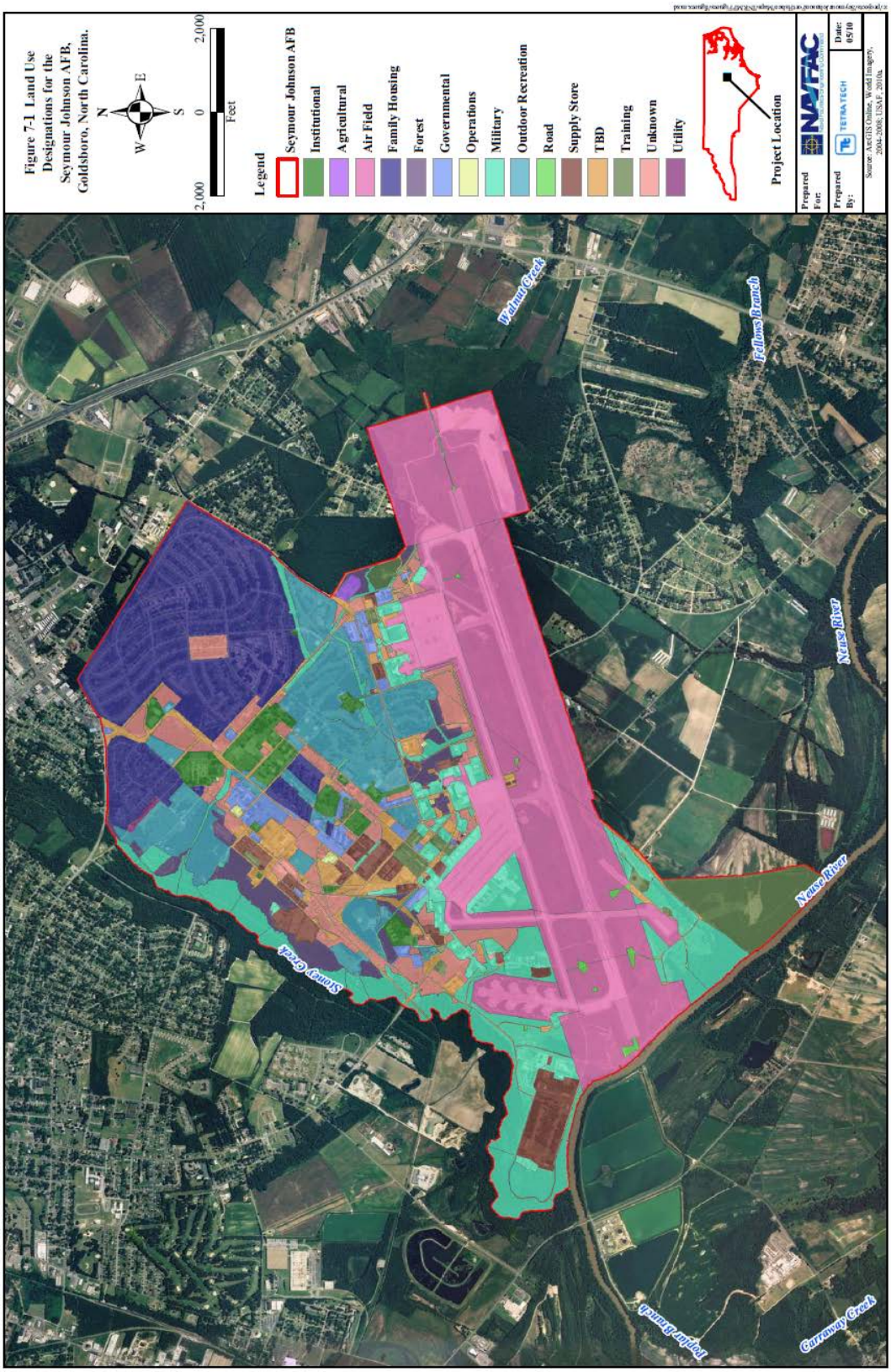
The appropriate congregation or dispersal of functions performed on the installation can affect stormwater runoff, groundwater recharge and contamination, and the general safety and well-being of the community. The proper balancing of open space, natural areas and highly developed areas, coupled with environmentally sensitive construction practices (i.e., siting decisions as well as buffers and daily clean up) and architectural design suited to fit the natural landscape, can have a dramatic effect in reducing management burdens and costs, protecting the health and safety of the personnel who live and work on the installation, protecting and enhancing the natural resources contained within the public domain, and creating a quality of life on and around the installation will assist in maintaining the morale of the personnel who visit and serve there.

Stormwater runoff, hazardous materials and wastes, air pollution, and numerous other areas of environmental concern will also be directly coordinated with land use goals and practices. The implementation of land use goals are, in most instances, a longer range program than can be addressed within the 5 year life of this INRMP. However, because land use is so essential to good ecosystem planning, attention will be paid to these longer range goals at the same time that this INRMP is being implemented.

Seymour Johnson Air Force Base

Land use data for SJAFB was obtained from USAF and the SJAFB General Plan, and Figure 7-1 provides an overview of the land uses currently in place. Table 10 provides a summary of the percentage of each current land use type as well as a summary of the percent for each land use type that will result if future proposed projects are implemented. New development or redevelopment at SJAFB is expected to largely occur in area that are currently developed, or have been subject to development in the recent past. As such a large percentage of open space and natural areas is not expected to be converted to development.

1 Figure 6-1 Land Use Designations for the Seymour Johnson AFB, Goldsboro, North Carolina.



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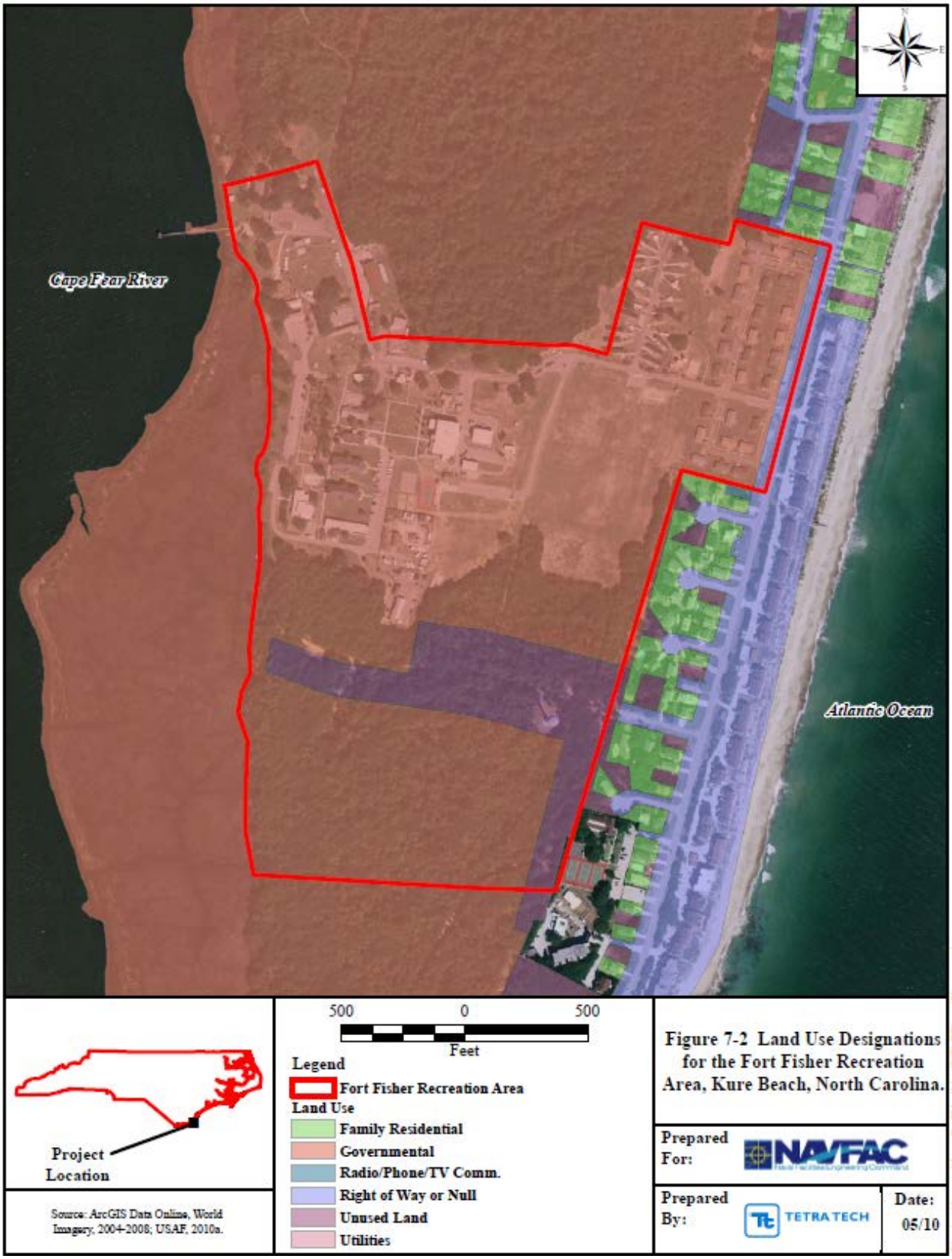
1 Figure 6-2 Land Use Designations for the Fort Fisher Recreation Area, Kure Beach, NC.



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Approximately 42 percent of SJAFB land use is dedicated to the airfield and supporting operations. Industrial and housing both represent approximately 17 percent of the current land use, with open space accounting for approximately 11 percent of the land use. Area dedicated to outdoor recreation comprises approximately 8 percent of land use, and community services (including administrative and medical operations) make up about 5 percent of the remaining land use. Land use designated as water makes up less than 1 percent of the land use at SJAFB.

Table 10. Present and Proposed Land Use Classifications for Seymour Johnson AFB, Goldsboro, North Carolina

Land Use	Current Percent (%) of Base Acreage	Percent (%) of Base Acreage resulting from Proposed Development and Redevelopment
Airfield and Supporting Operations	42	45
Industrial	17	16
Housing	17	12
Open Space	11	10
Outdoor Recreation	8	9
Community, Administrative and Medical	5	8
Water	<1	<1
Total	**100**	**100**

Source: USAF 2008.

If necessary, a review of land use data will be conducted, and following that evaluation, a decision will be made about a new land use survey. Once the accuracy of current land use data is verified, land use goals compatible with ecosystem goals will be developed. As indicated in Table 8 these proposed projects will largely be focused on redevelopment of existing disturbed areas, and any reduction in open space areas is expected to be minor.

Fort Fisher Recreation Area

A majority of the land use at FFRA is dedicated to outdoor recreation and supporting facilities (Figure 7-2). Approximately 88 percent of the installation is dedicated to recreation use, approximately 11 percent is open space, and approximately 1 percent consists of non-recreational housing, right-of-ways, and utilities (Table 11).

Table 11 Present Land Use Classifications for Fort Fisher Recreation Area, Kure Beach, North Carolina

Land Use	Acreage	Percent (%) of Recreation Area Acreage
Recreational	87	88
Open Space	10	11
Non-recreational housing, right-of-ways, and utilities.	1	1
Total	**98**	**100**

Land use at FFRA is essentially restricted to its currently designated classifications. Therefore, no changes in land management are anticipated or recommended. Nonetheless, a seasonal survey will be implemented to ensure that the current carrying capacity of the installation is not exceeded.

Disturbance of the Brackish Marsh habitat at FFRA, including fill, ditching, wall construction, or additional docks, or constructing corridors across the marsh also will be avoided.

6.3 MILITARY MISSION IMPACTS ON NATURAL RESOURCES

As threats to our national security change and as technology develops, the military mission at SJAFB and FFRA will continue to evolve, and potentially may increase in scope.

Seymour Johnson Air Force Base

The most significant impacts of the military mission on natural resources at SJAFB are:

- Soil and groundwater contamination;
- Effects of stormwater runoff on the surrounding watershed;
- Storage, use, and transportation of hazardous materials;
- Disposal of hazardous waste; and,
- Management of Installation Restoration Program (IRP) sites.

Other SJAFB activities that may impact natural resources are less directly related to the nature of the military mission, and these are commonly associated with areas that have a concentration of human activities. These include, but are not limited to, the following:

- Development and operation of Base facilities;
- Grounds maintenance activities (i.e., landscaping and mowing), and the application of herbicides, pesticides, and fertilizers;
- Disposal of non-toxic waste;
- Air pollution from vehicular traffic and other Base operations;
- Noise pollution from the airfield and other Base facilities; and
- Outdoor recreational and training activities.

The only known future mission impact that has been identified is a potential increase in training flights resulting from the addition of aircraft and training personnel at SJAFB. This also would likely result in an increase in night flights, and would mostly affect the Air Installation Compatible Use Zone.

Fort Fisher Recreation Area

Mission impacts on natural resources at FFRA are not much different from areas associated with a high level of human activity. Potential impacts are similar to those identified for SJAFB, and include, but are not limited to, the following:

- Soil and groundwater contamination;
- Stormwater runoff on the surrounding watershed;
- Storage, use, and transportation of hazardous materials;
- Disposal of hazardous and solid wastes;
- Negative impacts on native vegetation;
- Grounds maintenance (i.e., landscaping and mowing), and the application of herbicides, pesticides, and fertilizers;
- Air pollution from vehicular traffic and other Recreation Area operations;
- Reduction of wildlife habitat; and,
- Negative impact of outdoor recreational and training activities on local and regional natural resources,

Any impacts associated with future changes in the military mission will be addressed within and beyond the Recreation Area boundaries to safeguard against harm, the local and regional natural resources. Priorities for coordination and attention beyond FFRA property lines will include the following resources:

- Buffer lands of MOTSU,
- Cape Fear River estuarine system, and.
- Brackish Marsh habitat of FFRA.

There are no anticipated mission changes for FFRA within the next 5 years. There is a continuing need, however, to establish and monitor the carrying capacity of FFRA and to insure that current levels of use of the facility do not jeopardize the fulfillment of its mission, damage the natural resources present on the installation, or do harm to the ecosystem of which FFRA is a part.

6.4 FUTURE SUPPORT OPPORTUNITIES

Training opportunities for future development to support the military mission exist in those areas with little to no restrictions on training due to natural resources, including buffer areas, corridors, and potential encroachment partnering areas. Neither SJAFB nor FFRA currently has any significant restrictions that impact training, recreation, or education; essentially the entire area of each facility provides opportunities for DoD to conduct training and carry out its mission. Although actual training at FFRA is only conducted within the NCNGTC, the recreation area is intended and is available for rest and relaxation of military personnel. The opportunities could be augmented by identifying potential encroachment partnering areas for each facility.

CHAPTER 7
NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 NATURAL RESOURCES PROGRAM MANAGEMENT

There are a number of organizations on Seymour Johnson AFB that are crucial to proper implementation of the INRMP.

While development and implementation of the overall INRMP is the responsibility of the 4 CES/CEIE Environmental Flight, all organizations are responsible for compliance with the INRMP. Key players in the implementation of the INRMP include Real Property and airfield maintenance. Environmental management of the airfield environment is performed by the Base Real Estate officer (4 CES/CER), Civil Engineer Operations Flight (4 CES/CEO) and Environmental Flight (4 CES/CEIE).

