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CHAPTER 1.0 INTRODUCTION

1.1 BACKGROUND

1.1.1 CONSERVATION RESERVE ENHANCEMENT PROGRAM (CREP)

The U.S. Department of Agriculture (USDA)/Commodity Credit Corporation (CCC) and the State of North Carolina propose to implement the North Carolina Conservation Reserve Enhancement Program (CREP), administered by USDA's Farm Service Agency (FSA). CREP is a component of the FSA's Conservation Reserve Program (CRP), which targets the specific environmental needs of each State. North Carolina's CREP enrollment period will run from the agreement signing in 2004 through 2007.

CRP was established under Subtitle D of the Food Security Act of 1985, initially to cost-effectively assist producers in conserving and improving soil resources on farms and ranches. Environmentally sensitive acreages normally devoted to the production of agricultural commodities would be converted to a long-term, resource conservation cover. CRP participants would enter into contracts for periods of 10–15 years in exchange for annual rental payments and cost-share assistance for installing certain conservation practices (CPs). In subsequent years, amendments to CRP regulations have made certain other croplands and pasturelands eligible for CRP based on their potential to benefit water quality and wildlife habitat as well.

The environmental impact of this program shift was studied in the 2002 Programmatic Environmental Impact Statement (PEIS). The Final PEIS for CRP was published in January 2003 and provides FSA decision makers with programmatic level analyses that provide contexts for state specific EAs. The Record of Decision (ROD) for the PEIS was published in the *Federal Register* on May 8, 2003 (68 FR 2487-24854).

The Farm Security and Rural Investment Act of 2002 authorized CRP through 2007 and raised the overall enrollment cap to 39.2 million acres.

Within CRP, CREP agreements are established as partnerships among USDA, the State and/or tribal governments, other Federal and State agencies, and other non-governmental organizations (NGOs). In 1997, the Secretary of Agriculture initiated North Carolina's CREP (pursuant to the 1996 Federal Agriculture Improvement and Reform Act) as a joint Federal-state partnership. This CREP is intended to provide North Carolina's agricultural producers with financial incentives to voluntarily remove their lands from agricultural production for periods of 10–15 years and voluntarily install FSA approved CPs. Through CREP, producers receive annual rental payments and cost-share assistance to establish long term, resource-conserving covers on eligible land.

The two primary objectives of North Carolina's CREP are to:

- coordinate Federal and non-Federal resources to address specific conservation objectives of a State government and the nation in a cost-effective manner; and
- improve water quality, erosion control, and wildlife habitat related to agricultural use in specific geographic areas.

The majority of the funding (80 percent) for CREP is funded through USDA, invoking a Federal nexus. The nexus requires that CREP follow the process and procedures pursuant to the National Environmental Policy Act (NEPA). FSA has prepared this Programmatic Environmental Assessment (PEA) to evaluate the environmental impacts of implementation of CREP (the Proposed Action) in accordance with NEPA, as amended (NEPA; 42 U.S.C. 4321–4347), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR § 1500-1508), NEPA implementing regulations of USDA (7 CFR Part Ib), and FSA NEPA implementation procedures (7 CFR Part 799, Environmental Quality and Related Environmental Concerns: Compliance with the National Environmental Policy Act). FSA is the lead agency developing this PEA. CRP and CREP are administered by FSA in cooperation with the Natural Resources Conservation Service (NRCS), Cooperative State Research and Education Extension Service, State forestry agencies, and local Soil and Water Conservation Districts. For additional information on this PEA, contact George Pless, State Environmental Coordinator, Farm Service Agency, Rowan Farm Service Agency, P.O. Box 2186, Salisbury, North Carolina 28146, (704) 637-1602, mailto:george.pless@nc.usda.gov.

1.1.2 Purpose of Using a Programmatic Environmental Assessment (PEA) to Analyze This Proposed Action

As a programmatic document, this PEA does not address individual, site specific impacts. This PEA allows FSA to reduce paperwork and identify potential impacts at a broad, study-area level that may need in-depth analysis prior to implementation of anticipated, site–specific, CREP contracts. Regulations promulgated by CEQ state the following:

> Sec. 1500.4 Reducing paperwork:
>
> (i) Using program, policy, or plan environmental impact Statements and tiering from statements of broad scope to those of narrower scope, to eliminate repetitive discussions of the same issues (Secs. 1502.4 and 1502.20).
>
> Sec. 1502.4 Major Federal actions requiring the preparation of environmental impact Statements:
>
> (b) Environmental impact Statements may be prepared, and are sometimes required, for broad Federal actions such as the adoption of new agency programs or regulations (Sec. 1508.18). Agencies shall prepare Statements on broad actions so that they are relevant to policy and are timed to coincide with meaningful points in agency planning and decision-making.
>
> (c) When preparing Statements on broad actions (including proposals by more than one agency), agencies may find it useful to evaluate the proposal(s) in one of the following ways:
>
> 1. Geographically, including actions occurring in the same general location, such as body of water, region, or metropolitan area.
>
> 2. Generically, including actions that have relevant similarities, such as common timing, impacts, alternatives, and methods of implementation, media, or subject matter.
>
> 3. By stage of technological development including Federal or Federally assisted research, development or demonstration programs for new technologies, which, if applied, could significantly affect the quality of the

> human environment. Statements shall be prepared on such programs and shall be available before the program has reached a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

FSA plans to use this PEA to address similar actions in the implementation of the program. Whenever NEPA analysis is required for site specific implementation of CREP practices, analysis will tier off of this document and the PEIS that has been prepared for CRP. FSA has a framework in place to ensure NEPA compliance at the field level, where site specific NEPA reviews will take place prior to implementing a CREP contract.

1.2 PURPOSE AND NEED

1.2.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the North Carolina CREP is to enhance the water quality of the four watersheds that have been classified as nutrient-sensitive waters (NSW): the Chowan River Basin, Neuse River Basin, Tar Pamlico, and B. Everett Jordan Reservoir Watershed. These NSWs encompass a portion or all of 44 counties in North Carolina, primarily in the northeastern part of the state, and together compose the proposed CREP area for this PEA (see Figure 1.1).

Implementation of CPs is designed to improve the water quality of discharges coming from agricultural land. The primary goal of the North Carolina CREP agreement is to provide an opportunity, through financial and technical assistance, for eligible producers in the CREP area to voluntarily establish buffers, through the implementation of CPs such as filters, strips, grass waterways, hardwood tree plantings, wildlife habitat, wetlands, that improve the water quality of agricultural non-point discharges. Other, secondary goals of implementing CREP are:

- protecting and conserving the diversity of aquatic life, including threatened, endangered, or otherwise federally or state protected (protected) species;
- protecting and conserving the diversity of terrestrial wildlife, including protected species;
- improving water-based recreation;
- improving private and commercial fishing and shell-fishing harvests;
- decreasing the cost of drinking water treatment;
- decreasing the cost of aquatic vegetation control;
- improving soil quality; and
- providing economic benefits to the agricultural producer.