Additional support is provided by the Air Force Civil Engineer Center (AFCEC), East Region Support Team and the Robins Installation Support Team (CZO); AFCEC/CZTQ Technical Subject Matter Specialists; and HQ Air Combat Command (ACC) A3AA, Ranges and Airspace.

The development and implementation of the INRMP is accomplished through coordination with the USFWS and NCWRC. The SAIA requires that INRMPs be prepared in cooperation with, and reflect mutual agreement of, the USFWS and NCWRC, and affords them signatory authority of SJAFB INRMP. Cooperation and coordination with the USFWS and NCWRC is an integral part of the USAF's natural resources management program.

The following sections describe the regulatory drivers, management actions, and ecosystem management strategies for each of the program elements that are relevant to natural resources management at SJAFB and FFRA. INRMP goals and objectives are included for each section as they pertain to each of the resource topics.

7.1.1 Relationship to Other Management Plans

This INRMP is not intended to replace existing policy, range and training operations guidance, or military management plans. The purpose of this INRMP is to document and assist, as required, in the development, integration, and coordination of natural resource management programs with other plans and programs. Moreover, this INRMP is intended to facilitate the integration of existing natural resource management actions (plans and programs) with SJAFB's and FFRA's primary military missions.

Relevant Installation Management Plans

There are several existing management plans and other documents that have been prepared for the installations that will be considered when implementing natural resources management actions. This INRMP has been developed to be complementary to the following installation documents:

- SJAFB Management Action Plan (USAF 1995);
- SJAFB SWP3 (USAF 2009a);
- SJAFB Urban Forest Management Plan (USAF 1999);
- Outdoor Recreation Plan (USAF 2002a);
- SJAFB Hazardous Waste Management Plan (USAF 2004);
- SJAFB General Plan (USAF 2008);
- SJAFB BASH Plan (USAF 2009b);
- ICRMP (Tetra Tech 2010); and,

- SJAFB Three Eagles Golf Course Pest Management Plan (Barnes 2010).

North Carolina Wildlife Action Plan (NCWAP)

Management of wildlife at SJAFB and FFRA will be conducted in accordance with the North Carolina Wildlife Action Plan (NCWAP). North Carolina was the first state to develop, and have endorsed by USFWS, a state wildlife action plan, the NCWAP. The NCWAP includes a long-term strategy to conserve fish, wildlife and natural areas; to enhance wildlife populations; and, to enhance the quality of life for residents and visitors of North Carolina. The NCWAP is a strategic plan that is intended to provide the basis for agencies, organizations, industries, and academics across the State for implementing sound fish and wildlife management practices, and improving these management strategies over time.

The following five core goals were developed for the NCWAP, and were the result of feedback and input received from conservation stakeholders:

- Improve understanding of species diversity in North Carolina and enhance the ability to make conservation or management decisions for all species;
- Conserve and enhance habitats and the communities they support;
- Foster partnerships and cooperative efforts among natural resource agencies, organizations, academia, and private industry;
- Support educational efforts to improve understanding of wildlife resources by the general public and conservation stakeholders; and,
- Support and improve existing regulations and programs aimed at conserving habitats and communities.

7.2 FISH AND WILDLIFE MANAGEMENT

7.2.1 General Fish and Wildlife Management

A majority of the installation lands have been developed, and currently offer relatively few opportunities for fish and wildlife management. For this reason it is important to proactively manage these resources to ensure their long-term viability. It is vital that habitat management be coordinated with other land management and mission related activities.

Seymour Johnson Air Force Base

A Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at SJAFB was signed in 1984 by the USFWS, the State of North Carolina, NCWRC, and SJAFB. This agreement addresses joint responsibilities of the three agencies, including prohibitions on the introduction of exotic species, the preparation of a fish and wildlife management plan, the enforcement of game laws, the conservation of wildlife and migratory waterfowl, licenses and permits, the use of chemical toxicants for controlling nuisance species, the protection of endangered and threatened species, and public access to military property.

SJAFB will conduct an inventory of wildlife and wildlife habitat. Surveys will focus on natural areas and open space areas, including but not limited to areas of the Base located adjacent to Stoney Creek and Neuse River, border and fenced areas along the boundary, Base golf course, airfield, and forested and landscaped areas in the vicinity of buildings.

Fort Fisher Recreation Area

Cooperation and coordination with MOTSU in management of the adjacent forest habitat, and agency consultation requirements, will assist in the establishment of conservation guidelines for the CFEF

habitat. In addition to establishing a buffer between FFRA activities and CFEF communities (see Section 5.1.1), other potential environmental stewardship projects for fish and wildlife management include establishing site-specific avoidance measures for recreation area participants during times when large numbers of migrating birds and butterflies are present, and providing educational programs to alert visitors and residents to the seasonal needs of wildlife and insects utilizing the marsh. Additionally, to the extent possible, FFRA will attempt to schedule Recreation Area and NCNGTC activities in a manner that minimizes undue stress and incidental harm to fish and wildlife and their habitats.

7.2.2 Hunting

On August 26, 2009, the Commander of the 4th FW released Operating Instruction (OI) FSS 34-110, authorizing and providing basic procedures and requirements for a limited hunting program on SJAFB. Hunting opportunities at SJAFB are open to all Air Force civilian and military personnel, including the Air Force Reserves and Air National Guard. Hunting is allowed in three designated areas totaling less than 100 acres. that are found immediately outside of Base fencing, but still on Base property. One hunter with one child is the maximum allowed per area per day. Hunting is conducted in accordance with applicable North Carolina hunting rules and seasons. Only white-tail deer and feral hogs are allowed to be taken. Details on the authorized weapons, ammunition, hunting days and location for each area is provided in Air Force Operating Instruction FSS 34-110.

Hunting is permitted on a daily permit basis, and all hunters are charged a nominal fee for each permit, and are required to sign in and out. In accordance with Section 108 of the SAIA, collected funds can be expended to support natural resources programs, such as improving the hunting program, or for other natural resource projects as needed. The 4th FSS takes permit applications, collects fees and issues applicable permits for hunting within the confines SJAFB.

Information on use, carrying capacity limits, proposed improvements, conservation practices, and hunting opportunities and procedures for SJAFB will be incorporated into the next revision of the Outdoor Recreation Plan.

7.2.3 Migratory Birds Management

Migratory birds are all birds listed in 50 CFR 10.13, and essentially includes all birds, except pigeons, English sparrow and European starling. The MBTA (July 3, 1918 as amended) prohibits any taking, killing or possessing of migratory birds. EO 13186 (January 10, 2001) established the responsibilities of federal agencies to protect migratory birds. The EO requires a MOU between the federal agency and the USFWS if the agency takes actions that have, or are likely to have, a measurable negative effect on migratory bird populations.

Seymour Johnson Air Force Base

SJAFB does not take actions that are likely to have a measurable effect on migratory bird populations and therefore a MOU is not required. As part of the BASH program at SJAFB, a Migratory Bird Depredation Permit has been issued by the USFWS. This permit establishes various procedures and allows the taking, after all non-lethal methods have been exhausted, of the minimum number of birds necessary to protect the aircraft and aircrews. An annual report is due by January 31 of every year listing the species name, numbers of birds taken, and other relevant information. Threatened and endangered species cannot be taken.

Fort Fisher Recreation Area

Protection of migratory birds at FFRA will consist of implementing avoidance measures during periods when high numbers of birds are utilizing the Brackish Marsh or adjacent habitats for roosting and foraging.

7.2.4 Vegetation Management

Ecosystem planning to support fish and wildlife habitat requires the development of appropriate management practices for the preservation and enhancement of natural communities. The following vegetation management projects will be implemented:

- Delineate current boundary of natural communities at each installation;
- Identify natural areas that could potentially be expanded through restoration, and areas where improved grounds could be converted to semi-improved or unimproved grounds, and allowed to evolve into natural communities;
- Document and assess presence of invasive species; and,
- Monitor and, when possible, remove invasive species, and foster the restoration of native plant species.

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Efforts will be made over time to replace introduced plant species with species found naturally in the area. This management practice will also maintain and improve the sustainability and native biological diversity of the natural communities that comprise the local ecosystem (AFGD 94-016).

The natural communities identified at SJAFB do not require any special management considerations; however, the potential for allowing existing natural areas to expand will be evaluated, in consideration of the requirements of the military mission. Attention will be paid over time to the expansion or establishment of invasive species, as edge effects and other kinds of disturbance make forests more susceptible to invasion. Allowing forests surrounding the natural community to mature and minimizing canopy openings such as roads may help reduce edge effects.

Fort Fisher Recreation Area

Most of the occurrences of CFEF are found in mainland areas near the coast and are largely confined to the southern two-thirds of the State (USAF 1994a). CFEF are not known to need any special active management beyond protection from human disturbance. Because of the rarity of this community type, all examples larger than a few acres, and even young maturing CFEF communities, are regarded as significant and will be protected. Cooperation and coordination with natural resources personnel at the MOTSU will be enhanced and activities on FFRA that might represent a threat to this significant natural community types will be avoided. Where feasible, a buffer will be established between any proposed activities and CFEF communities. Plans for proposed recreational improvements at FRRA will be developed to minimize human activity within the border areas of FFRA adjacent to CFEF communities, and the cutting of new canopy breaks, including narrow ones for dirt roads and utility corridors, will be avoided.

Disturbance of the Brackish Marsh habitat at FFRA, including fill, ditching, wall construction, or additional docks, or constructing corridors across the marsh also will be avoided.

7.3 OUTDOOR RECREATION AND PUBLIC ACCESS TO NATURAL RESOURCES

SJAFB and FFRA both offer ample outdoor recreation opportunities. Access to these facilities is limited to active and retired military personnel and their family members, their authorized guests, and Air Force civilians. Limited exceptions to allow use by the general public may be authorized by the SJAFB Installation Commander as circumstances require. It is recognized that ample recreational facilities for public use are available in the pmmediate region of each installation.

The primary ecosystem management goal for outdoor recreation activities is for these facilities to provide maximum sustainable use, within the constraints of the military mission. Planning of new outdoor recreational facilities will be also coordinated with other planning activities to establish the most current data concerning acreage of various land use categories and vegetative inventories.

The following goal and objectives have been developed for recreation management at the installations.

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Outdoor recreation facilities at SJAFB consist of an eight-site family campground, a group picnic area, a family picnic area, and a nature trail. Carrying capacity limits for all outdoor recreation facilities at SJAFB will be established, especially where natural resource could be impacted such as for the nature trail and along the Neuse River. These areas will only be used as non-consumptive outdoor recreation facilities for the enjoyment of Base personnel, and may also provide the backdrop for educational opportunities.

Any proposed improvements of recreational facilities located along the Neuse River (such as construction of a boat ramp or fishing pier) will be reviewed to evaluate impacts (such as increased human activity) along the waterfront and within the river itself. Additionally a cost benefit analysis of maintenance and operation in contrast to the more passive management of this waterfront as a natural area, will be conducted, as well as an assessment of the expected carrying capacity of the proposed facility.

Enhancement of the existing nature trail and construction of additional trails within wooded and natural areas on the Base will also be evaluated and designed in consideration of the DoD guidance for ecosystem management provided in this and other DoD guidance documents. The primary emphasis of proposed improvements should result in:

- No net reduction of fish or wildlife habitat;
- Minimal impact on vegetative communities and vegetative cover;
- Identification of significant and sensitive natural areas to be avoided and protected from degradation resulting from human use;
- Identification of opportunities to provide educational and aesthetic enjoyment of the natural resources;
- Establishment of the carrying capacity for the areas through which the nature trails pass; and,
- Provision of educational pamphlets and/or aesthetically compatible signboards at trail heads that contain information on the conservation of the natural resources of the Base.

Many off-Base recreational opportunities are available for SJAFB personnel. Any group trips and outdoor activities sponsored by SJAFB need to be scheduled and planned in consideration of the carrying capacity of the off-Base resources. Before departing, Base personnel and other participants will be educated and briefed on the appropriate conservation practices for the specific natural resources being visited.

Fort Fisher Recreation Area

FFRA is charged with the mission of providing recreation and conference facilities activities for active and retired military personnel, DoD employees, and their families and guests. FFRA is located in close proximity to major tourist recreation areas along Cape Fear and in the Wilmington region, which creates a transitory human population that ebbs and flows with a relatively predictable seasonal variation.

The concept of carrying capacity is defined in the current Outdoor Recreation Plan by the facility's current level of use; however a precise carrying capacity for FFRA recreational facilities is needed in planning future projects, and in assessing current impacts to natural resources. Carrying capacity limits will be developed for the use of natural areas at FFRA including nature trails, potential historical and cultural sites, the bordering forest lands and the Cape Fear River frontage. Natural areas will be used only as non-consumptive outdoor recreation facilities for personnel enjoyment and educational opportunities of Recreation Area visitors.

Facilities use and future development will be guided and restricted by sustainable management practices to ensure the continued quality of recreational opportunities at FFRA, without diminishing the quality of that experience by harm to natural resources. Seasonal use of the facility will be determined and various seasonal vulnerabilities of the natural resources present. Overuse of the facility will be avoided and activities, and/or large numbers of visitors who represent threats to the quality of the recreational opportunity and/or to the natural resources present will be scrupulously avoided.

The desire to create an overflow use area for camping at FFRA, as outlined in the Outdoor Recreation Plan, will be reconsidered for its compatibility with DoD ecosystem management practices and for protection of the recreational quality of facilities located at FFRA. It is likely that the need for an overflow area indicates that use of the facility is already exceeding its carrying capacity. The Outdoor Recreation Plan will be updated to include carrying capacity information for all current and proposed recreational facilities.

7.4 CONSERVATION LAW ENFORCEMENT

Ensuring compliance with natural resource laws, regulations, and management initiatives is a cooperative effort. The SJAFB NRM is dedicated to the implementation and enforcement of this INRMP, and the pertinent natural resources laws and regulations.

Seymour Johnson Air Force Base

Natural resources staff at SJAFB is supported by Base Security Police, who function as the primary law enforcement and protection group at SJAFB. Furthermore, the services of state (NCWRC) and federal (USFWS) fish and wildlife agency enforcement personnel are involved as needed for their technical expertise or manpower. USAF policy is to permit access to installation lands by federal, state, and local conservation personnel for official enforcement duties. According to the MOU between the DoD and the USFWS, the USFWS will, upon request from the DoD, provide law enforcement support to protect and conserve fish, wildlife, and plan resources on DoD installations.

Fort Fisher Recreation Area

FFRA does not have access to onsite security personnel, however local, state, and federal law enforcement personnel are available to assist with oversight and enforcement of natural resource laws and regulations.

7.5 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES AND HABITATS

The ESA (Public Law 93-205) requires military installations to protect and conserve federally listed threatened and endangered plants and animals and their habitats. Candidate species are given the same protection as species that are already listed. ESA also requires that installations that support a listed species develop specific plans for preservation of the species and their habitats. AFPD 32-70 further requires that all installations prepare and maintain a current inventory of threatened and endangered species and habitats.

Seymour Johnson Air Force Base

No threatened or endangered species are known to occur at SJAFB, and the Base does not include any critical habitat. If any threatened or endangered species are discovered at SJAFB management a Threatened and Endangered Species Management Plan will be prepared in coordination with pertinent state and federal agencies.

If there is an indication that a species of concern exists on the Base, SJAFB will conduct a survey of insects, birds, mammals, amphibians and reptiles to generate a comprehensive species list for SJAFB and to reaffirm absence (or determine presence) of the Neuse River waterdog, a state species of special concern.

Fort Fisher Recreation Area

No threatened or endangered species are known to occur at FFRA, and the Recreation Area does not contain any designated critical habitat. The existence of rare plant species within the vicinity of FFRA (i.e., in open beach areas), and the potential for other rare insects or bird species to be observed nesting, breeding, or migrating throughout the area makes it important that natural resources personnel responsible for FFRA actively coordinate and cooperate with personnel responsible for the MOTSU buffer lands adjacent to FFRA. A survey of insects, birds, mammals, amphibians and reptiles will be conducted to generate a comprehensive species list for the Recreation Area. These data will allow for efficient, effective, and reasonable guidelines and policies to be developed and implemented for human uses of FFRA compatible with the protection of significant natural resources.

7.6 WATER RESOURCES PROTECTION

Protection of wetlands and water quality is an important part of natural ecosystem management due to the diverse biological and hydrologic functions they perform, such as improving water quality, groundwater recharge, pollution treatment, nutrient cycling, provision of wildlife habitat and niches for unique flora and fauna, stormwater storage, and erosion protection (Benton *et al*. 2008). To protect these important resources, many federal, state, and local laws have been enacted to regulate actions that impact them. SJAFB personnel will adhere to all applicable water resource protection laws.

7.6.1 Watershed Management

North Carolina has developed a “whole basin approach” to water quality protection that focuses on coordinating and integrating all program activities for each of the State’s 17 major river basins. North Carolina is one of several coastal states to take a lead in realigning their water quality programs along watershed boundaries.

The Riparian Buffer Protection Rules for the Neuse and Tar-Pamlico River Basins (15A NCAC 2B .0233 and 15A NCAC 2B .0259) became effective in 2000. The purpose of this rule is to protect and preserve existing riparian buffers in the Neuse and Tar River basins to maintain their nutrient removal function. The Neuse River Buffer Rule applies to all intermittent and perennial streams, lakes, ponds and estuarine

waters in the basin. Because SJAFB lies within the basin, all intermittent and perennial streams on Base fall under this rule. Fifty (50)-foot buffer zones on both sides of the streams are protected and removal of vegetation in the riparian buffer zone requires compliance with the rule. Continuation of existing management practices (such as periodic mowing within the buffer zone) are exempt. All projects that could potentially impact the Neuse River or its tributaries will be reviewed for compliance with the Neuse River Buffer Rule, and practicable avenues of avoidance of buffer zone impacts will be considered.

To help ensure the protection of the Neuse River Watershed, the following management actions will be implemented.

- Analyze the adequacy of existing stormwater facilities and BMPs to handle current and potential "first flush" effects within each drainage basin and for each installation as a whole. Subsequent to the analysis, decisions will be made concerning the need for additional mitigating actions or structures within each drainage basin for the short and long term. These decisions will be guided by known and possible future mission changes and other possible developments. These analyses and the resulting data will allow for a more precise, effective, and less costly response to any potential surface water or ground water problem that might arise. This information will be available for long term planning for the location of new buildings as well as for evaluating the location of existing facilities and the performance of any new functions that have the potential for water contamination.

- Collect effluent data from each drainage basin within the context of an ecosystem goal for surface and ground water discharges from SJAFB to make it easier to evaluate the scientific, ecological, and economic value of current and proposed BMPs.

- Develop accurate drainage maps with topographical characteristics clearly delineated using GIS to indicate the nature of rain events (i.e., frequency, scope, and amount) and other precipitation for a relevant historical period. An analysis will be conducted to identify where precipitation differences exist, where the greatest amount of water accumulates during rain events, where the greatest amount of water re-enters the groundwater table (based on an accurate soil analyses), and data showing mean and maximum stormwater flows for various drainage basins over a relevant period of time. Because there is an intimate connection between the IRP and the management of water resources, coordination with the IRP and HAZMART is essential in planning the drainage basin studies and in developing the drainage basin approach.

- Collect seasonal and annual data and aggregated concerning stormwater runoff and nonpoint source pollution to evaluate the contribution and water quality of stormwater runoff from SJAFB and FFRA to the surrounding watersheds.

- Address watershed protection and enhancement of water quality of effluent discharges, and the amounts of water used in future landscaping and grounds maintenance activities, including the use of herbicides, pesticides, and fertilizers.

- Apply appropriate stormwater management practices for groundwater recharge and preservation for future facilities use and construction.

Aquatic ecosystems are most effectively addressed in a watershed context. A comprehensive watershed approach will ensure collaboration and cooperation with all agencies and organizations that have jurisdiction over, and/or are interested in water resource protection. The USAF entered into an agreement with the Coastal America National Implementation Team to coordinate and cooperate in the restoration and protection of coastal areas (AFI 32-7064).

7.6.2 Floodplain Management

EO 11988 (Floodplains Management) requires all federal agencies to provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and, restore and preserve the natural and beneficial values of floodplains in acquiring, managing, and disposing of federal lands.

7.7 WETLANDS PROTECTION

As directed by the CWA, the military is responsible for identifying and locating jurisdictional waters of the U.S. on their properties, including wetlands that have the potential to be impacted by activities associated with the military mission. Activities that have the potential to impact wetlands and waters of the U.S according to Section 404 (CWA) include development of roads, installation of new culverts, and grading or fill activities. However, certain actions that have minimal adverse impact on wetlands and other water resources may qualify for a Nationwide Permit (NWP). The NWP Program was designed to streamline the Section 404 permitting process and includes activities conducted under 'maintenance activities' such as repairing, rehabilitating, or replacing existing structures as well as removing accumulated fill or debris from within or around existing structures. Activities associated with aquatic habitat restoration, establishment, or enhancement may also qualify under a NWP.

Impacts to wetlands and other surface waters by planned future projects are to be avoided to the extent practicable. A formal jurisdictional wetland and water resources delineation will be needed to verify resource boundaries before undertaking activities that disturb regulated wetlands or waterbodies, and a CWA Section 404 permit may be required. When wetland impacts are unavoidable and a permit is required to authorize the activity, appropriate impact minimization and mitigation will be required and will be determined through consultation with the appropriate federal and state agencies (USACE, USFWS, and NCWRC). Additionally, Section 404 requires restoration of wetlands damaged by any project activities, with in-kind replacement of wetlands as the preferred mitigation strategy.

In accordance with AFI 32-7064, USAF installations will avoid starting new construction in wetlands unless there are no practicable alternatives to such construction. Any proposed design for development or construction must utilize all practicable measures to minimize harm to wetlands and demonstrate that potential impacts have been analyzed at the appropriate level of environmental impact analysis. In making final decisions, the USAF will consider the requirements of the military mission, the economic and environmental impact, and other pertinent factors. The term "new construction" is defined by EO 11990 as draining, dredging, channelizing, filling, diking, impounding, and related activities. Activities in wetlands may not commence until 30 days after the publication of a finding of no significant impact (FONSI) or Record of Decision (ROD) resulting from NEPA review of the proposed action. Additional guidelines and requirements for evaluating wetland impacts and conservation and preservation of wetland habitat are provided in Chapter 4 of AFI 32-7064.

Proposed projects that may impact wetlands require that a jurisdictional wetland delineation that has been conducted by a qualified wetlands professional is approved by USACE. It is often neither practical nor cost effective to maintain a current (i.e., performed within the past 3 years) USACE jurisdictional wetland delineation for an entire installation. One alternative is to maintain current USACE delineations for areas where construction or other development is anticipated in the near future. A jurisdictional wetland delineation should be reevaluated after 3 years if monitoring indicates that the wetlands have significantly changed, or if a proposed activity is tentatively sited within 50 feet of the wetlands boundary.

Due to the extent of development at SJAFB and FFRA, wetlands do not currently present any significant management concerns, and there are no current or anticipated section 404 or 401 permitting activities or obligations. A planning level wetland delineation should be conducted at both installations for future land use planning purposes. Upon completion of the wetland delineations, a thorough review of management decisions and activities with regard to land use and wetlands will be conducted.

7.8 GROUNDS MAINTENANCE

EO 12856 (Environmentally and Economically Beneficial Landscaping Practices) requires all federal agencies to develop sustainable landscaping practices to address environmental concerns. These include, but are not limited to, water conservation, energy conservation, erosion control, and a reduction in the use of fertilizers and pesticides.

The following landscape management guidance will be implemented:

- Minimize requirements for fertilizer and pesticide use;
- Establish low maintenance, self-sustainable varieties of native trees, grasses and flowering plants;
- Incorporate the proper use of mulches to effectively conserve water, reduce weeds, and control erosion;
- Establish further goals for composting, and of recycling green yard wastes;
- Establish goals for use of recycled water and/or high efficiency irrigation systems;
- Ensure the proper placement of trees, shrubs, and other plants for long-term savings in grounds maintenance, water, and energy costs;
- Design, use, and promote construction practices that minimize adverse effects on the natural habitat;
- Provide a list of types of vegetative cover to be encouraged and discouraged on the different categories of land use present;
- Provide information on the appropriate planting, mowing and pruning seasons;
- Establish goals to reduce the use of fertilizers and reduce irrigation requirements;
- Provide information and training for personnel performing weed and pest control;
- Incorporate IPM practices over time; and,
- Provide recommendations, where possible, for converting improved grounds to semi-improved grounds, converting semi-improved grounds to unimproved grounds, and maintaining and expanding natural areas.

7.9 FOREST MANAGEMENT

Although forest resources at the installations are limited, proactive management of this habitat is essential for maintaining the balance of ecological communities available for use by wildlife, and to maintain overall ecosystem health and forest sustainability. The current UFMP provides the natural resources management guidelines and recommendations for SJAFB. Forest resources at FFRA are limited, and do not warrant a specific forest management plan. No additional forest management goals have been established for this INRMP.

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The UFMP for SJAFB was adopted prior to issuance of ecosystem management guidelines by the USAF. The recommendations provided in this document will replace the UFMP, as this INRMP will serve to provide integrated natural resources management for all natural resources program areas. The current forest resources of SJAFB are expected to be retained in their current condition, and no timber harvesting is expected to occur.

Fort Fisher Recreation Area

No special management of the trees at FFRA is needed. There is no commercial timber available on FFRA, and the forest resources on the property are relatively sparse and fragmented except along FFRA's borders. The adjacent CFEF is managed by MOTSU and any activities that could potentially impact forested areas located along FFRA boundaries will be coordinated with MOTSU

7.10 WILDLAND FIRE MANAGEMENT

Prescribed burning is not accomplished for SJAFB or FFRA. Wildfire threat is low, so no wildland fire management is proposed.

7.11 AGRICULTURAL OUTLEASING

There are no agricultural outleases applicable to SJAFB or FFRA.

7.12 INTEGRATED PEST MANAGEMENT AND INVASIVE SPECIES

All pest management issues will be handled according to the SJAFB Integrated Pest Management Plan (IPM). The IPM is maintained and reviewed annually by the Entomology Section of the Civil Engineer Squadron and the entomologist at the headquarters of ACC. An IPM has also been prepared specifically for the golf course that ensures that the most appropriate control of pests is applied that minimizes impacts to natural resources, while simultaneously supports the military mission.

Invasive species management includes control of insect pests, invasive plant species, and noxious weeds, through treatment and prevention measures. Invasive species management can be implemented via a strategy of IPM that will aid in control by changing routine practices, or making habitat and structural alterations. The integration of IPM strategies will reduce the use and need for application of chemical controls; however, chemical controls may be required if problems persist despite the use of IPM methods. When chemical controls are necessary, they will be applied carefully to kill only targeted pests, with minimum use of the least toxic product available.

An invasive species survey will be conducted at both installations, when resources allow, to assess the presence and extent of invasive species. Where invasive species removal is warranted, manual removal is the preferred method; however, for persistent species, application of an herbicide may also be required to ensure eradication efforts are successful.

7.13 BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)

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Bird and wildlife strike issues will be handled according to the SJAFB BASH Plan, which was prepared for the Base and provides guidance for reducing the potential for bird/wildlife airstrike hazards during takeoffs and landings (USAF 2009b). The extensive open country surrounding the runways of SJAFB may provide foraging areas for raptors and other types of birds, which could present a potential hazard for aircraft taking off and landing at the Base. As required by the BASH Plan, data are collected for all bird and wildlife removals that have occurred. The preferred method of dispersing birds and wildlife observed within the airfield area is through the use of pyrotechnics. Other measures that may be used in include killing/euthanization, capture, or relocation. The BASH Plan is maintained and reviewed annually by the Safety Office of the Operations Group, and close coordination is maintained between Environmental Flight personnel and the BASH wildlife biologist responsible for day-to-day BASH issues. Over the 4-year period of 2006–2009, a total of 80 bird/wildlife airstrikes were recorded, averaging about 20 strikes

per year. Meanwhile, the implementation of the BASH Plan has successfully protected thousands of birds and countless USAF pilots by preventing them from encountering one another in-flight.

A Special Airport Depredation Permit issued by the NCWRC has been maintained at SJAFB since 2001. This permit establishes various procedures and allowances for removal of small mammals and deer. An annual report is provided to NCWRC within 15 days of the permit expiration date (December 31) each year, and timely submittal of this report automatically initiates the issuing of an updated permit.

Fort Fisher Recreation Area

BASH does not apply to FFRA due to the lack of aircraft traffic.

7.14 COASTAL ZONE AND MARINE RESOURCES MANAGEMENT

The Coastal Zone Management Act (CZMA), administered by NOAA, is the law that authorized funding for state coastal programs around the country to improve the environmental and economic health of America's coastal areas by establishing federal-state partnerships, and provided the legal framework related to management of the nation's coastal resources. The CZMA encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife supported by those habitats. The CZMA grants North Carolina and other coastal states that have a federally approved coastal management program the authority to review federal activities, federal license or permit activities, and federally funded activities to ensure that federal actions that may affect its coastal area meet the "enforceable policies" of the state's coastal program. The process by which a state decides whether a federal action meets its enforceable policies is called federal consistency review. Federal consistency applies to any activity that is in, or affects land use, water use or any natural resource in the coastal zone, if the activity is conducted by or on behalf of a federal government agency, requires a federal license or permit, receives federal funding, or is a plan for exploration, development or production from any area leased under the Outer Continental Shelf Lands Act.

Federally owned properties may be excluded from the coastal zone, however, federal activities that can be reasonably expected to affect any land or water use or natural resource within a coastal zone outside the federal property are still subject to a federal consistency review. Therefore, any activity that may affect the natural resources down gradient of the federal property boundary is subject to a federal consistency review. The NRM should consider and be aware of any activities that could impact the coastal zone, including but not limited to sedimentation problems.

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SJAFB is part of the Neuse River drainage basin, which ultimately empties into Pamlico Sound, a significant estuary on the North Carolina Coast. SJAFB does not fall within the North Carolina Coastal Management Zone as defined in federal law, and the overall contribution of SJAFB to the health of Pamlico Sound is probably small; however, an ecosystem approach to the management of water resources is recognized as an important part of the planning process at SJAFB.