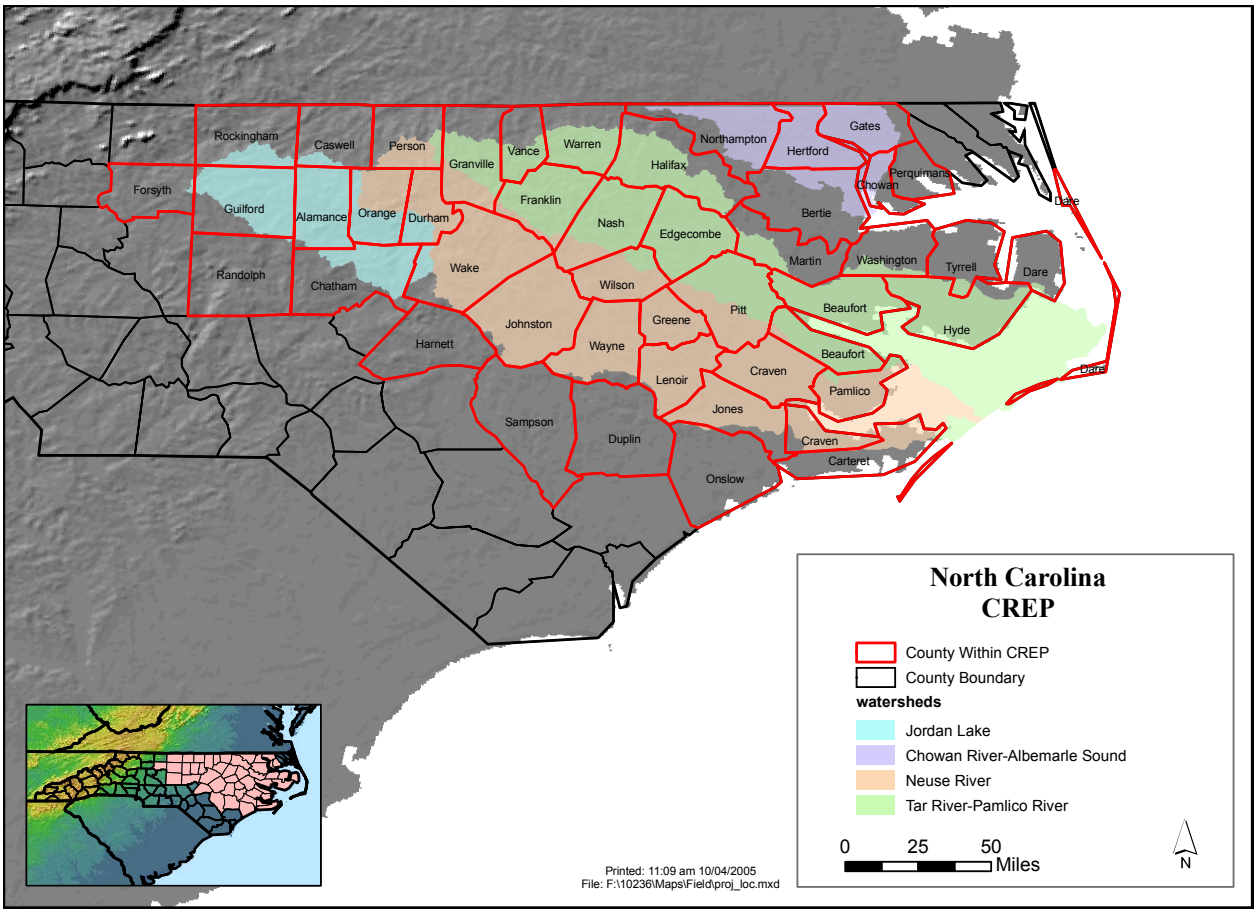

Figure 1.1. North Carolina CREP proposed CREP area.

1.2.2 NEED FOR THE PROPOSED ACTION

Non-point pollution has been identified by the North Carolina Division of Water Quality as the primary source of degradation of the fresh water bodies as well as coastal plains in the State. According to the U.S. Environmental Protection Agency (EPA), non-point pollution, unlike pollution from point sources such as industrial and sewage treatment plants, comes from many diffuse sources. Non-point pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These non-point pollutants include:

- excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- oil, grease, and toxic chemicals from urban runoff and energy production;
- sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- salt from irrigation practices and acid drainage from abandoned mines;
- bacteria and nutrients from livestock, pet wastes, and faulty septic systems; and
- atmospheric deposition and hydromodification (EPA 2005a).

The North Carolina Non-point Assessment Report states that agriculture is the largest source of stream-use impacts. Of the 30 percent of stream miles impacted by non-point pollution throughout the State, agriculture is suspected of impacting approximately 65 percent. In addition, 60 percent of non-point pollution in estuarine areas is believed to come from agricultural land uses (NCDSWC 2005). Common agricultural pollutants are sediment, nutrients, and fecal-coliform bacteria from animal operations.

1.3 OBJECTIVES OF THE NORTH CAROLINA CREP

The primary objectives of this agreement are to achieve, to the extent practicable, the following:

1.3.1 OBJECTIVE #1: PROVIDE AN OPPORTUNITY FOR FARMERS IN NORTH CAROLINA TO VOLUNTARILY ESTABLISH RIPARIAN AND WETLAND AREAS THROUGH FINANCIAL ASSISTANCE.

Indicators:

- Target the four river basins (i.e., Chowan, Neuse, Tar Pamlico and Jordan Reservoir watersheds) to address high-priority environmental needs.
- Enroll 100,000 acres of riparian and non-riparian wetlands in CREP.
- Address conservation objectives in a cost-effective manner.
- Provide farmers with monetary incentives via coordination between Federal and State resources.

1.3.2 OBJECTIVE #2: RESTORE AND ENHANCE RIPARIAN HABITAT CORRIDORS NEXT TO STREAMS, DRAINAGE DITCHES, ESTUARIES, WETLANDS, AND OTHER WATER COURSES BY ENROLLING UP TO 85,000 ACRES OF RIPARIAN FORESTED BUFFERS AND GRASS FILTER STRIPS.

Indicators:

- Enroll up to 85,000 acres of riparian wetlands in CREP.
- Successfully implement approved CRP practices (CP 3A, CP 21, CP 22, CP 23).
- Reduce state-classified NSWs.
- Improve wildlife habitat and fisheries.
- Achieve the nutrient reduction goals of each watershed.

1.3.3 OBJECTIVE #3: RESTORE UP TO 15,000 ACRES OF NON-RIPARIAN WETLANDS EITHER ASSOCIATED WITH DRAINAGE DITCHES OR ADJACENT TO PRIMARY FISHERY NURSERY AREAS TO ADDRESS IMPACTS ASSOCIATED WITH DRAINAGE.

Indicators:

- Enroll up to 15,000 acres of non-riparian wetlands in CREP.
- Successfully implement approved CRP practices.
- Reduce State-classified NSWs.
- Improve wildlife habitat and fisheries.
- Achieve the nutrient reduction goals of each watershed.

1.3.4 OBJECTIVE #4: PROVIDE A MECHANISM TO HELP FARMERS COMPLY WITH THE NEUSE NITROGEN REDUCTION RULES AND POTENTIAL REGULATIONS OR GOALS.

Indicators:

- Achieve a 30 percent reduction of nitrogen from 1995 levels from wastewater treatment plants, urban areas and agricultural land.
- Enroll up to 100,000 acres of riparian and non-riparian wetlands in CREP.
- Protect existing riparian buffers.
- Reduce unnecessary fish kills.
- Encourage and achieve the public's involvement in CREP.