Fort Fisher Recreation Area

The location of FFRA on the coast necessitates close cooperation and coordination with representatives from the North Carolina Coastal Management Program, and other state and local agencies responsible for coastal zone management and protection. In particular, stormwater drainage patterns, quality, and effects will be closely scrutinized and monitored, and potential "first flush" effects (effects that occur immediately after the onset of a rain event) will be mitigated where they may be found to be detrimental

to waters located on FFRA and in the vicinity. In a first flush, materials and substances that have accumulated since the last rain event are quickly transported into the storm water runoff and can create a shock for surrounding water bodies and streams. Often, these first flush effects represent the greatest threat for short term contamination and direct harm to natural resources.

7.15 CULTURAL RESOURCES PROTECTION

The *Seymour Johnson Integrated Cultural Resources Management Plan* outlines the cultural resources of SJAFB and FFRA, and plans for management of those resources in accordance with AFI 32-7065 and pertinent other guidelines and regulations. These facilities have been comprehensively surveyed for the presence of significant cultural resources consisting of prehistoric (pre-European contact) and historic period archaeological sites and above ground sites, buildings, structures, and objects. SJAFB contains two Cold War Era historic properties eligible for listing on the National Register of Historic Places (NRHP) (Buildings 5015 and 2130) and one Cold War Era cultural resource that has been recommended as eligible for the NRHP (Building 4909). FFRA contains one NRHP eligible historic property (Civil War Era historic archaeological Site No. 31NH697) and one unevaluated cultural resource (Civil War Era historic archaeological site No. 31NH642). Natural resources management activities has limited potential for adversely affecting these historic structures.

7.16 PARTNERSHIPS AND OUTREACH

It is important to establish partnerships and conduct public outreach to promote the conservation and stewardship of the natural resources of the installations. A partnership with the North Carolina chapter of Partners in Flight will be pursued in order to evaluate the potential for the installations to participate in the Neotropical Migrant Program. A partnership with the North Carolina chapter of Watchable Wildlife, Inc., also will be pursued for participation in the Watchable Wildlife Program. Base personnel also are encouraged to establish and participate in natural resource programs such as Arbor Day, Earth Day, Audubon Christmas Bird Count, and other programs that promote environmental conservation and stewardship.

7.17 GEOGRAPHICAL INFORMATION SYSTEMS (GIS) MANAGEMENT, DATA INTEGRATION, ACCESS, AND REPORTING

GIS is a term that describes a computer based mapping, database management and analysis technology that is used by DoD facilities to manage a wide range of issues including comprehensive planning, facilities management, construction management, natural resources management and assessment of environmental impacts and environmental restoration. This technology links digital maps of facilities and natural resource features such as land-use, soils, and hydrology with data concerning the attributes of those features stored in a powerful database management system (such as Oracle). Examples of data that can be included in the GIS database include:

- Number and function of installation structures;
- Characteristics of air operations areas;
- Water quality data for installation water resources; and,
- Location of significant wildlife habitat, critical habitat, and species occurrences.

The USAF recognizes the benefits of being able to perform spatial analysis of installation features, both man-made and natural. Buffer-zones can be readily generated at specified distances around features such as noise contours around runways or safety zones around explosive storage areas. Additionally, multiple layers of thematic data can be overlaid and the intersection or union of those multiple layers can be used to understand where to locate facilities or perform operations based on factors such as land use, land

cover, flood zones, soils, proximity to road access and other pertinent factors. Digital models of terrain can also be developed and utilized in GIS, and use of this type of GIS data has been applied to aviation, delineation of flood zones and for facility engineering purposes.

The SJAFB and FFRA GIS database will continue to be developed to support the management of natural resources. Additional GIS information that will be catalogued for each installation includes, but is not limited to:

- Identification of present and proposed land uses;
- Delineation and analysis of floodplains;
- Analysis and evaluation of drainage basins;
- Wetland delineation;
- Soils analysis;
- Carrying capacity information for recreational facilities;
- Identification of natural communities and sensitive ecosystems; and,
- Natural resource survey locations and results.

CHAPTER 8
MANAGEMENT GOALS AND OBJECTIVES

This Chapter contains the management goals and objectives which reflect the direction of SJAFB's natural resources management program during the planning period. They were developed in response to issues and management concerns obtained from cooperating agencies, the military mission, and other interested stakeholders. Goals are the primary focal points for the implementation of this plan over the 5-year planning period, and include primary and supportive goals.

Goals. Goals are the primary focal points for the implementation of the INRMP over the five years covered by the plan. A goal should reflect the values of the installation by expressing a vision of a desired condition for the installation's natural resources in the foreseeable future. Each goal is supported by one or more objectives.

Objectives. Each goals is supported by objectives which indicate a management initiative or strategy that will be used to achieve the stated goal. An objective specifically states what will be done and how it will be done. An objective must be time-bound and measurable. The objective statement, therefore, should include timelines for completion and quantifiable units for measuring results (e.g. acres treated) so that you are able to determine exactly when the objective is completed. Briefly explain the performance measures that will be used to monitor the success or failure in achieving each objective.

Projects. Projects (or Tasks) are the individual component actions required to achieve an objective. Projects statements describe the specific methods and procedures that will be used (i.e. scopes of work) to achieve the objective supported. Projects are actions that become line items in the proposed budgets (e.g. ACES-PM) for INRMP implementation. Projects must be achievable within the period covered by the INRMP.

The mission statement of the natural resources management program at SJAFB and FFRA is to facilitate and enhance the military mission through the conservation, protection, and consideration of natural resources on the installation. Inherent in this mission statement is the requirement to maintain realistic training areas with viable populations of native plants and animals through the professional management of the natural infrastructure. Within the context of this mission statement, the following management goals and objectives are provided to ensure compliance with the terms and intent of the 1997 amendments to the Sikes Act and other applicable natural resources laws and regulations and to ensure no net-loss in the capability of the natural infrastructure to support the military mission of SJAFB and FFRA. As discussed throughout this INRMP, the remaining natural resources at both SJAFB and FFRA are limited in scope and nature. There are no threatened or endangered species or their habitats, there are no natural surface water bodies, and there are only small fragmented forest areas on SJAFB, and no forested areas on FFRA. Therefore, the goals, objectives, and projects are also limited in scope and nature.

GOAL 1: PROTECT THE LIMITED REMAINING NATURAL RESOURCES AT SJAFB AND FFRA

. Objective 1.1: Protect wetlands and Waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Sustain "no net loss" and prevent degradation of existing functions and values over the INRMP planning period.
    Project 1.1.1: Eliminate or minimize wetland disturbances due to construction
    Project 1.1.2: Maintain GIS coverage of jurisdictional wetland boundaries for use in Base planning.

Objective 1.2: Protect the natural features of creek and river floodplains to preserve functions and minimize personnel and property risk from flood hazards.

Project 1.2.1: Eliminate or minimize disturbances within the 100-year floodplain.

Project 1.2.2: Review proposed developments to determine whether they will occur in the floodplain and recommend appropriate BMPs for floodplain protection when development would occur near floodplains.

Objective 1.3: Conserve water resources by promoting practices and actions that reduce water use.

Project 1.3.1: Track water usage and identify oppurtunities for water savings.

CHAPTER 9
INRMP IMPLEMENTATION, UPDATE AND REVISION PROCESS

This INRMP was developed by the Seymour Johnson natural resources staff and approved by the Seymour-Johnson AFB Wing Commander. In accordance with the Sikes Act and Title 32 of the Code of Federal Regulations (CFR) 989, *The Environmental Impact Analysis Process*, the plan was also coordinated with appropriate federal, state, and local government officials, public groups, and individuals with interest in or jurisdiction of natural resources in North Carolina.

9.1 NATURAL RESOURCES MANAGEMENT STAFFING

The SAIA states "Section 107 of the Sikes Act (16 U.S.C. 670e-2) requires sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel to be available and assigned responsibility to perform tasks necessary to carry out Title I of the Sikes Act, including the preparation and implementation of integrated natural resource management plans". SJAFB is currently staffed by one Natural Resource Manager.

The professional development of natural resources management staff greatly enhances the effectiveness of this INRMP. This requires the maintaining of staff knowledge through training and participation in conferences and workshops.

The management of natural resources requires a specialized skill set on the part of personnel. In addition to holding science based degrees, Environmental Flight personnel acquire skills by attending training through the Air Force Institute of Technology, Civil Engineer and Services School, Civil Engineering Corps Officers School, and National Conservation Training Center. All natural resources managers at Category I installations must take the course *DoD Natural Resources Compliance*, developed by the DoD Interservice Environmental Education Review Board (ISEERB) offered by the Naval School, Civil Engineer Corps Officer School (CECOS).

Natural resources staff keep abreast of current issues by attending annual training held by various professional societies. Societies such as National Military Fish and Wildlife Association, The Wildlife Society, Society of American Foresters, and Society for Ecological Restoration all host annual meetings focused on the management of natural resources. Additionally, specialized conferences, such as Atlantic White Cedar Symposium, Red-cockaded Woodpecker Symposium, Fire Behavior and Fuels Conference, wetlands training and GIS training courses are attended by staff.

The Air Force offers online training modules in environmental and natural resources programs through the Environmental and Safety and Occupational Health program.

9.2 ANNUAL COORDINATION REQUIREMENTS

The INRMP will be reviewed annually to assess the effectiveness of integration linkages. Findings from this annual review will be presented to update senior Base leaders of the status and effectiveness of the Plan. Annual updates of the INRMP, including specific proposed projects for each upcoming FY, will be prepared by 4 CES prior to the preparation of the annual Conservation, Forestry, and Fish and Wildlife budgets.

In accordance with AFI32-7064, annual review and coordination of the INRMP with the state fish and wildlife management agency and the US Fish and Wildlife Service is required to evaluate the progress of INRMP implementation and to make recommendations on how management actions need to be adjusted to improve the efficiency and effectiveness of the Plan. Components will include the review of all

goals/objectives/projects, monitoring data, undertakings that required submission of Air Force Forms 332 or 813, and stakeholder involvement activities. Each review should result in adding another year of projects to the Plan. The target date for conducting annual reviews is immediately prior to the close of each FY (i.e., between 1 Sep and 30 Sep).

A critical consideration is to ensure that there is no net loss of military capability as a result of implementing the INRMP. Specifically, this evaluation will require careful examination of management objectives from which annual projects are developed.

Consensus should be reached on (1) whether or not the INRMP was fully implemented, and (2) whether or not the management practices were effective. If no significant revisions are required, the parties will be requested to sign a memorandum stating that the plan was fully implemented and that management is effective. If it is determined that the plan is ineffective or needs substantial revision, the update process should be initiated.

9.3 MONITORING INRMP IMPLEMENTATION

Monitoring INRMP Implementation will be a component of the annual review. The annual review will capture the previous year's work and any changes necessary in the INRMP or work plans to respond to conditions, both operational and climatological, to ensure the continued effective management of resources and sustainment of the military mission.

The annual review will be captured by the following written documentation:

1. The year the most recent INRMP was completed or revised.
2. The organizations contacted and/or that participated in coordination.
3. Feedback (if any) from the coordination groups/organizations.
4. Any changes made, as a result of the coordination (e.g., project changes, document changes, etc.).
5. Status of project funding.
6. Accomplishments for the previous year and planned future efforts.
7. Determination of whether the INRMP requires revision.

As the foundation for adaptive management on-base, these annual reviews will help keep the INRMP current and relevant with the incorporation of new projects, additional data, new understanding of natural processes and species, knowledge of other Base operations impacting natural resources, and lessons learned from completed and ongoing projects.

Annual reviews and updates will be conducted to account for minor changes. Substantive changes in the military mission, condition of natural resources, the ecosystem, and regulatory requirements would drive a revision of the INRMP. More specifically, the INRMP will be revised for the following reasons:

(1) when mission interference or lack of mission support requires a change in natural resource management direction;
(2) when ecological monitoring data reveals management actions are having a negative effect on the resources and have reached a threshold of significance, requiring a fundamental change in management methods; and
(3) when new laws or regulations require additions or deletions of management activities. If major revisions are needed, the Environmental Element should outline a schedule to accomplish the revision and notify the MAJCOM.

CHAPTER 10 FY 2016 WORKPLAN

FY 2016	Proj Description	Implement	Fund Source	Priority
	Minimize wetland disturbances	Current/Ongoing	No Funding	#1
	Minimize floodplain disturbances	Current/Ongoing	No Funding	#2
	Track & Conserve Water	Current/Ongoing	No Funding	#3

1

FY 2017	Proj Description	Implement	Fund Source	Priority
	Minimize wetland disturbances	Current/Ongoing	No Funding	#1
	Minimize floodplain disturbances	Current/Ongoing	No Funding	#2
	Track & Conserve Water	Current/Ongoing	No Funding	#3

2

FY 2018	Proj Description	Implement	Fund Source	Priority
	Minimize wetland disturbances	Current/Ongoing	No Funding	#1
	Minimize floodplain disturbances	Current/Ongoing	No Funding	#2
	Track & Conserve Water	Current/Ongoing	No Funding	#3

3

SEYMOUR JOHNSON
AIR FORCE BASE
GOLDSBORO, NORTH CAROLINA

BIRD AIRCRAFT STRIKE HAZARD (BASH) PLAN

FEBRUARY 2015

February 2015

4TH FIGHTER WING/SE
SEYMOUR JOHNSON AFB, NC 27531-2524

SEYMOUR JOHNSON AFB BIRD AIRCRAFT STRIKE HAZARD (BASH) PLAN

MEMORANDUM FOR: See Attached Distribution List

FROM: 4 FW/CC

SUBJECT: Seymour Johnson AFB BASH Plan.

1. The Seymour Johnson AFB BASH Plan provides guidance for reducing the bird aircraft strike hazard in the areas where the 4FW and tenant flying units based at Seymour Johnson AFB (916 ARW) conduct flying operations.

2. This plan is effective upon receipt.

3. This document supersedes the previous BASH plan dated October 2013.

4. The office of primary responsibility for this plan is 4 FW/SE.

Mark H. Slocum, Colonel, USAF
Commander

Attachments:
1. Distribution List
2. Environmental Analysis
3. Bird Exclusion Zone (BEZ)
4. Coastal Area Map

RECORD OF CHANGES:

This 4 FW BASH plan has undergone a complete revision and restructure.
A highlight of policy changes are as follows:

2.1.4. BHWG information now presented at the Flight Safety Council instead of ESOH Council.

4.1.1. The BWC can only be downgraded with approval from 4OG/CC or representative.

5.4.3.2. Clarification of aircraft speed while in BWC Moderate on Low-levels, MOA's and R-5306A .

6.1.1. Range Control Officer has the authority to upgrade BWC at Dare Bombing Range.

6.4.1. MERLIN radar capabilities have changed and the altitude and ranges have been updated.

7.3. Dedicated bird clearing pass at Avon Park Range regardless of BWC.

TABLE OF CONTENTS

ATTACHMENTS

1. SUMMARY

1.1. PURPOSE: The 4 FW BASH Plan provides 4 FW agencies and tenants with a program to mitigate bird hazards where SJAFB assigned aircraft conduct flight operations. In areas where the hazard is not controllable, the plan attempts to minimize exposure of SJAFB assigned aircraft to expected bird concentrations that would present an unreasonable risk of bird strikes. The primary flying units and aircraft utilizing the airfield include the 4 FW (F-15E) and the 916th Air Refueling Wing (KC-135R). This plan includes the terminal area, local low levels, and local bombing ranges.

1.2. DESCRIPTION OF LOCAL BIRD HAZARDS: The concentration of birds at and around SJAFB poses a significant risk to flying operations. The terrain, bodies of water and climate are ideal living conditions for birds year-around, as well as those who migrate. Many SJAFB low-level routes and the Dare County Bombing Range are located within the Atlantic Flyway, one of the most concentrated areas of migratory birds in the United States. See attachment 2 for a detailed description of the bird hazards associated with SJAFB.

1.3. CONDITIONS OF EXECUTION: This plan is based on hazards from both resident bird populations and seasonal bird migrations. Implementation of specific portions of this plan is continuous, while other portions require implementation as dictated by bird activity.

1.4. OPERATIONS TO BE CONDUCTED: Specific operations include:

1.4.1. Maintain a Bird Hazard Working Group (BHWG) and a Bird Hazard Working Team (BHWT).
1.4.2. Eliminate or reduce environmental conditions that attract birds to the airfield.
1.4.3. Prevent and eliminate high-risk concentrations of birds in the terminal area.
1.4.4. Outline potential areas and times for high-risk bird activity.
1.4.5. Outline procedures for reporting observed hazardous bird activity.
1.4.6. Outline procedures for altering or discontinuing flying operations to avoid expected and/or actual hazardous bird activity.
1.4.7. Disseminate information to assigned and transient aircrews regarding specific bird hazards and avoidance procedures.

1.5. REFERENCES:

1.5.1. AFI 91-202
1.5.2. AFI 91-204
1.5.3. AFP 91-212
1.5.4. AFSEC BASH TEAM
1.5.5. ACC SE BASH
1.5.6. US BAM
1.5.7. AHAS

2. CONTROL MEASURES

2.1. BIRD HAZARD WORKING GROUP (BHWG)

2.1.1. Function: Collect, compile, and review data on bird strikes, identify and initiate actions to reduce wildlife hazards. Recommend changes in operational procedures, prepare informational programs for aircrews, and highlight BASH issues with off-base agencies.

2.1.2. Authority: The 4 FW Vice Wing Commander chairs the BHWG meetings and approves/disapproves recommendations of the group. 4FW Flight Safety (SEF) will provide oversight.

2.1.3. Composition: IAW AFI 91-202, the 4 FW BHWG will consist of, as a minimum, representatives from:

2.1.3.1. Flight Safety
2.1.3.2. United States Department of Agriculture (USDA)
2.1.3.3. Air Traffic Control
2.1.3.4. Civil Engineering
2.1.3.5. Airfield Management
2.1.3.6. Aircraft Maintenance
2.1.3.7. 4FW Range and Airspace
2.1.3.8. 916 ARW/SE

2.1.4. Meeting schedule: Directly after or combined with the semi-annual Flight Safety Council meetings.

2.1.5. Reference document: A Wildlife Hazard Assessment was conducted by USDA personnel for SJAFB, associated low-level routes and Dare County Range in 2003. The Wildlife Hazard Assessment document should be referenced as a baseline before making any changes to 4 FW BASH policies or procedures. A copy of the assessment is located in flight safety.

2.2. BIRD HAZARD WORKING TEAM (BHWT)

2.2.1. Function: The 4 FW has gone beyond the minimum requirements for a BHWG to establish a local BHWT. The BHWT is a more refined version of the BHWG, intended to accomplish specific and detailed work with regards to the BASH program.

2.2.2. Authority: The 4 FW Flight Safety Officer or the USDA Biologist chairs the BHWT. Decisions of the team are generally agreed upon collectively. However, the chairman will rely on the normal chain of command for appropriate issues.

2.2.3. Composition: The BHWT is composed of:

2.2.3.1. Flight Safety BASH Program Manager
2.2.3.2. USDA Representatives
2.2.3.3. Flight Safety NCOIC
2.2.3.4. 4 FW Stand/Eval (OGV)

2.2.3.5. 4 FW Scheduling (OSOS)
2.2.3.6. Civil Engineering:
2.2.3.7. Pest Management
2.2.3.8. Environmental Management Element
2.2.3.9. Pavement & Construction Equipment
2.2.3.10. Grounds Maintenance
2.2.3.11. Air Traffic Control
2.2.3.12. Airfield Management
2.2.3.13. Aircraft Maintenance
2.2.3.14. Base Foreign Object Debris (FOD) manager
2.2.3.15. Squadron Flight Safety Officers (SFSOs)
2.2.3.16. 916 ARW/SE
2.2.3.17. 916 OG/OGV

NOTE: If a member's participation is not anticipated, it is not necessary for that person to attend.

2.2.4. Meeting schedule: The BHWT meets quarterly, ideally a week prior to the BHWG. Potential topics of discussion for each quarter are: January – Wintering waterfowl, review fall migration, spring migration. April – Grass cutting, nesting season. July – Blackbird flocking. October – Final grass cut, fall migration, FY bird activity. Invitations are distributed by electronic mail and acknowledged with RSVP. An annual review of BASH procedures will be accomplished during the first meeting of each fiscal year typically occurring in October or November.

2.3. BIRD WATCH CONDITIONS (BWCs)

2.3.1. AFI 91-202 outlines the definitions of USAF BWCs as listed below. There are three levels of risk, LOW, MODERATE, and SEVERE, which will be referenced. This terminology will be used for rapid communications to disseminate information regarding significant bird activity and to implement specific operational procedures. Do not confuse the USAF BWC definitions with those used by the Avian Hazard Avoidance System (AHAS).

2.3.2. At the airfield, USAF BWC apply. Observation of local conditions will be the primary means to establish the Seymour Johnson AFB BWC. However, the AHAS should be used as an aid to predicting BASH risk in the local area, especially during night operations. On a low-level or any range in the 4FW Inflight Guide, AHAS BWC applies. Local flight observations and MERLIN Radar (where available) should be used to aid AHAS BWC and ensure safe operating conditions.

2.3.3. USAF BWCs are definied as follows:

2.3.3.1. **Bird Watch Condition LOW**: Wildlife activity on and around the airfield representing low potential for strikes. For example: Up to 20 small birds in the airfield environment, or on a low level or range, one near pass with a small, non-migratory bird may allow for the BWC to remain LOW. Under these circumstances, however, a warning to following aircrew to avoid a known bird hazard, albeit minimal, is expected and encouraged.

2.3.3.2. **Bird Watch Condition MODERATE**: Wildlife activity near the active runway or other specific locations representing increased potential for strikes. BWC MODERATE requires increased vigilance by all agencies and supervisiors and caution by aircrew. For example: 20-50 small birds in the airfield environment, but not near the runway or approach/departure paths, or 1-3 predator (hawk) size birds flying near the runway may constitute BWC MODERATE.

2.3.3.3. **Bird Watch Condition SEVERE**: Wildlife activity on or immediately above the active runway or other specific location that representing high potential for strikes. Supervisors and aircrews must thoroughly evaluate mission need before conducting operations in areas under condition SEVERE. For example: More than 50 small starling size birds or 1-2 hawks congregating near the approach or departure paths would warrant BWC Severe. A smaller group (4-10) of duck size birds or a large concentration (100+) of starlings anywhere within the Bird Exclusion Zone may also constitute BWC Severe. On a low-level, any concentration of birds that causes a flight lead to recommend that the 4 FW Supervisor of Flying (SOF) close the low-level segment, such as a large migration of swans or ducks, would define BWC SEVERE. On a range, any concentration of birds that cannot be safely avoided while flying below 4500' AGL would define BWC SEVERE. Sometimes BWC SEVERE may need to be declared for a protracted time period, potentially halting certain flight training and causing non-effective sorties. The SOF, Tower Watch Supervisor, or Airfield Management should declare the appropriate level of BWC for the current or predicted conditions, regardless of the expected duration or impact on mission effectiveness.

2.3.4. AHAS definitions are defined on the AHAS web site (www.USAHAS.com). AHAS is an internet-accessible system that uses weather radar and thermal data to monitor and predict bird concentrations in near real time. In addition to offering a current observation of bird activity, AHAS is capable of forecasting bird risk for up to 24 hours in advance. Aircrew will follow AHAS BWC and may elevate BWC based on flight observed conditions, but not reduce BWC.

2.3.5. Restrictions based on BWC and flight location are covered in Sections 4-8 of this document.

2.4. BASH PHASE I – 16 November through 14 August. Wildlife activity is generally LOW during these periods with the primary threat resulting from turkey vultures, hawks, and waterfowl. During the rainy periods between December and April, gull activity increases on and around the runway environment. The City of Goldsboro operates a waste water treatment pond facility off the West end of the runway that attracts over 1,000 wintering waterfowl between November and April.

2.5. BASH PHASE II – 15 August through 15 November. Wildlife activity is increased during the fall due to migration. The primary threat is from flocking blackbirds, swallows and mourning doves. Expect Bird Watch Conditions to change to MODERATE or SEVERE at any time during these periods.

2.6. HISTORICAL CONDICTIONS -- The following conditions have historically produced hazardous levels of bird activity.

2.6.1. An approaching weather frontal system
2.6.2. Low cloud ceilings without precipitation
2.6.3. One hour before or after sunrise or sunset
2.6.4. Drastic changes in temperature: 15 degrees/30 minutes
2.6.5. Known migration seasons

3. COMMUNICATIONS

3.1. Information regarding bird hazards may be received through a variety of sources. For example, signs posted around the airfield within the Bird Exclusion Zone instruct observers to report bird activity to the control tower (generally via radio) or to Airfield Management at DSN 722-4097. Aircrew routinely advises the SOF on UHF radio of bird sightings. Flight Safety and USDA are often informed through consultants and local military bases that potential bird hazards exist. Whatever the source of the information, the changes to the BWC must be disseminated quickly and appropriately once it has been declared.

3.2. Because each BWC infers associated restrictions to flight operations, it is imperative that the affected crews be made aware of changes ASAP. For example, BWC Severe essentially closes the pattern, low-level, or range. If the condition is expected to be protracted, a Formal Training Unit (FTU) sortie may be non-effective due to unaccomplished training. With an early warning, however, the instructor may be able to flex to an alternate pattern, low-level, or range to affect a complete sortie.

3.3. Kinston Regional Jetport at Stallings Field is sometimes used by FTU aircrew for student training when the SJAFB BWC is moderate or severe. Kinston does not have a BASH program and there are limited procedures in place to advise aircrew of the bird activity at Kinston. Aircrew will contact Kinston Tower or 4 FW/SOF to determine the status of any hazardous bird activity prior to entering the Kinston visual pattern. Aircrew will exercise good airmanship/ safety of flight while balancing bird activity in the Kinston pattern and effective student training.

3.4. Upon observing hazardous bird conditions, the information must reach the 4 FW SOF, Tower Watch Supervisor or Airfield Management as quickly as possible. The most expeditious manner is to contact:

3.4.1. 4 FW SOF “Lion SOF” via UHF radio, FM Lion Net, or DSN 722-4176
3.4.2. Seymour Tower
3.4.3. Ground Control
3.4.4. ATC Watch Supervisor
3.4.5. Airfield Management

3.5. Once the SOF/Tower Watch Supervisor has been made aware of the hazard, it is their responsibility to declare a BWC as required, and then disseminate the news to aircrew and other affected/interested agencies. The Bird Watch condition, the affected specific location, and the nature of hazard should be issued where appropriate. The level of dissemination depends on the BWC, the location and the expected period of implementation. In general, the following contacts should be made:

3.5.1. **BWC MODERATE/ SEVERE:**

3.5.1.1. Airfield Management Operations (to respond to airfield for bird dispersal)
3.5.1.2. ATIS (for Terminal Area, protracted conditions only)
3.5.1.3. Approach Control (for Airfield, if not on ATIS)
3.5.1.4. Command Post (x1973, x2181 they will announce on Lion Net)
3.5.1.5. Flying Squadrons
3.5.1.6. Wing Flight Safety/USDA Wildlife Biologist (x4227/x4229)
3.5.1.7. 916 ARW (for Airfield or Kinston)
3.5.1.8. AF Dare RCO (if Range is affected)
3.5.1.9. 4 OSS Scheduling (if Range or Low Levels are affected)

4. AIRFIELD

4.1. AUTHORITY

4.1.1 During normal flight operations, the authority to declare a BWC in the terminal area is vested with the SOF. Depending on the location and time, the authority to upgrade a BWC to MODERATE or SEVERE is given to the SOF. If the SOF is not on duty, then the Tower Watch Supervisor or Airfield Management may declare a BWC. Some subjectivity may be involved in declaring a BWC. If doubt exists as to the hazard severity, a conservative declaration should be made. The BWC can only be downgraded with approval from 4OG/CC or representative.

4.1.2 The following individuals will routinely advise the SOF of hazardous bird conditions that may necessitate a change in BWC

4.1.2.1. Air Traffic Control Personnel (4 OSS/OSAT)
4.1.2.2. Airfield Management Personnel (4 OSS/OSAA)
4.1.2.3. USDA Personnel
4.1.2.4. 4 FW Flight Safety Personnel (4 FW/SE, SEF, FSDO)

4.1.3. Generally, the personnel listed above are well trained to understand BASH, but may not have the best situational awareness regarding local area flight operations. Therefore, the SOF (or Tower Watch Supervisor or Airfield Management when SOF is not available), as the OG/CC's representative, will be the final authority to declare a BWC for the airfield.

4.1.4. Once the BWC has been decided, the declaring authority (SOF, Tower Watch Supervisor, or Airfield Management) is responsible to disseminate the change in accordance with this plan.

4.2. PREVENTION

4.2.1 Bird Exclusion Zone: A perimeter around the airfield property has been defined in which bird concentrations of any significance will not be tolerated. The Bird Exclusion Zone (see attachment 3) includes the runway, all taxiways, and all parking ramps. In addition, much of the base's improved common property that is within one-half mile of the runway is also included in the zone.

4.2.2.1. Signs have been erected at strategic locations within the bird exclusion zone to alert base personnel that they are in the zone. The signs state:

4.2.2.2. "THIS AREA IS A BIRD EXCLUSION ZONE. REPORT BIRD ACTIVITY TO CONTROL TOWER OR AIRFIELD MANAGEMENT AT 722-4097. *Grass height: 7-14 inches*"

4.2.2. Drainage Control: Drainage within the bird exclusion zone is closely monitored and controlled. Routine inspections are accomplished following heavy rains to identify areas where water tends to pool. Civil Engineering is notified where necessary to raise the levels of the low areas to prevent future standing water. Vegetation within drainage ditches is kept clear.

4.2.3. Grass Height: Grass Height within the Bird Exclusion Zone is maintained at 7-14 inches. The 4 OSS/OSAA office maintains a copy of the Bird Exclusion Zone map for reference. Grass is cut to 7 inches, and then allowed to grow to 14 inches. In the late Fall, when grass growth begins to taper, the final cut of the season is made as close to 7 inches as possible.