1.4 ORGANIZATION OF THE PEA

This PEA consists of 10 chapters:

Chapter 1, Introduction. This chapter of the PEA specifies the Purpose and Need that FSA has identified, as well as background information, regarding CRP and CREP.

Chapter 2, Alternatives Including the Proposed Action. This chapter describes the Proposed Action and alternatives in detail.

Chapter 3, Affected Environment. This chapter includes a detailed description of the current condition of the resources that would be affected by the Proposed Action or alternatives. The chapter will describe potentially impacted resources to a level of detail that allows the decision-maker to make an informed choice among alternatives and to determine if any of the impacts would be significant enough to necessitate an EIS. Resources analyzed include biological, cultural, water, soils, recreation, health and human safety, socioeconomics, environmental justice, and other resources that have been given special designations (e.g., wilderness areas).

Chapter 4, Environmental Consequences. This chapter describes the potential environmental impacts of implementation of the alternatives on the resources discussed in Chapter 3.

Chapter 5, Cumulative Effects. This chapter analyzes the impacts of the Proposed Action when added to past, present, and reasonably foreseeable future actions.

Chapter 6, Mitigation Measures. This chapter discusses the measures that may be taken to minimize, reduce, or compensate for an impact. Mitigation is a tool to prevent significant adverse impacts that would otherwise necessitate an EIS.

Chapter 7, List of Preparers. This chapter lists those who assisted in the PEA's preparation.

Chapter 8, Persons and Agencies Contacted. This chapter lists all agencies, agency personnel, and other experts who participated in supplying data for the PEA.

Chapter 9, Glossary.

Chapter 10, References.

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CHAPTER 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 PROPOSED ACTION

This chapter describes the actions proposed (the Proposed Action). All alternatives will be compared in terms of their individual environmental impacts and their achievement of objectives in later chapters of this PEA.

2.2 SCOPING

The purpose of scoping is to identify significant environmental issues deserving of study, and through this, the alternatives to be analyzed in the document. The process involved engaging the public, and NGOs, as well as government agencies with oversight of resources potentially affected. CEQ requires scoping for all EISs, and many agencies through their NEPA regulations also require scoping for EAs.

Public disclosure and participation are the cornerstone of NEPA. Public involvement may take many forms and achieve various ends, but genuine participation requires a partnership between the public and policy makers.

Scoping for the North Carolina CREP was initiated on September 16, 2005 and concluded on September 23, 2005. This process entailed sending 39 letters to stakeholders, including government agencies and NGOs, requesting comments on the draft alternatives. In response, FSA received one comment letter (See Appendix H). The letter was reviewed and taken under consideration during the formulation of the alternatives.

Consultation letters requesting information were also sent to the Fish and Wildlife Service (FWS) and the North Carolina State Historic Preservation Office (SHPO). A copy of the consultation letters and the comments received are included in Appendix F.

Issues identified for analysis in this PEA include:

- Wildlife and Fisheries – Diverse populations of wildlife are found within the CREP watersheds. Habitat degradation from human population growth, habitat fragmentation, invasive exotic species, and pollution continue to threaten species. Current trends and issues affecting wildlife, including aquatic species; critical habitat; and threatened, endangered, or otherwise federally or state protected species are discussed in Section 3.1.
- Cultural Resources – North Carolina's long history of American Indian culture and European settlement has provided the State with a diverse collection of historic and cultural resources in need of preservation. To analyze potential impacts to historic properties at a statewide level is unrealistic for purposes of this PEA. However, site specific cultural reviews and tribal consultations will ensure protection of these vital resources. A discussion of State cultural resources is found in Section 3.2.
- Water Quality – The four watersheds for the North Carolina CREP have been identified as being NSW, experiencing a high amount of water quality degradation. Further information is found in Section 3.3 including surface water, groundwater, wetlands, and floodplains.

- Soils – The health and structure of soils in the proposed CREP area is key for agricultural production as well as the prevention of erosion and sedimentation. Current issues affecting soils are discussed in Section 3.4.
- Recreation – Recreation is a major component of North Carolina's economy as well as the quality of life of its citizens. Many of the recreational opportunities rely on the health of the proposed CREP area and more specifically the quality of wetland and riparian environments within the proposed CREP area. These opportunities include fishing, camping, and wildlife viewing to name a few. Further information on recreation is found in Section 3.5.
- Human Health and Safety – The health and safety of its citizens is the State's primary responsibility. The quality of ground and surface water, used for consumption as well as recreational activities within the proposed CREP area has been degraded through the use of fertilizers and pesticides on agricultural and urban lands. These use of these materials and the chemicals contained in them may contribute to an array of human illnesses. Further information regarding human health and safety is found in Section 3.6.
- Socioeconomics – Agriculture remains an important sector of the State and local economies. The North Carolina CREP proposes the potential enrollment of up to 100,000 acres of cropland across the four watersheds, potentially eliminating 100,000 acres from crop harvest each year. Current issues affecting socioeconomics are discussed in Section 3.7 and 3.8.
- Environmental Justice – The State of North Carolina strives for the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the implementation of CREP.
- Natural Landmarks, Wilderness Areas, Wildlife Refuges – North Carolina has an abundance of lands preserved for their natural, aesthetic, and unique qualities. Many of these lands are located along the coastal boundary of the proposed area. These areas susceptible to downstream flow of point and non-point pollution from all four watersheds. They are important for the preservation of a myriad of wildlife and habitat as well as to the recreation and economic sectors of the State. Further information is found in Section 3.9.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM ANALYSIS

Analysis of a third alternative would have considered the continuation of CREP until funding from North Carolina's Clean Water Trust Fund was exhausted. Questions regarding the duration of funding from the fund raised concerns regarding the long-term viability of CREP. Funding was however, guaranteed through the term of the agreement.

2.4 RESOURCES CONSIDERED BUT ELIMINATED FROM ANALYSIS

2.4.1 AIR AND NOISE

CREP would have no discernable impact on North Carolina's air quality. While the potential exists for minor localized improvements, the potential benefits would be minor and unquantifiable at the programmatic level of this PEA. Since the implementation of CREP would not result in impacts to the maintenance of the State's air sheds, this issue has been eliminated from further study in this PEA.

There would be no perceptible impacts from noise as a result of CREP implementation. Following the short-term noise associated with construction as the CPs are installed, there would be no continual impacts on the local soundscape. With the permanent easements and long-term nature of the CPs, which will result in decreased agricultural activities on CREP lands, noise level can be expected to decrease slightly overall. As a result, FSA has eliminated noise from further analysis in this PEA.

2.4.2 SOLE SOURCE AQUIFERS

Sole source aquifers refer to underground water sources that supply at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water sources that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water (EPA 2005b). EPA has designated 70 sole source aquifers nationwide. However, none are located within the State of North Carolina and therefore this resource was eliminated from further analysis.

2.4.3 TRANSPORTATION

As the population of North Carolina continues to grow, transportation will remain an important issue in the State. However, the implementation of CREP would not have an impact on the transportation infrastructure within the proposed CREP area, as much of the lands eligible for CREP are in rural areas and removed from the most active components of the transportation system. Therefore, transportation has been eliminated from further analysis by FSA.