4.2.4. Training: BASH is discussed in detail at all quarterly aircrew Flight Safety meetings. Semi-Annual SOF training is conducted to emphasize BASH awareness and appropriate actions to minimize hazards while maximizing mission effectiveness. Additionally, BASH training is given by 4 FW/SEF for initial SOF training.

4.3. DETERRENT

4.3.1. Pyrotechnics: Airfield Management and USDA maintain a stock of bangers/screamers/12 gauge cracker shells and other noisemakers intended to scare away birds. Airfield Management and USDA personnel are trained to safely operate the devices. The SOF can call them out to reduce a significant hazard that simpler methods were not sufficient to control. These pyrotechnic devices reach max heights of 500 feet and can quickly be used to disperse bird activity. Airfield Management and USDA will maintain records of all events where pyrotechnics were used.

4.3.2. Guns: USDA should be contacted to coordinate any required depredation. Once this decision has been made, USDA will have responsibility for executing the plan. This method is used when previously mentioned methods have failed to effectively deter problem birds. As the intention is to kill a bird from the problem flock, this measure is also considered effective in convincing the surviving birds that the SJAFB airfield is not a hospitable, or even survivable, habitat. USDA maintains records of all depredations. Permits to depredate migratory birds, deer or small mammals on base property are required by federal and/or state law and hard copies are on file in the 4FW Safety Office. SJAFB follows the current depredation policy established by the AF Safety Center.

4.4. RESTRICTIONS

4.4.1. If a BWC is not announced for the airfield, LOW should be assumed. When a BWC is declared, operations will be affected as follows:

4.4.1.1. **BWC LOW**: Normal operations.

4.4.1.2. **BWC MODERATE**: No formation takeoffs or landings. Weather permitting; the primary entry will be the overhead pattern to a full stop. The 1000 foot hold-down restriction on departure may be deleted at the Tower supervisor discretion and will be communicated in the takeoff clearance. If required, restricted low approaches authorized to 700 feet AGL minimum. 916 ARW aircraft will not conduct multiple approaches or touch and gos. Approaches with the intent of a full stop landing are permitted.

4 FW flights needing to complete checkride or FTU syllabus requirements for an effective sortie may contact the SOF for multiple patterns if BWC is MODERATE. This will only be accomplished for 4 FW aircrew if there are no IFE's in progress, not enough fuel to hold for BWC LOW and patterns could not be accomplished off station. Approval may not be granted depending on traffic, weather or bird conditions.

Tower watch supervisor and SOF will work together along with USDA personnel (Dover-3) to determine if pattern changes can be accommodated in a manner to avoid the bird hazard and not to affect safety of flight. BWC will remain MODERATE when flying modified patterns and ATIS will reflect accordingly. The intent is to balance mission requirements and bird strike potential. Multiple patterns under MODERATE conditions will be coordinated, approved and documented by the SOF. Some examples of possible pattern modification may include:

A. No closed traffic if birds are located on the inside downwind.
B. Mid-field closed traffic if birds are located on departure end.
C. Straight-ins only if birds are located at pattern altitude.

At all times aircrew, SOF and tower personnel will continue to monitor and remain vigilant of increased bird activity and may take such measures as to limit the number of aircraft in the pattern and/or call a "Knock-It-Off" if the situation warrants.

4.4.1.3 **BWC SEVERE**: No takeoffs or landings. Airfield is closed except to emergency aircraft. Aircraft on RTB proceed to an appropriate holding fix and contact the SOF for instructions.

4.4.2. With approval from the 4 OG/CC, the SOF can change the above restrictions as required to more effectively manage airfield operations and mitigate bird hazards. For example the SOF may elect to land aircraft in BWC SEVERE, for emergency situations and/or safety of flight.

4.4.3. Between late September and early October, numerous migrating blackbirds flock on and around the airfield near dawn and dusk, posing a major hazard to flying operations. For this reason, there will be no scheduled takeoffs 30 minutes prior to sunrise/sunset to 30 minutes past sunrise/sunset during this period. USDA/SEF will notify OSOS and OGV as soon as possible prior to when this period is forecasted to begin and disseminate restriction via an FCIF.

4.4.4. Seymour Johnson Air Force Base does not have an operational Bird Radar on the airfield.

4.5. COMMUNICATION

4.4.5. **BWC Downgrade:**

4.4.6. Once the hazardous threat of birds and/or mammals have passed the decision to reduce the BWC is vested with the SOF. The SOF must get prior approval to downgrade the BWC by the 4OG/CC or representative.

4.4.6.1. After approval is given to reduce BWC the SOF will relay downgraded BWC verbally to ATC.

4.4.6.2. ATC will then broadcast downgraded BWC to:

4.4.6.2.1. 4 FW SOF "Lion SOF" via UHF radio, FM Lion Net, or DSN -4176
4.4.6.2.2. Seymour Tower
4.4.6.2.3. Ground Control
4.4.6.2.4. ATC Watch Supervisor
4.4.6.2.5. Airfield Management

5. LOW LEVELS, MOAs, and R-5306A restrictions:

5.1. AUTHORITY

5.1.1. The authority to declare upgraded and/or downgraded BWC's for specific sections or entire lengths of low-level routes and MOA's is vested in the SOF regardless of AHAS or US BAM restrictions. However, SOF's may not downgrade conditions from the AHAS or US BAM. If the SOF increases the BWC for an area, low level/segment, that BWC will remain in effect until 1) the SOF lowers it back to current AHAS observation (based on aircrew/range controller observations), 2) a higher AHAS BWC is reported, or 3) one-half hour after sunset.

5.1.2. Flight leads that recognize a hazard warranting an increased BWC for following flights should contact the SOF as soon as possible. Specifically, a flight lead must contact the SOF (see 5.5 Communications) if their flight was forced to alter their flight path (i.e. climb) to avoid a bird strike from a significant but avoidable bird concentration. This situation defines BWC Moderate.

5.2. PREVENTION – Birds follow natural migration and behavior patterns; therefore, their presence cannot be controlled in low altitude areas where the 4 FW flies. The large scale of the area affected, coupled with private property issues, prevent the 4 FW from impacting the attractiveness of these areas to hazardous concentrations of birds. The 4 FW is relegated to understanding where and when birds are most likely to be present, then avoiding those locations whenever possible.

5.3 DETERRENT – There is no practical way to deter or scare birds on low-level training routes.

5.4 RESTRICTIONS – Major migration patterns along the Eastern US seaboard have been well studied and documented by experts.

5.4.1. Restrictions are in place for 4 FW aircraft to limit low-level flight operations in known high-risk areas predicted by the Avian Hazard Avoidance System (AHAS). AHAS uses weather radar and thermal data to monitor and predict bird concentrations in near real time. In addition to offering a current observation of bird activity, AHAS forecasts bird risk levels for each leg of a given Military Training Route (MTR) up to 24 hours in advance.

5.4.2. 4 OSS/OSOR will conduct route assessments of locally owned low-level routes annually. 4 OSS/OSOR will coordinate with 4 FW/SEF to accompany the route surveys to the maxium extent practical. In the event a 4 FW/SEF representative is unavailable to accompany on the route surveys, 4 FW/SEF will provide 4 OSS/OSOR with specific areas of interest on the MTR for increased bird activity. Based on 4 FW/SEF observations, changes will be made as necessary to low-level route briefings posted on the 4 OSS/OSOR Sharepoint. 4 FW aircrews will avoid all areas deemed a moderate bird hazard by the annual route assessment by 2000' AGL or 1 NM and all severe areas by 4500' or 3 NM.

5.4.3. AHAS is a tool to be used for bird risk assessment. If AHAS is not operational, attempt to use the BAM website. Aircrew will check AHAS prior to briefing low level or range flights. Flights will attempt to obtain the current AHAS observation from Squadron Top 3's, RCO, or SOF within 30 minutes of low level entry. Top 3's, RCO's or SOF will reference the AHAS RISK column for determination of BWC. Top 3's or SOF can use knowledge of AHAS to convey to aircrew BWC if AHAS is predicting BWC Moderate below 500ft AGL. For example: If AHAS is reporting BWC Moderate based on SOAR up to 400ft AGL, then the Top 3's or SOF can call this "BWC low above 500ft AGL" since the minimum flight altitude for training missions is 500ft AGL. If unable to get the current update, flights will use the more restrictive of the AHAS observation or AHAS forecast.

5.4.3.1. **LOW**: No restrictions on low-level flight. Aircrew will constantly assess bird activity during low altitude flying and adjust profiles to mitigate bird strike potential.

5.4.3.2 **MODERATE**: Flights may plan/ fly at 500 feet AGL. For non TF flights, the maximum airspeed is 400C (480C from IP to target only). For TF flights, the maximum airspeed is the greater of 400C or 420G (480C IP to target only). For FTU syllabus training using TF, 450G will be permitted when necessary to achieve required training. Aircrew will constantly assess bird activity during low altitude flying and adjust profiles to mitigate bird strike potential.

5.4.3.3 **SEVERE**: Flights are restricted to no lower than 4500 feet AGL. If this places the flight outside of the low level route structure, fly the appropriate VFR hemispheric altitudes and slow to airspeeds IAW AFI 11-202V3.

5.4.4. Aircrew will avoid the following lakes by 1 mile or 2000' AGL feet at tactical airspeeds: Smith Mountain Lake, Kerr Reservoir, Lake Wateree, and Lake Gaston. Aircrew will avoid similar-sized bodies of water by 2000' AGL and/or 1nm, unless more

restrictive guidance is published, at tactical speeds, through both diligent mission planning and prudent execution.

5.4.5. When flying on a low-level route, aircrew will cross coastal areas at or above 2000' AGL feet. When flying over coastal areas in a MOA or restricted area, adhere to AHAS restrictions based on current or forecast AHAS BWC.

5.5. COMMUNICATION

5.5.1. If the flight lead believes a low-level segment or MOA should be closed or elevated to preclude bird strikes, he must take the following action:

5.5.1.1. Aircrew will notify the SOF ASAP after route aborting for birds or if a change of BWC is recommended.
5.5.1.2. Aircrew will transmit bird activity observed on 255.4 stating location and recommended BWC.

5.5.2. Currently there is no ability to reduce BWC on low-levels or MOA's based on flight observations. Aircrew will abide by current AHAS BWC.

6. DARE COUNTY RANGES:

6.1. AUTHORITY

6.1.1. The authority to declare upgraded BWC's for R-5314 is vested in the 4 FW RCO regardless of MERLIN, AHAS or US BAM restrictions. However, RCO's may not downgrade conditions from MERLIN, AHAS, or US BAM. If the RCO increases the BWC for Dare County, that BWC will remain in effect until:

6.1.1.1 The RCO lowers it back to current MERLIN/AHAS observation (based on aircrew/range controller input),
6.1.1.2 A higher MERLIN/AHAS BWC is reported
6.1.1.3 One-half hour after sunset.

6.1.2. If a RCO declared BWC needs to be altered by subsequent flight leads due to current conditions, that flight lead will notify the RCO and recommend an increase/decrease of the BWC to an appropriate level.

6.2. PREVENTION – Dare County Range is near several wildlife refuges, making it an attractive area for migratory waterfowl. There are no practical means available to deter or scare birds at Dare County Range. The 4 FW is relegated to understanding where and when hazardous bird activity is likely to occur, then avoiding those locations whenever possible.

6.3. DETERRENT – Air Force Dare Range Control Officers (RCOs) are trained to have a working knowledge of the 4 FW BASH Plan. Therefore, they are qualified to advise flight leads of bird hazards that warrant altering flight operations. BWC's declared for Air Force Dare Range Complex will apply to 4 FW flight operations in all of R-5314, including Navy Dare. The RCO will relay his upgrade of the BWC to the 4 FW SOF.

6.4. RESTRICTIONS

6.4.1. MERLIN is an avian detection radar system used to detect bird activity and is the primary means of determining BWC for Dare County Range. MERLIN has fidelity out to a 4NM radius and up to 20,000 ft AGL. When MERLIN is operational the following restrictions apply:

6.4.1.1. **LOW:** No restrictions

6.4.1.2. **MODERATE:** Flights will avoid Moderate reported areas by +300 feet or 2 NM laterally.

6.4.1.3. **SEVERE:** Flights will avoid Severe reported areas by +500 feet. Lateral deconfliction is not authorized.

6.4.2. If MERLIN is not operational, revert to AHAS restrictions in accordance with paragraph 5.4.3. For all sorties planning on using Dare County Range, AHAS will be checked prior to the flight briefing and within 30 minutes of range entry regardless of MERLIN status. If AHAS is not operational attempt to use the BAM website.

6.4.3. In November, the Tundra Swans conduct their migration to their winter nesting areas along the east coast, especially flying on clear nights around the full moon. These birds migrate through the airspace containing R-5314 and R-5306A bombing ranges. During this period, 4 FW/SEF and 4OG/OGV will coordinate flight restrictions in the bombing ranges and disseminate via an FCIF. USDA and 4FW/SEF will notify 4 OSOS and 4 OG/OGV as soon as possible prior to when this period is forecast to occur. This period will be defined as +/- 5 days of a full moon occurring during the migration.

6.5. COMMUNICATIONS

6.5.1. When a BWC has been established, the decision to upgrade can be accomplished by any range user or the RCO. This will be communicated via UHF through the RCO and passed to any aircraft utilizing the range.

6.5.2. Once the bird threat has passed, the decision to downgrade the BWC is vested in the RCO as covered in paragraph 6.1. This information will be relayed to affected aircraft via UHF radio.

7. OTHER RANGES and MOA's:

7.1. The 4 FW also uses other bombing ranges and Military Operating areas such as:

7.1.1. BT-9 & BT-11 (R-5306A)
7.1.2. Avon Park, FL (R-2901)
7.1.3. Gamecock I MOA, SC
7.1.4. Gamecock C MOA, SC
7.1.5. Farmville MOA, VA

7.2. AHAS will be used with the same restrictions for MODERATE and SEVERE as in paragraph 5.4.3.

7.3. Prior to operating at Avon Park Range in Florida, 4 FW flight leads should contact the RCO telephonically for a BASH briefing before aircrew step. Upon entering the range airspace, flight leads will ensure they receive a current BASH update from the RCO over UHF. Avon Park is a known problem BASH area; 4 FW flight leads will operate in the area with caution and vigilance. A dedicated bird clearing pass at 350C and 500' AGL min (1500' if AHAS Moderate, 4500' if AHAS Severe) prior to tactical maneuvering at Avon Park is **MANDATORY** regardless of BWC.

8. TASKED ORGANIZATIONS

8.1. 4 FW Wing Staff Agencies:

8.1.1. 4 FW Safety and USDA:

8.1.1.1. Prepare and maintain basic plan and changes to this document.

8.1.1.2. Maintain a bird awareness program in conjunction with squadron flying safety officers. The program can include briefings, films, posters and information on bird hazards, reporting procedures.

8.1.1.3. Establish procedures for reporting and recording all bird strikes at SJAFB involving 4 FW, tenant, and transient aircraft.

8.1.1.4. Brief aircrews on seasonal bird hazards and provide information on migrations of local and seasonal bird activities through contact with government wildlife organizations and contract avian experts.