2.4.4 VEGETATION

By definition, vegetation within the CREP area is already damaged by agricultural use or is associated with lands that are currently lying fallow from past uses. With the implementation of CREP, improvements in vegetative cover should occur. As a result, FSA has eliminated vegetation from further analysis as part of this PEA.

2.4.5 WILD AND SCENIC RIVERS

Currently there are four streams with a Wild and Scenic River designation in the State. These streams include:

- Horse Pasture River,
- Lumber River,
- New River, and
- Wilson Creek.

However, there are no designated streams within the proposed area. As a result, FSA has eliminated wild and scenic rivers from further analysis as part of this PEA.

2.5 ALTERNATIVES SELECTED FOR ANALYSIS

2.5.1 THE PROPOSED ACTION: ALTERNATIVE A – IMPLEMENTATION OF THE AMENDED CREP

Alternative A (the Proposed Action) assumes the implementation of the CREP agreement. However, the State of North Carolina is currently proposing to amend the current CREP agreement. The amendment would allow qualified cropland adjacent to those ditches meeting state criteria to be eligible for CP 21 only, and only in conjunction with practice CP 22 (See Section 2.1.1.1, Conservation Practices below). The State also proposes to define an "eligible ditch" as having a minimum bottom width of one foot and a minimum side-slope ratio of 0.5:1.0. Some of these ditches currently deliver water directly to streams without any filtering effect, thus negating the intended filtering of established buffers. North Carolina seeks to buffer these ditches to remedy the issue. The State also seeks to include water control structures as a cost-share component as applicable under CP22 if required to restore the hydrologic conditions of the site.

Alternative A targets up to 100,000 acres of land, including 85,000 acres of riparian and 15,000 acres of non-riparian wetlands, within the four watersheds in CREP. Alternative A would continue until the full funding of $275 million is exhausted or until 100,000 acres are enrolled. CPs in the four major watershed areas would focus on those stream segments or water bodies classified as NSW, which have experienced harmful algal blooms, reduced levels of oxygen, and increased fish kills, and have displayed other symptoms of stress and disease in the aquatic biota (NCDENR DWQ 2005).

Current agricultural practices utilize pesticides and fertilizers, which impact wetlands ground and surface waters. In addition, pesticides and fertilizers contribute to declines in native wildlife populations (FSA 2003). This CREP agreement is intended to provide North Carolina's agricultural producers with financial incentives to voluntarily remove their lands from agricultural production for contract periods of 10–15 years and voluntarily install CPs. Through CREP, producers can receive annual rental payments and cost-share assistance to establish long term, resource-conserving covers on eligible land.

Eligible producers would receive funding to install CPs. USDA/CCC and the State of North Carolina's Clean Water Management Trust Fund would jointly fund contracts. Federally appropriated funds would total $221 million of the $275 million (80 percent), and the State share would total $54 million (20 percent). Federal and state tax incentives would be available for those easements given in perpetuity. In North Carolina, the Conservation Tax Program allows the producer to deduct the value of the donated easement. The tax deduction is up to $250,000 and must be used within 5 years of the credit.

2.5.1.1 Conservation Practices

Approved CPs proposed for North Carolina have been selected as the best management practices to improve conditions and to ensure success of the State's CREP. The selected CPs are implemented based on eligibility criteria divided into two categories (Agreement 1999).

Non-riparian Wetlands

Land to be enrolled as non-riparian wetlands may be enrolled on hydric soils if the land eligibility criteria and program priorities are met. Enrollment of the lands should help address excess pulses of freshwater into primary fish nursery areas and the filtering of water associated with drainage ditches. CPs include:

- CP 23 (Wetland Restoration): This practice restores the functions and values of wetland ecosystems in agricultural use. It demonstrates excellent phosphorus reduction efficiency and improves quality of downstream waters. These benefits would contribute to meeting CREP objectives and improving conditions in the CREP project areas.

Riparian Wetland

Land to be enrolled as riparian wetlands may be approved in accordance with the following criteria: (a) land is composed entirely of hydric soils, or (b) land is predominantly hydric soils that lie within 750 feet from the top of a streambank. CPs include:

- CP 3A (Hardwood Tree Planting): This practice establishes a stand of predominantly hardwood trees in a timber planting that will enhance environmental benefits. Hardwood trees benefit the environment by providing permanent cover for wildlife and preventing soil erosion. Preventing soil erosion will improve water quality by preventing nutrient-laden soil from entering the water system.
- CP 21 (Filter Strip): The purpose of this practice is to remove nutrients, sediment, organic matter, pesticides, and other pollutants from surface runoff and subsurface flow by deposition, absorption, plant uptake, and other processes, reducing pollution in surface and subsurface water bodies.
- CP 22 (Riparian Buffer): Riparian buffers are strips of grass, trees, or shrubs established adjacent to streams, ditches, wetlands, or other water bodies. Riparian buffers reduce pollution and protect surface and subsurface water quality while enhancing the aquatic ecosystem.
- CP 23 (Riparian Buffer-Wetland Restoration): This practice restores the hydrology of the site for wildlife habitat and water quality purposes.

The North Carolina CREP seeks to enroll on a continuous basis lands that meet an eligibility requirement discussed above as well as all other requirements set forth in the 1999 Agreement. Eligible producers will enroll in 10 to 15-year contracts with FSA. Producers may also extend the benefits of the program through separate agreements with the State of North Carolina. Extended agreements with the State may be accepted if lands are hydrologically restored to their greatest extent practicable and if, where feasible, enrollments allow the use of trees as the natural cover. USDA and the State may provide further restrictions on eligibility with an amendment to the 1999 Agreement; however, extension of eligibility criteria requires an amendment of the Agreement. Participant and land eligibility requirements under CREP are the same as for CRP. The land must have been owned or operated by the applicant for the previous 12 months, must have been planted in crops 2 of the last 5 years, and must be physically and legally capable of being planted in a normal manner. Eligible producers will not be denied the opportunity to offer eligible acreage for enrollment during other CRP enrollment periods.

2.5.1.2 Roles and Responsibilities

U.S. Department of Agriculture (USDA)/Commodity Credit Corporation (CCC)

USDA/CCC, through FSA, is one of the financial partners of the North Carolina CREP and, as such, has extensive responsibility in overseeing program compliance. USDA/CCC bears the responsibility of determining farmer eligibility; paying incentive, bonus, and annual rental payments; and coordinating with the State of North Carolina and other vendors to provide technical assistance to producers.

State of North Carolina

The responsibilities of the State of North Carolina would include the overall administration of the program. Among the facets of the program provided by North Carolina are the following:

- Provide supplemental and cost-share payments to eligible producers;
- Supply at least 20 percent, but not exceeding $54 million, of the total costs of implementing the North Carolina CREP;
- Coordinate funding and actions of the various state and local agencies providing services to the program;
- Manage the North Carolina CREP so that it is consistent with other Federal, State, and local natural resource restoration and conservation programs;
- Provide a report to FSA summarizing the status and progress of enrollments under the Agreement;
- Monitor state water quality using methods developed by the State for CREP; and
- Develop an outreach plan for CREP.

Natural Resources Conservation Service (NRCS)

NRCS will play a technical role in CREP implementation process by reviewing contracts, visiting each site, determining eligibility, and ultimately developing the conservation plan according to the minimum specifications.