8.1.1.5. Routinely monitor and inspect airfield for bird activity. Emphasize awareness during flight operations. Any hazardous bird activity will be reported appropriately, with recommendations to adjust the BWC as required.

8.1.1.6. Collect and maintain bird strike data, which includes all SJAFB flying units, and look for trends. Disseminate hazard data to BHWG and flying units from all available sources.

8.1.1.7. Establish and maintain procedures for declaring, communicating, and terminating BWC's.

8.1.1.8. Ensure a portion of the bird remains (snarge) are sampled from the aircraft or from the airfield after an actual bird strike and sent to Smithsonian Institute for species identification analysis.

8.1.1.9. Submit BASH data on the Air Force Safety Automated System (AFSAS) for all 4 FW, tenant, and transient aircraft.

8.1.1.10. Ensure the 916 ARW/SE has access to all SJAFB BASH information.

8.1.1.11. Flight Safety and USDA personnel make timely and educated recommendations to the SOF regarding Bird Watch conditions for the airfield.

8.1.1.12. Review this plan and requirements annually. Plan review will be done with the supervisor or shop chief and this person will be responsible for plan review and/or implementation within the shop. Training will be accomplished for most members in a BHWT meeting. Document training on bird strike sheet.

8.1.1.13. Notify 4 OSS/OSOS, 916 ARW scheduling, 916 OGV and 4 OGV up to three weeks prior if bird forecasts warrant (i.e. annual blackbird migration during the period 1 September to 30 November at dawn and dusk, tundra swan migration in November) limiting takeoffs and landings for certain times of the day or use of Dare County range. Provide 916 OGV and 4FW OGV with desired information to be transmitted to aircrew via FCIF.

8.1.1.14. Obtain depredation permits and/or licenses. The USDA Wildlife Biologist will coordinate and obtain necessary Federal permits and/or licensees for actual bird and/or mammal kills.

8.1.1.15. Work with OGV to issue specific guidance via FCIF in accordance with this plan regarding procedures to be followed by 4 FW aircrews under BWC's on the airfield, low-level routes, working areas, and ranges.

8.1.1.16. Provide a representative to fly on annual route surveys to assess bird risks.

8.1.2. 4 FW Command Post Responsibilities:

8.1.2.1. Disseminate changes to the Bird Watch condition by broadcasting the change on the Lion Net.

8.1.2.2. If KC-135 flight operations are active in the local area, notify the 916 ARW CP of changes to the Bird Watch condition.

8.1.2.3. If notified of an actual bird strike to 4 FW or 916 ARW aircraft by any source, (aircrew, SOF, MOC, etc.) notify Flight Safety (Dover 2, Dover 3 or the Chief of Flight Safety).

8.1.3 4 FW Public Affairs Responsibilities:

8.1.3.1. Be the releasing authority on any BASH related information to news media representatives, the Seymour Johnson base community and/or general public.

8.1.3.2. Respond to any queries from news media representatives or general public concerning bird strikes, major changes in operations, or pending projects to control bird populations or reduce potentially hazardous bird strikes.

8.2. 4 Operations Group Responsibilities:

8.2.1. 4 Operations Group Commander Responsibilities:

8.2.1.1. Provide guidance on aircrew procedures as described in this plan.

8.2.1.2. Direct OGV to develop SOF procedures and a SOF training program that incorporates the BASH reduction program.

8.2.1.3. Direct the OSS to develop air traffic control procedures as part of the BASH plan.

8.2.1.4. Direct the OSS to develop Airfield Management procedures as part of the BASH plan.

8.2.2. 4 Operations Group Standardization and Evaluation (OGV) Responsbilities:

8.2.2.1. Publish pertinent BASH guidance from this plan in AFI 11-2F-15E Vol. 3 Seymour Johnson AFB Supplement and 4th Operations Group In-flight Guide. The information should include flight restrictions imposed under Bird Watch conditions LOW, MODERATE, and SEVERE for the airfield, low levels, and ranges.

8.2.2.2. Issue specific guidance in accordance with this plan regarding procedures to be followed by the 4 FW SOF upon declaration of a Bird Watch condition (see paragraph 3.2.3). This includes maintaining checklist and providing training to new SOF's during both initial certification and semi-annual SOF meetings held IAW AFI 11-418.

8.2.2.3. When requested by 4FW Safety, issue an FCIF alerting aircrew of recurring annual restrictions due to migrating blackbirds, tundra swans and wintering waterfowl at the City of Goldsboro Waste Water Treatment Facility.

8.2.3. 4 FW Supervisor of Flying Responsibilities:

8.2.3.1. Monitor bird hazards within the terminal area, active local low levels, active local ranges, and working areas.

8.2.3.2. Assist tower personnel by observing bird activity around the airfield.

8.2.3.3. Maintain primary responsibility for ensuring BWC's are altered appropriately for forecasted and real-time hazards.

8.2.3.3. When advised to alter the Bird Watch condition by Flight Safety, USDA, or Airfield Management personnel, consider the recommendation in light of current flying operations. Unless circumstances warrant a safe and appropriate alternate action, the BWC should be declared as advised.

8.2.3.4. When the SOF detects or is advised of a hazardous bird condition on the airfield, low-level route, range, or working area, he/she will:

8.2.3.4.1. Evaluate and if required, alter the Bird Watch condition for the affected area. If assistance is desired in deciding the appropriate BWC, contact Flight Safety/USDA.

8.2.3.4.2. Have the tower supervisor advise 4 OSS/OSAA of the Bird Watch condition.

8.2.3.4.3. Record all changes in Bird Watch conditions in the SOF Log.

8.2.3.4.4. When birds are located at one end of the runway, consider a runway change (wind, weather, and airfield conditions permitting) to recover aircraft.

8.2.3.4.5. Ensure that the information is promptly relayed to airborne aircrew as well as applicable agencies.

8.2.4 4 FW Flying Squadron Commander Responsibilities:

8.2.4.1. Ensure aircrews adhere to the procedures set forth in this plan.

8.2.4.2. Ensure squadron schedulers account for seasonal bird hazards and warnings when scheduling unit flying. Commanders should balance operational needs with hazards.

8.2.5. 4 FW Aircrew Responsibilities:

8.2.5.1 Include BASH reduction procedures when planning sorties that include prolonged low altitude flight. Furthermore, aircrew will brief bird strike mitigation procedures IAW this plan any time proloned low altitude flying is expected.

8.2.5.2. Communicate bird strikes and hazardous bird activities as follows:

8.2.5.2.1. On airfield, report to SOF or tower/ground controllers.

8.2.5.2.2. On departure or arrival, report to controlling agency or the SOF.

8.2.5.2.3. On IR/VR training routes, Military Operating Areas (MOAs), and warning areas, report SOF. On IR/VR routes, relay to appropriate FSS (if possible) and to succeeding flights.

8.2.5.2.4. On Dare County Range, report to the range control officer who will relay the information to the SOF and succeeding flights.

8.2.5.2.5. Report all bird strikes to flight safety and maintenance debrief immediately after landing.

8.2.6. 4 Operations Support Squadron Responsibilities:

8.2.6.1. 4 OSS/OSAT (Air Traffic Control Tower) Responsibilities:

8.2.6.1.1. Remain alert for and advise aircraft of wildlife activity on, over, or near the airfield.

8.2.6.1.2. Inform RAPCON of hazardous wildlife activity and changes in the Bird Watch condition.

8.2.6.1.3. Include the Bird Watch Condition on ATIS if MODERATE or SEVERE, and it appears the current bird activity and BWC status will remain constant for 15 minutes or more.

8.2.6.1.4. If the SOF is on duty, inform him/her immediately of any significant sighted or reported bird activity.

8.2.6.1.5. When the SOF is not present in the tower, Airfield Management and/or the Tower Watch Supervisor has the authority to declare changes to the Bird Watch conditions for the airfield, and will coordinate with Tower for broadcast of the change. If the SOF is on duty, tower personnel should advise him of hazardous bird conditions, whereby the SOF will declare an appropriate BWC.

8.2.6.1.6. As per FAAO 7110.65, inform aircraft under their control of hazardous bird activity, to include the Bird Watch condition if other than LOW. Example: "Large flock of small birds vicinity of approach of Rwy 08, altitude approximately 200 feet AGL. Bird Watch condition MODERATE." Note: Omit this information if it is included on the ATIS broadcast and the pilot states the correct ATIS code.

8.2.6.1.7. Relay or initiate flight instructions to aircraft under their control if abnormal procedures are required due to bird hazards or restrictions imposed by changes in the BWC. (i.e. divert, hold, go-around, hold short, etc.).

8.2.6.1.8. If bird dispersal is necessary, provide Airfield Management or USDA personnel access to the runway in line with safe aircraft operations. Dispersal methods generally take less than five minute.

8.2.6.2. 4 OSS/OSAR (RAPCON) Responsibilities:

8.2.6.2.1. Inform tower of any reported or suspected bird activity within or near the terminal area.

8.2.6.2.2. Remain alert for possible bird activity on radar displays.

8.2.6.3. 4 OSS/OSAA (Airfield Management) Responsibilities:

8.2.6.3.1. Monitor conditions during airfield inspections that might present a bird strike hazard. Immediate hazards will be reported to the 4 FW/SOF during periods of normal flying operations. During periods when a 4 FW/SOF is not on duty, contact the Tower Watch Supervisor.

8.2.6.3.2. When hazardous bird conditions are noticed, Airfield Management will contact the SOF or Tower Watch Supervisor (during non-F-15E flight operations) with a recommendation to declare BWC Moderate or Severe. In general, the SOF will declare the BWC as advised, unless circumstances warrant an alternate action.

8.2.6.3.3. Receive reports of bird activity from any source and document on AF IMT 3616, Daily Record of Facility Operations.

8.2.6.3.4. When BWC MODERATE or SEVERE is declared, issue a NOTAM.

8.2.6.3.5. Document unusual bird activity, bird strikes and/or wildlife responses. Documentations must include BWC, time of activity, weather conditions, location of activity, species, estimated number of birds/ mammals and dispersal method used. Report this information to 4FW/SE.

8.2.6.3.6. Bird, bat or mammal remains found within 200 feet of the runway surface must be treated as a strike. Document location, time found and species if known. Place in plastic bag and put in freezer located near the entrance of 4FW Safety Office.

8.2.6.3.7. Observe environmental conditions on the airfield that could attract birds and report them to USDA biologist x4229 and 4 CES/CEOI (Pest Management, x1350).

8.2.6.3.8. The Airfield Manager will work in connection with USDA to develop plans for control or removal of hazardous bird attractants within the airfield environment. The Airfield Manager and USDA will coordinate with 4 CES/CEOS when needed to reduce BASH issues.

8.2.6.3.9. When bird dispersal is required, respond, in order of necessity, to include driving to the birds' proximity and activating pistol pyrotechnics or contacting USDA to do so if needed.

8.2.6.3.10. Brief all transient aircrews on current bird hazards and BWC.

8.2.6.3.11. Issue a NOTAM during the Blackbird migration in the fall alerting transient crews of the increased bird hazard around the airfield.

8.2.6.4. 4 OSS/OSOR (Ranges & Airspace) Responsibilities:

8.2.6.4.1. Review any proposed new low-level routes (or changes) with 4 FW/SEF and USDA Wildlife Biologist for potential BASH impact.

8.2.6.4.2. Coordinate with 4FW/SEF and USDA for a representative to fly along with OSS/OSOR on annual route surveys for the purpose of assessing bird risks.

8.3 4 Mainteance Group Responsibilities:

8.3.1. Participate in the BASH reduction program by adhering to the directives contained in this plan.

8.3.2. Record and report all bird strikes to Flight Safety. If possible, maintenance debrief sections should have the aircrew fill out a Bird Strike Information Sheet immediately after landing. If the strike was discovered after the aircrew is no longer available (i.e., by Swing Shift personnel), ensure that all known data is recorded and reported.

8.3.3. After a bird strike is discovered ensure bird remains are sampled from the aircraft. During the hours of 0700-1700 Flight Safety/ USDA personnel will be contacted to take the sample. 4 MXG/QA will take the sample between the hours of 1700-0700 as needed to augment Flight Safety/ USDA personnel IAW the procedures outlined below:

8.3.3.1 Bird Strike Sampling Procedures: Carefully remove the bird strike sample and place it in a marked plastic zip lock bag. If only a blood smear is present, use an alcohol swab and swipe across the blood smear, then place the swab in a bag. This is critical for accurate identification.

8.3.4. Forward a copy of the Bird Strike Information Sheet (same worksheet as used to report IFEs/Incidents) to 4 FW Flight Safety as soon as possible. AMU OICs will ensure adequate supplies of these forms are available in Maintenance Debrief. Wing Safety will keep the newest version of the IFE/Bird strike sheet on the safety web page.

8.4. 4 Mission Support Group Responsibilities:

8.4.1 4 Civil Engineer Squadron Responsibilities:

8.4.1.1. The Base Civil Engineer is responsible for implementing procedures for removal or control of as many bird attractants as possible on SJAFB. USDA Wildlife Biologist will coordinate changes.

8.4.1.2. Complete necessary surveys and environmental impact assessments as required by law.

8.4.1.3. Provide the following representatives to the BHWT to advise the team and correct environmental conditions on the airfield which increase BASH potential:

8.4.1.3.1. Pest Management
8.4.1.3.2. Environmental Management Element
8.4.1.3.3. Pavement & Construction Equipment, Grounds Maintenance

8.4.1.4. Modify current airfield conditions that attract birds (ditches, standing water, buildings, towers, hangar rafters, perches, nests, food/water sources, etc.).

8.4.1.5. Implement a long-range program in conjunction with all base improvements and modifications that attempts to make the airfield as unattractive to birds as possible. Special emphasis should be to eliminate ornamental trees and shrubs for new construction within the cantonment area.

8.4.1.6. Control vegetation. The Service Contracts Section (4 CES/CEOSS) will control vegetation around the airfield to include all mowing operations, through a service contract. Pest Management (4 CES/CEOIE) will be responsible for vegetation control on airfield pavements and ditches. The Heavy Repair Element (4 CES/CEOH), will assign responsibility ditch construction, filling low spots, planting bare areas, removing dead vegetation, removing taxiway edge effect, and removing plants with berries.

8.4.1.7. Maintain grass height in the Airfield Bird Exclusion Zone between 7 and 14 inches. Only 4 CES/CEOS Quality Assurance Personnel or Contracting Officer's are authorized to direct the contractor on grounds maintenance standards.

8.4.1.8. Control water. The control of water is under the purview of Heavy Repair Element (4 CES/CEOH), who will assign personnel to modify ditches, build culverts, eliminate standing water, remove feed materials, and drain marsh areas as necessary to control bird populations in the airfield environment. These actions will be coordinated with the Environmental Management Element (4 CES/CEIE).

8.4.1.9. Control waste. The collection and removal of waste products on base is provided by 4 CES/CEO through a contracted service, administered by the Operations Support Element (4 CES/CEOS). The proper flight element will ensure waste is collected appropriately and disposed of rapidly.

8.5. 916 Air Refueling Wing Responsibilities:

8.5.1. 916 Maintenance Squadron Commander Responsibilities:

8.5.1.1. Participate in the BASH reduction program by adhering to the directives contained in this plan.

8.5.1.2. Record and report all bird strikes to the USDA or appropriate wing's flight safety office. If possible, maintenance debrief section should have the aircrew fill out a Bird Strike Information Sheet immediately after landing. If the strike was discovered after the aircrew is no longer available, ensure that all known data is recorded and reported.

8.5.1.1.3. When a bird strike is discovered, ensure bird remains are sampled from the aircraft. If USDA or safety personnel are available, they should be contacted to take the sample. If not, maintenance should take the sample in accordance with 8.3.3.1.

8.5.1.1.4. Forward a copy of the Bird Strike Information Sheet to USDA and Safety as soon as possible.

ATTACHMENT 1

DISTRIBUTION

Agency/Office Symbol

HQ ACC/SEF LANGLEY AFB, VA
HQ AFSEC/SEFW, KIRTLAND AFB, NM
9 AF/SEF, SHAW AFB, SC
4 FW/CC
4 FW/CV
4 OG/CC
4 OG/OGV
4 MXG/CC
4MSG/CC
4 FW/SE
4 AMXS/CC
4 OSS/CC
4 OSS/OSA
4 OSS/OSAT
4 CES/CC
4 CES/CEOHE
4 CES/CEOIE
336 FS/CC
335 FS/CC
334 FS/CC
333 FS/CC
4 TS/CC
414 FG/CC
307 FS/CC
916 ARW/CC
916 ARW/MXG
916 ARW/MXS
916 ARW/SE
916 OG/CC
911 ARS/CC
77 ARS/CC
USDA

ATTACHMENT 2

ENVIRONMENTAL ANALYSIS

One of the primary techniques for decreasing the bird strike threat to 4 FW aircraft is avoidance of the high-risk environment by modifying flight operations. Information on the environment in these high-risk areas is provided here both as a reference and as an aid to supervisors and aircrews for the planning and accomplishment of the mission. While flexibility for adjustments has been accounted for, the Seymour Johnson AFB BASH Plan is primarily based on the known environmental conditions outlined below.

A. Airfield/Local Areas:

(1) SJAFB occupies apprixoximately 3,238 acres of Wayne County land located in the warm, humid region at Latitude N 35'20'30", Longitude W 077'58'30", in the coastal plains of North Carolina. This location is 57 nautical miles from the Atlantic Coast at the nearest point and lies within the Atlantic Flyway waterfowl migration corridor. The flat to gently rolling terrain has elevations ranging from 60 to 110 feet above MSL on the base. The elevations increase south to north away from the Neuse River, which defines the southern boundary of the base. The base is in the Neuse River/Stoney Creek watershed and a system of open ditches, covered concrete pipes, drop inlets, and catch basins has been incorporated into the drainage pattern.

(2) Improved grounds cover 1,320 acres and the perennial vegetation cover is composed of common Bermuda grass, Kentucky 31 Fescue, Kobke (legume), Crabgrass (native), and White Dutch Clover. Semi-improved grounds cover 887 acres. The semi-improved ground around the airfield is mowed to 7-14 inches. Vegetation around these grounds consists of Bermuda grass, tall Fescue, Lespedeza, White Clover, and Crabgrass. Approximately 485 acres of the base are unimproved grounds. The vegetation cover on the large majority of these grounds is brush and wood cover of native hardwoods (primarily oak), and soft pines. In these areas starlings, blackbirds, sparrows, and various songbirds are the most abundant species.

(3) Blackbirds and starlings have been observed in significant numbers on the base. Thousands of the birds are routinely seen migrating from feeding areas to roosts, especially during the fall season. The worst time has historically been late October and early November, especially within one half hour prior to sunset until one half hour following sunset. The most common hazardous movement pattern for the birds has been north to south across the approach path of Runway 26 at about 100-200 feet AGL.

(4) The city of Goldsboro operates a wastewater treatment plant off the west end of the runway on the opposite side of the Neuse River. They currently have several holding lagoons that are 5 feet deep and cover 177 acres. Currently, the lagoons attract a large number of birds to include ducks, gulls, geese, herons, swans, cormorants, and egrets. As many as 3,000 birds have been observed using this area during winter months. Gulls from the ponds have been observed in significant numbers on the runway at Seymour Johnson. In addition to the waste water treatment ponds, the City of Goldsboro established a 40-acre wetland site located 1.5 miles northwest of SJAFB. This area also attracts large numbers of geese and ducks.

(5) The base also has an 18-hole golf course that covers 163 acres. In the past, as many as 100 resident Canada geese posed a problem by flying into and out of the small pond near the Pro Shop at the golf course on a daily basis. In the past employing a full time Border collie dog to harass the geese has rectified the problem. Currently, there are no resident Canada geese at SJAFB.

(6) Hawks and vultures have been sighted above or near the runway on numerous occasions.

(7) Seymour Johnson AFB also has a variety of other birds, such as sparrows, Eastern meadowlarks, killdeer, and crows in and around the airfield. These birds ordinarily do not cause damaging bird strikes to aircraft.

B. Low-Level Routes:

(1) The Atlantic Flyway represents the most significant BASH threat to 4 FW aircraft conducting typical low level flight operations along the Atlantic seaboard. For the purposes of this BASH Plan, the Atlantic Flyway is defined only from Delaware to South Carolina, with detailed emphasis on the Eastern North Carolina area. Data for defining the boundaries of the Atlantic Flyway corridor was obtained from Geo-Marine, ACC's primary contractor for bird avoidance models and BASH studies. Also, historical bird strike and sighting data from the AFSEC and the USFWS was employed. The large majority of migrating waterfowl that transit this area uses the Flyway. Its boundaries from Lake Mattamuskeet north to Delaware are thoroughly studied and well understood by waterfowl experts. From Mattamuskeet southward, the Atlantic Flyway boundaries are less understood, and therefore less precise.

The Western edge of the Atlantic Flyway corridor is defined by a line running from:

a. Mason Neck NWR (South of Washington D.C.), to
b. Dismal Swamp NWR (Southwest of Norfolk, VA), to
c. Pungo NWR (Southwest corner of R-5314), to
d. Santee NWR (South Carolina)

The Eastern edge of the Atlantic Flyway corridor is defined by a line running from:

a. Bombay Hook NWR (Delaware), to
b. Martin NWR (in Chesapeake Bay), to
c. Fisherman Island NWR (Southern tip of VA peninsula) to
d. Back Bay NWR (southeast of Roanoke), then follows the Atlantic coastline to
e. Cape Romain NWR (South Carolina).

In the vicinity of the Atlantic Flyway, migratory and over-wintering waterfowl will represent a significant low-level hazard. Migratory waterfowl corridor populations include:

a. 225,000 - 750,000 ducks,
b. 200,000 - 400,000 geese, and
c. 30,000 - 60,000 tundra swans.

Major wintering waterfowl concentration is known to occur in the following locations, which are all in the vicinity of 4 FW routine low level flight operations:

a. Pea Island NWR (15 miles east of R-5314)
b. Pungo NWR (SW corner of R-5314)
c. Presquile NWR (15 miles north of point C, VR-1753)

d. Fisherman Island NWR (15 miles south of point A, VR-1753)
e. Plum Island NWR (20 miles southeast of point B, VR-1753)
f. Cedar Island NWR (in R-5306A)
g. Great Dismal Swamp NWR (10 miles southwest of Norfolk)
h. Swanquarter NWR (20 miles south of R-5314)
i. Mattamuskeet NWR (5 miles south of R-5314)

Waterfowl feeding flights will often extend out 20 miles from refuges, depending on food availability. North Carolina wintering waterfowl numbers will vary depending on weather severity and will increase when severe weather at Delaware refuges (which support over 300,000 geese each fall) drives the birds south. Expect the migratory waterfowl hazard to be greatest at night and dusk/dawn during 15 October - 1 December and 15 February - 31 March, up to 3,500 feet AGL. Expect the wintering waterfowl hazard to be greatest at dawn/dusk (plus or minus 1 hour) during 15 October - 15 April, up to 1,000 feet AGL. Wintering flocks (particularly snow geese and tundra swans) will move throughout the day on feeding flights. Snow geese are ground feeding flocks, and are particularly hazardous to low-level flights since these birds will spook up to 300 feet AGL, then disperse, when an aircraft approaches below 1,000 feet AGL.

(2) Raptors (vultures and hawks) are a year-round hazard and will represent a significant threat to low-level flight. Wintering raptors distributed throughout the region, both along the coast and inland, average 1.2 raptors per square kilometer. One of the highest raptor migration concentration areas in the US (110-220 raptors per hour reported from look-outs) extend from New York City to Virginia Beach, 40 miles inland, and traverses VR-1753 route segment A-B. Migrant raptors tend to disperse south of Virginia Beach. Included in this dispersal region are VR-73 segments F-L; VR-84 segment A-C, F-H; and R-5314.

Red-tailed hawks, other broad-winged hawks, and turkey vultures (41-55 birds per hour) traverse the mountains of western North Carolina, western Virginia, and West Virginia. Spring migration movements are more dispersed than fall, though spring concentrations have been reported of up to 40 raptors per hour along this course. Ninety percent of the resident and migrant raptor activity occurs between 0800 and 1700 with the highest altitudes attained where and when the thermals are greatest. Migrant raptors, especially in October - November, will normally soar to a maximum of 3,000 feet AGL; however, migrants pose a threat at all altitudes -- the record vulture strike occurred at 37,000 feet! Resident raptors will also soar to several thousand feet. Migrant and resident raptors may be found in groups of 10-20 when catching the same thermals. Raptors will not usually fly in the rain or move against a head wind.

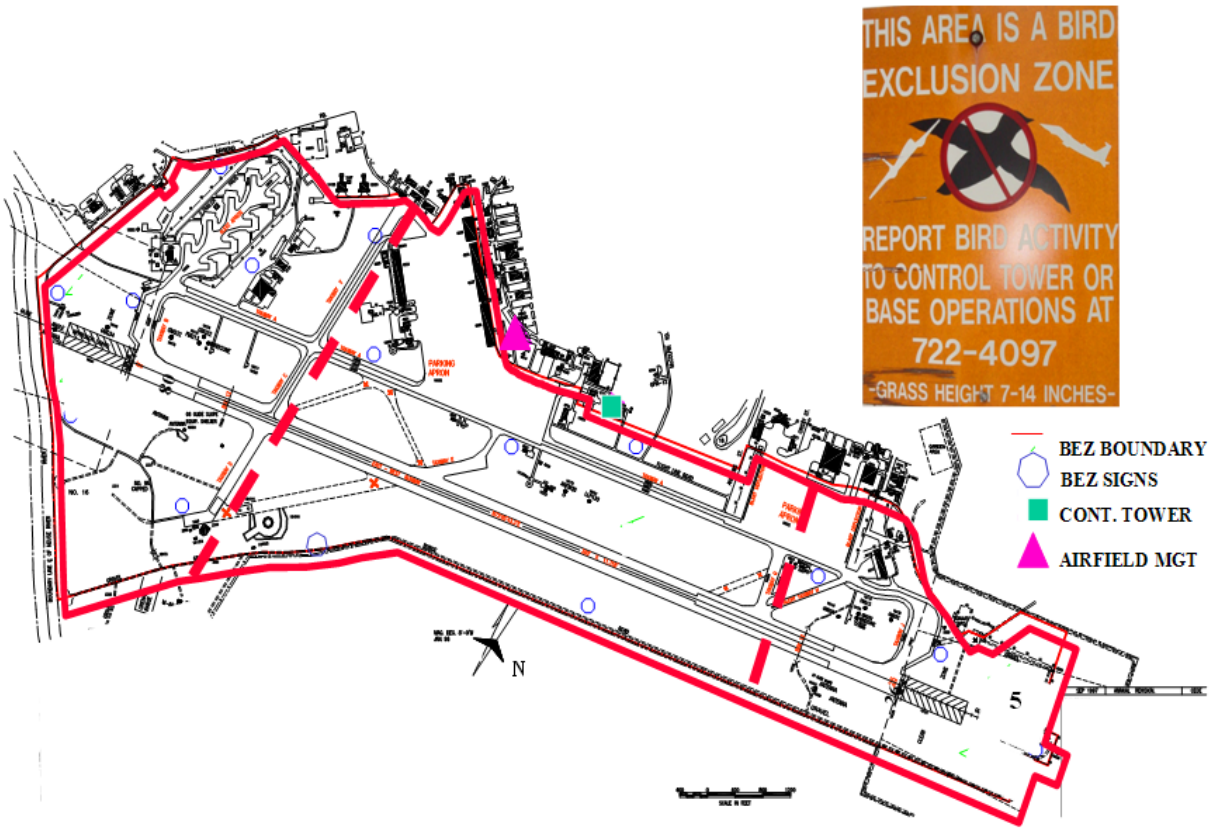
C. Dare County Range vicinity:

Five National Wildlife Refuges (NWRs) are located within 60 miles of the Dare County Bombing Range. Significant concentrations of waterfowl, raptors, and shorebirds migrate to and winter at the NWRs. These five NWRs contain more than 300,000 acres. Approximately 50 percent of the total acreage consists of lakes within the Mattamuskeet and Pungo NWRs. Additional water sources in the area include rivers (Chowan, Alligator, Pungos, Pamlico, and Neuse), sounds (Albermarle, Croatan, Roanoke, and Pamlico) and natural marshes surrounding the range. The flat plain between the Albermarle and Pamlico sounds is dominated by extensive swamp, wet savanna, and low pinelands. Limited agriculture areas are restricted to ridge lands with suitable drainage producing corn, soybeans, small grains, truck crops, and winter browse. Fresh and saltwater fish, crustaceans, and plankton are sources of food available to shorebirds. Rich farmlands and fresh water marshes are wintering habitats for geese, ducks, and swans.

Waterfowl concentrations between 1 October and 31 March are highest around Mattamuskeet and Swan Quarter NWRs and at the western side of the mouth of the Alligator River. Timber, marsh, and open water provide for nesting wood ducks, wading birds, and resident game birds. Two hundred and fourteen species of birds, including endangered and threatened species such as the American Bald Eagle, have been seen at Mattamuskeet NWR. The banks, inlets, beaches, and great flats along Cape Hatteras attract many species of shorebirds. In addition to the flight to and from foraging areas during the winter and summer months, birds pose a significant hazard to aircraft operations during spring and fall migrations. Hundreds of thousands of birds from the area fly in the spring to breeding grounds in the northern United States and Canada and return the following fall. Concentrated migration routes include the airspace above and along the Alligator River south to Lake Mattasuskeet, Swan Quarter NWR, and west over to Pungo NWR. Other migration routes include the airspace several miles out to sea paralleling Cape Hatteras National Seashore between Roanoke and Ocracoke Islands crossing Pamlico Sound and follow the coast of North Carolina. Generally, migrants pass through Dare County between early October and mid-December and again between mid-February and mid-April. Waterfowl can migrate at altitudes up to 8,500 feet, but the vast majority has been known to remain below 3,000 feet AGL.

ATTACHMENT 3

BIRD EXCLUSION ZONE



ATTACHMENT 4

Coastal Area Map

If not in Special Use Airspace or a MOA, cross all coastal areas at or above 2000' AGL.