Fish and Wildlife Service (FWS)

FWS will be consulted and provide guidance if threatened or endangered species or designated critical habitat issues are revealed and if the implemented CPs have the potential to affect a species or habitat.

State Historic Preservation Office (SHPO)

SHPO will be consulted and provide guidance on cultural resource issues such as historic properties and the potential effects of implemented CPs on those cultural resources.

2.5.1.3 CREP Payments (Federal Funding)

Producers meeting eligibility requirements are eligible for payments through USDA/CCC. USDA/CCC agrees to:

- Pay for 50 percent of the reimbursable costs of CPs, not to exceed 50 percent of the land value for vegetative practices.
- Pay a one-time incentive equal to 25 percent of the normal costs of hydrologic restoration as specified in CCC regulations.
- Make rental payments under the CRP contract at established CRP county average rental rates where the enrollment is for less than 10 acres, and at CRP county soil rental rates for enrollments in excess of 10 acres. Make special CREP incentive payments, as a percent of CRP maximum annual rental rate otherwise applicable to the land to be enrolled in the North Carolina CREP in amounts not to exceed the following percent of such rates:
  1. For cropland to be established as filter strips, 70 percent.
  2. For cropland to be established as riparian forest areas, 100 percent.
  3. For wetland restoration, 100 percent.
  4. For cropland to be established as hardwood tree planting, 100 percent.
  5. For cropland to be established as rare and declining habitat, 100 percent.

2.5.1.4 State Implementation Program

Producers meeting eligibility requirements may receive payments through the State Incentive Program. Two options for participation and payments are as follows:

- Producers who enroll solely in a 10-year CREP contract would receive the following cost-share payments: 25 percent of the approved costs of establishing trees, 25 percent of the approved costs of livestock exclusion and remote watering, and 25 percent of the costs of installing grassed filter strips. For lands planted in trees, North Carolina also makes a one-time $100 bonus payment per contract.
- Producers who enroll solely in a 15-year CREP contract will receive the following cost share payments: 30 percent of the approved costs of establishing trees, and 30 percent of the costs for other approved cost-share practices (including site preparation, plantings, and the costs of livestock exclusion and remote watering). For CREP lands planted in trees, North Carolina would also make a $100 bonus payment per contract. However, under no circumstances do producers receive in excess of 100 percent of practice costs.

2.5.2 ALTERNATIVE B – NO ACTION

Alternative B would consist of no implementation of the North Carolina CREP, thus allowing continued degradation within the four watersheds identified. Agricultural production in these areas utilizes 5 million acres, which is approximately 34 percent of the 14.7 million acres that compose the region.

Nutrient contamination continues to impact water quality within the proposed CREP area (see Table 2.1). Nutrients alter natural water chemistry, increase water turbidity, stimulate the growth of exotic vegetation, promote eutrophication, and result in stagnant water conditions. Cattle and other livestock have access to

stream banks and shorelines of many of the State's water bodies. High levels of nutrients are transported from agricultural operations to surface water and groundwater via runoff and contamination of recharge areas.

With the selection of Alternative B, the No Action Alternative, modes of agricultural production would remain as they have for decades. There would be no incentives to implement FSA-approved CPs. The installation of filter strips, buffers, and other CPs that provide natural methods of water purification would not be federally or state funded in any way. High levels of pesticides and nutrients would continue to accumulate and pollute basin and watershed systems, furthering the degree of environmental degradation to the ecological systems with in these watersheds. Potential for negative social and economic impacts would remain and possibly increase in time.

Table 2.1. Water Bodies Affected by Agricultural Pollutants Based on Current Agricultural Practices Within the CREP Area

Watershed/Basin Area	Degraded Water Bodies (stream miles)
Chowan River Basin	93.6
Neuse River Basin	453
Tar-Pamlico River Basin	28
Cape Fear River Basin	1.9

Source: DDENR DWQ 2004.

2.6 NORTH CAROLINA CREP AREA

2.6.1 IDENTIFICATION OF GEOGRAPHICAL BOUNDARIES

The North Carolina CREP boundary contains all or part of 44 counties in the northeastern portion of the state, encompassing 23,112 square miles, or 14.7 million acres (See Figure 1.1). The proposed CREP area is composed of two of the three ecoregions that characterize the State: the Piedmont and Mid-Atlantic Coastal Plain ecoregions. The western CREP area contains Guilford, Randolph, Rockingham, and Forsyth Counties in the middle of the State, while the remainder of the counties are located within the Mid-Atlantic Coastal Plain region of the state. Four of the State's five largest cities are located in the proposed CREP area: Raleigh, Greensboro, Durham, and Winston-Salem.

2.6.2 IDENTIFICATION OF TEMPORAL BOUNDARIES

North Carolina has a long history of farming; however, sustainable agriculture became possible only after commercial fertilizers were made available in the late 1800s. Today agriculture remains an integral sector of the State economy, but it is one that is coming under increased pressure from the encroaching urban development. Looking ahead, North Carolina's population is projected to grow by approximately 2 million by 2020. This population growth will increase the demand on natural resources in the next 15–20 years. As the need for clean water sources and land continues, so will the pressures on agricultural uses.

Although the 1999 agreement expires in 2007, the State Implementation Program offers 15-year contracts for land enrollment making 2014 a temporal boundary for analysis purposes. The Corps of Engineers water resources projects generally use a long-term planning horizon of 50 years. So based on the above and historical land uses, this assessment assumes a temporal boundary of 20–50 years to assess environmental effects.

2.7 COMPARISON OF ALTERNATIVES

Table 2.2. Summary of Alternatives

Incentives					
Alternatives	**Assumptions**	**Implementation Period**	**Conservation Practices**	**Federal Rental Payment**	**State Incentive Program**
A. Implementation of the Amended CREP	Funding of $275 million is exhausted 100,000 acres are enrolled	Through 2007	CP 3A CP 21 For Eligible Ditches (See Section 2.4.1): CP 21 – For cropland meeting eligibility requirements and only in conjunction w/ CP 22 CP 22	Federal Commitment: 10 acres – CRP county weighted average soil rental rate < 10 acres – CRP county weighted average soil rental rate Special Incentive Payments as a percent of CRP maximum rental rate: Dry land – CP 21, 70 percent Dry land – CP 22, 100 percent Wetland Restoration, 100 percent Dry land – CP 3A, 100 percent One time incentive payment – 25 percent to restore hydrology of the site	State Commitments 10 year CRP Contract: 25 percent of approved costs, 25 percent costs of livestock exclusion and remote watering+ $100 bonus for each contract 15 year CRP Contract: 30 percent of approved costs 25 percent costs of livestock exclusion and remote watering + $100 bonus for each contract
B. No Action	No Action	No Action	No Action	No Action	

CHAPTER 3.0 AFFECTED ENVIRONMENT

3.1 BIOLOGICAL RESOURCES

North Carolina is rich in fish, wildlife and habitat diversity. Topographically, the State can be divided generally into, coastal, piedmont and mountain regions, which in turn fall within larger ecoregions (Figure 3.1). The four river basins (Neuse, Chowan, Tar Pamlico and Cape Fear) are comprised of portions of the Piedmont and Mid-Atlantic Coastal Plain (or Coastal) ecoregions. Elevations ranging from sea level to over 6,000 feet provide habitat for over 1,000 species of birds, mammals, fish, reptiles, and invertebrates (NCWRC 2005).

The Coastal ecoregion is characterized by flatlands extending from the coast approximately 125 miles inland. Elevations in the region increase inland at a rate of approximately one foot per mile. The central Piedmont ecoregion is immediately west of the Coastal ecoregion and is characterized by rolling hills ranging from 150 to 1,500 feet in elevation (NCWRC 2005).

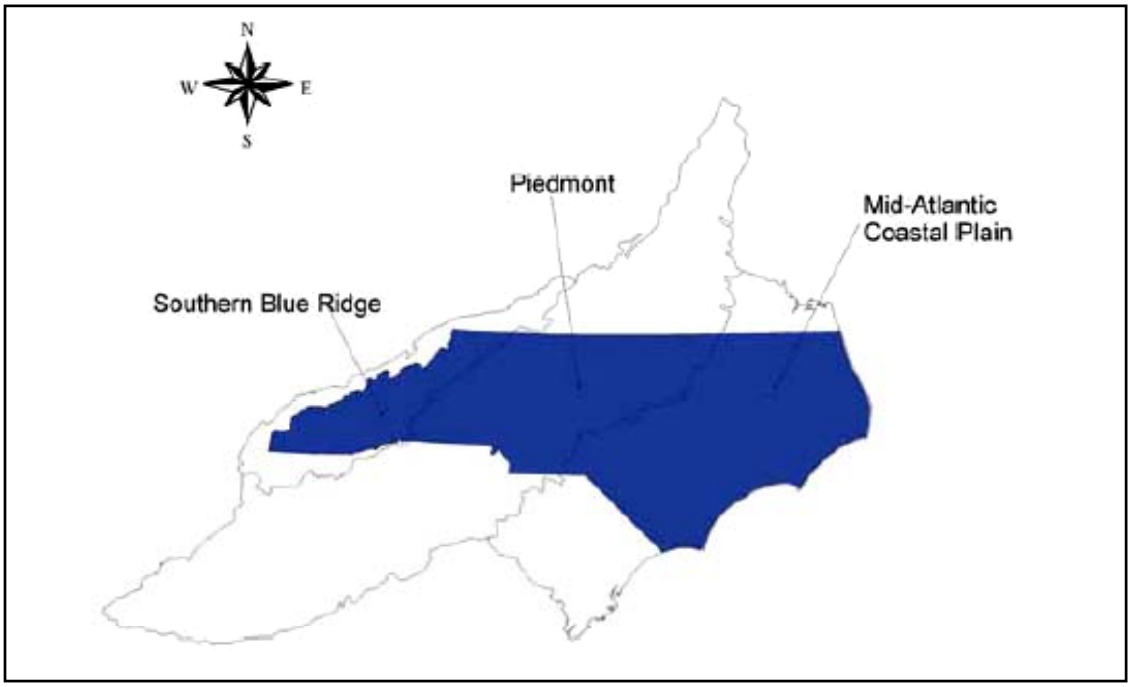

Figure 3.1. Ecoregions in North Carolina.

Source: Bailey 1995.

3.1.1 WILDLIFE AND FISHERIES

3.1.1.1 Overview

The State of North Carolina is home to 5,700 species of plants, 700 vertebrate species and more than 10,000 species of invertebrates (NCNHP 2005). The southeastern U.S. harbors 62 percent of the freshwater species in North America, 90 percent of mussels and crayfish and 75 percent of aquatic snails. Within North Carolina, aquatic biological diversity thrives on the varied landscape from Appalachia to the Coastal region (American Rivers 2005).

Traditionally ranked in the top-10 seafood producing states, North Carolina has over 4,000 miles of shoreline and 2.5 million acres of marine and estuarine waters. Latest estimates show that 4,000 full-time commercial fishermen and 2 million recreational anglers enjoy the bounty of the State's marine resources statewide economy (NCDENR DMF 2004).

Habitat degradation, including alteration to terrestrial habitats as well as aquatic habitats, and loss due to development associated with human population growth are among the most threatening impacts to fish and wildlife species across the study area. Other threats include water quality impacts and invasive and exotic species introductions (NCWRC 2005).

Species and habitat conservation activities are implemented through various agencies and organizations throughout the proposed area. These conservation partners include:

Federal agencies:

- U.S. Fish and Wildlife Service
- Natural Resources Conservation Service
- National Oceanic and Atmospheric Administration
- U.S. Forest Service
- National Park Service
- GAP Analysis Project

State agencies:

- North Carolina Wildlife Resources Commission
- North Carolina Museum of Natural Sciences
- North Carolina Natural Heritage Program
- North Carolina Division of Marine Fisheries
- North Carolina Division of Coastal Management
- North Carolina Division of Forest Resources
- North Carolina Division of Water Quality
- Ecosystem Enhancement Program
- One North Carolina Naturally Initiative

Non-profit organizations:

- The Nature Conservancy
- North Carolina Audubon
- North Carolina Wildlife Federation
- The Conservation Trust for North Carolina

3.1.1.2 Terrestrial Wildlife

The terrestrial wildlife species found in the North Carolina CREP area are typical of the southeastern region of the U.S. These species include big game species such as black bear, bobcats, and white-tailed deer. Additional species of interest in the study area fall within the general categories of upland game species, raptors, waterfowl and shorebirds, fish and aquatic species, small mammals, reptiles, amphibians, and invertebrates.

Black Bear (Ursus Americanus)

Historically, black bear inhabited the entire State of North Carolina; presently, bear habitat is in the Mountain region and the Coastal region. Black bear are not presently found within the Piedmont region due to the high human population (NCWRC Wildlife Profiles 2005; Figure 3.2).

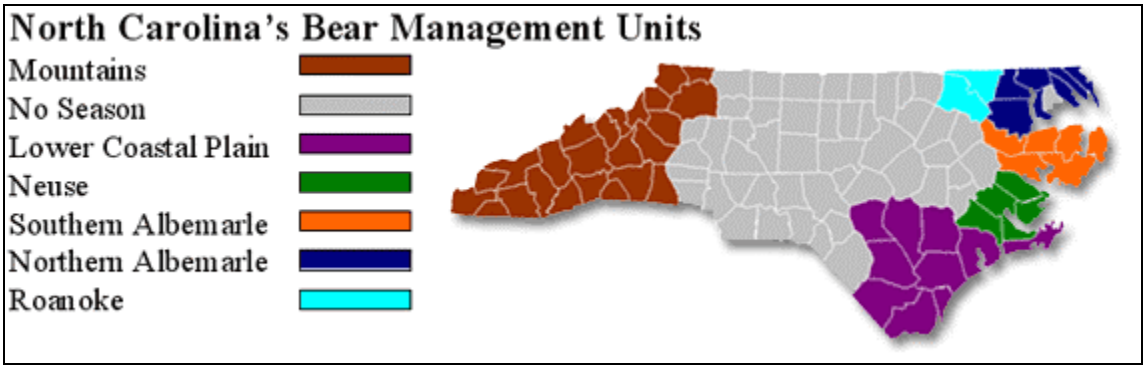

Figure 3.2. North Carolina bear management units.

Source: NCWRC 2005.

Black bear prefer large expanses of uninhabited woodland or swampland with dense cover. The range of the bear is generally affected primarily by food and cover, sex and age and may overlap or be completely shared with others Within the study area, lowland hardwoods, swamps, and pocosins within the Coastal region provide good habitat. Bears live in an area of approximately 2,000 to 3,000 acres for females and 11,000 to 15,000 acres for males (22,000 in coastal areas).

North Carolina has an active tradition of black bear hunting dating to the early colonial period. Beginning in the 1930s, hunters and conservationists pushed for bear hunting regulations and for the creation of a state wildlife resources agency to manage wildlife and enforce wildlife laws. The North Carolina Wildlife Resources Commission was created in the 1940s, and Wildlife Commission personnel began officially

monitoring black bears in the 1960. Since 1999, the black bear harvest in the coastal counties has increased by 20 percent (Table 3.1).

Table 3.1. Coastal Region Black Bear Harvest, 1999–2003

County	1999	2000	2001	2002	2003
Beaufort	81	90	155	130	154
Bertie	37	32	37	29	38
Carteret	18	29	21	21	25
Chowan	14	5	5	11	10
Craven	53	45	72	62	54
Dare	4	4	2	2	19
Duplin	5	9	8	3	3
Gates	17	23	35	24	26
Halifax	8	3	5	2	0
Hertford	17	21	20	8	8
Hyde	145	157	149	119	187
Jones	73	65	115	75	83
Martin	10	18	22	22	16
Northampton	8	6	10	14	1
Onslow	25	45	49	47	34
Pamlico	18	29	42	25	26
Sampson	5	2	3	8	8
Tyrrell	80	89	63	97	94
Washington	62	51	67	62	63
Totals	**680**	**723**	**880**	**761**	**849**

Source: NCWRC 2005.

Threats to the black bear presently include widespread poaching, loss of habitat and the inevitable human-bear conflicts as bear habitat is encroached upon. Poaching has become a larger problem in recent years, due to the increased black bear population. The black bear gall bladder trade is also a reason for the increased poaching problem. Housing continues to be built in bear habitat. This causes both loss of habitat and eventually results in human-bear conflicts.

Bobcat (Felis rufus)

The bobcat has a wide range, encompassing the entire State; however, similar to the black bear, the wooded habitats of the Coastal region and mountains support the largest numbers (NCWRC Wildlife Profiles 2005). Bobcats reach their highest density in the southeastern portion of the State in Brunswick,

Bladen and Columbus counties, south of the project area. Bottomland hardwoods, young pine stands, swamps and pocosins provide good habitat in the Coastal region.

The bobcat is territorial and has a large home range, the size of which depends on habitat quality and the sex and age of the bobcat. Ranges may be as small as a half mile or as large as 30 square miles, with male ranges being two to five times larger than female ranges. The bobcat is carnivorous and preys on small mammal species such as rabbits and mice. Threats to the bobcat include poaching and loss of habitat.

White-tailed Deer (Odocoileus virginianus)

Although the white-tailed deer population was threatened with extinction after being hunted extensively by European settlers, the populations are now at an all-time high with numbers continuing to increase. Today there are approximately 1.1 million deer in North Carolina (NCWRC Wildlife Profiles 2005).

White-tailed deer are able to utilize almost any type of habitat. They flourish in creek and river bottom habitats as well as in oak ridges, pine forests, farmlands or any other habitat that offers food and cover. They have even adapted to suburban sprawl. Deer are found in every county in the study area but are distributed unevenly. See Figure 3.3 for white-tailed deer distribution.

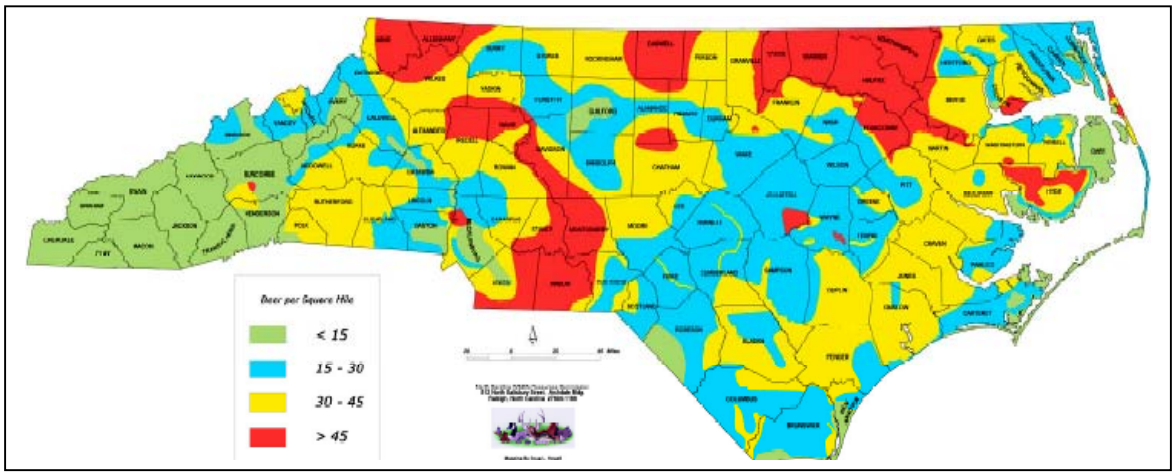

Figure 3.3. White-tailed deer distribution in North Carolina.

Source: NCWRC 2005.

Deer are the most popular game animal in the study area; both the population and the annual harvest numbers continue to grow. Properly managed, hunting has been a beneficial management tool for keeping deer from becoming overpopulated (NCWRC Wildlife Profiles 2005; Table 3.2). Presently there are no real threats to this species.

Table 3.2. North Carolina Deer Harvest 2004

Season	# Deer Harvested	% of Total Harvest
Gun	173,700	83.8
Muzzleloader	20,220	9.8
Archery	13,330	6.4
Total	**207,250**	**100.0**

Source: NCWRC 2005.

Upland Mammals

Common upland and smaller species within the study area include mink, muskrat, opossum, river otter, raccoon, eastern cottontail, marsh rabbit, eastern gray squirrel, striped skunk, woodchuck, beaver, eastern chipmunk and game birds such as Wild Turkey. Of these species, the mink, muskrat, river otter, marsh rabbit, fox squirrel and woodchuck rely on stream banks, wetlands, marshlands and pine oak forests that characterize the Piedmont and Coastal regions. Many of these species are game species hunted for their meat or their pelts.

Upland Non-game Birds

The state of North Carolina has one of the most diverse bird faunas of any geographic region in North America (Potter et al. 1980). A total of 460 bird species have been recorded within the state's boundaries, primarily due to its wide array of landforms, climate, and vegetation. This represents more than 70 percent of all bird species occurring in eastern North America, including two of the rarest: Wood Stork and Red-cockaded Woodpecker. The location of North Carolina lies astride the Atlantic Flyway where each spring and fall millions of birds breeding in the northeastern United States and Canada pass through on their migration to wintering areas in the southern United States, or in Central or even South America. The prevailing westerly winds typically push fall migrants to the east, often resulting in impressive concentrations of migratory landbirds along North Carolina's Atlantic coast.

Upland Reptiles and Amphibians

The reptile and amphibian biodiversity of North Carolina is high. There are 28 different frog and toad species within North Carolina and 45 salamander species. Amphibians in North Carolina and the world have been on a decline for the last several years. There are 32 species of snake found in North Carolina. Although most are non-venomous and even popular in the pet trade, such as the corn snakes and rat snakes, there are 6 species of venomous snakes found in North Carolina as well, including the cottonmouth and timber rattlesnake. There are 21 species of turtles found within the state as well as the endangered American Alligator. A variety of these species are found throughout the study area. Many of these species, especially the amphibians, are susceptible to environmental degradation and are therefore good indicators of environmental health. Many species have experienced declines in recent years.

Raptors

There are 20 species of raptors that may be identified in North Carolina throughout a given year. These species include the Bald Eagle, Osprey, Red-tailed Hawk, and several species of owls. Based on the diversity of habitat, these species may also be seen in the proposed CREP area as well. Special habitat needs for raptors include nest sites, foraging areas, and roosting or resting sites. Species-specific threats will be covered in the following sections under species-specific threats.

Waterfowl, Shorebirds, Wading Birds and Migratory Birds

Due to its diverse coastal habitat, including barrier islands, sounds, marshes and various forest types, as well as its riverine systems further inland, the study area plays a vital role for a diverse assemblage of nesting water fowl, shore birds and wading birds, with more than 400 species recorded (NC Audubon 2005). Alligator, Cedar Island, Currituck, Mackay, Mattamuskeet, Swanquarter, Roanoke River, Pea Island and Pocosin National Wildlife Refuges are major locations for roosting, feeding and stopover habitat in the Atlantic Flyway for migratory birds such as the Tundra Swan, as well as habitat for nesting birds that are present year-round.

3.1.1.3 Aquatic Wildlife

Aquatic species are often used as indicator species of ecosystem health. These species often need protection from resource utilization such as recreation, agricultural uses, mineral extraction, and invasive non-native species. The four river basins as well as the Coastal plains region are home to an abundance of aquatic species in their inland, joint, and coastal waters. However, the health of many of these habitats is in decline due to severely degraded water quality, and over–fishing has the potential to affect the populations of both game and bait species. Currently there are approximately 200 species of freshwater fish that are known to be native to the region and approximately 60 species that have been introduced from another river basin, state, or continent, nearly all of which occur or have the potential to occur in the study area. These species are distributed among the river basins as noted in Table 3.3.

Table 3.3. Number of Aquatic Species Using the River Basins in the CREP Study Area

River Basin	# of Native Species	# of Introduced Species
Neuse	98	15
Chowan	60	9
Tar Pamlico	87	10
Cape Fear	104	19

There are a total of 40 marine/coastal species in the State, nearly all of which occur or have the potential to occur in the proposed CREP area. Of these species, 10 are viable or have a sustainable population; 3 are in recovery; 6 are of concern to the State Division of Marine Fisheries; 11 are currently over fished; and 9 are unknown (NCDENR DMF 2005a). In 2004 Commercial and recreational fishing harvested approximately 160 million pounds of finfish and shellfish (Table 3.4), with commercial harvests totaling $79.7 million (NCDENR DMF 2005b).

Table 3.4. Total Pounds of Marine/Coastal Species Harvested, 2004

Commercial	Recreational	Recreational Commercial Gear
134,094,431	24,905,130	640,704

Source: NCDENR DMF 2004.

3.1.2 PROTECTED SPECIES

3.1.2.1 Overview

The Endangered Species Act (ESA) was enacted to protect endangered and threatened species and to provide a means to conserve critical habitat. All Federal agencies were mandated to protect species and preserve their habitats by ensuring that Federal actions do not jeopardize the continued existence of listed species. ESA defines an endangered species as one that is in danger of extinction throughout all or a significant portion of its range and a threatened species as one that is likely to become endangered within the foreseeable future. Critical habitat is defined by ESA as areas that are essential to the conservation of listed species. Private, city, and state lands are generally not affected by critical habitat until the property owner needs a Federal permit or requests Federal funding.

Because the North Carolina CREP is partially funded by Federal dollars, Section 7 consultation with the FWS will be required when federally protected species or their critical habitat have the potential to be encountered in the implementation of CREP contracts. Section 7 of the ESA, called "Interagency Cooperation," is the mechanism by which Federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species. Under Section 7, consultation with FWS is initiated when any action the agency carries out, funds, or authorizes may affect a threatened or endangered species or critical habitat.

FWS published its Final Policy on Safe Harbor Agreements and associated regulations were published in the *Federal Register* on June 17, 1999. These regulations would help remove disincentives from private producers that wish to manage their property for the benefit of listed species (64 FR 32706-32716), which would entail the development of Safe Harbor Agreements and Candidate Conservation Agreements with Assurances (CCAAs). These agreements would ensure agricultural producers that traditional agricultural uses could continue alongside habitat improvements. They would also address the issue of a "take" with regard to activities such as habitat restoration.

3.1.2.2 Species

Currently there are a total of 64 federally listed species in the State, including 37 vertebrates and invertebrates and 27 plants (FWS 2005). A complete list of federally and state listed species occurring or with potential to occur in North Carolina is included in Appendix A. There are 19 federally listed animal species and 11 federally listed plant species that occur or have the potential to occur within the proposed CREP area (Table 3.5).

Table 3.5. Protected Animal And Plant Species that Occur or Have The Potential to Occur within the Proposed CREP Area

Common Name	Scientific Name	Status	Background
Invertebrates			
Dwarf wedgemussel	*Alasmidonta heterodon*	E	The dwarf wedge mussel inhabits creek and river areas with a slow to moderate current and a sand, gravel, or muddy bottom. A recovery plan has been written for this species.
Tar River spinymussel	*Elliptio steinstansana*	E	The Tar spinymussel, one of only three freshwater mussels in the world with spines, is a medium-sized mussel reaching about 2.5 inches in length. A recovery plan has been written for this species.
James spinymussel	*Pleurobema collina*	E	Suitable habitat for this species includes free-flowing streams with a variety of flow regimes. The James spinymussel is found in a variety of substrates that are free from silt. A recovery plan has been written for this species.
Fish			
Cape Fear shiner	*Notropis mekistocholas*	E	The Cape Fear shiner is generally associated with gravel, cobble, and boulder substrates, and has been observed in slow pools, riffles, and slow runs. This species has designated critical habitat within four North Carolina counties including Moore, Chatham, Lee and Randolph.
Shortnose sturgeon	*Acipenser oxyrinchus*	E	The sturgeon inhabits the lower sections of larger rivers and coastal waters along the Atlantic coast. It may spend most of the year in brackish or salt water and move into fresh water only to spawn.
Reptiles			
American alligator	*Alligator mississippiensis*	T (S/A)	Alligators can be found in rivers, swamps, bogs, lakes, ponds, creeks, canals, and bayous. Alligators can tolerate some salt water and have been spotted in marshes as well
Loggerhead sea turtle	*Caretta caretta*	T	The loggerhead is widely distributed within its range. It may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and shipwrecks are often used as feeding areas. Hatchlings have been found floating at sea in association with Sargassum rafts. Nesting occurs mainly on open beaches or along narrow bays having suitable soil, and it is often in association with other species of sea turtles. A recovery plan has been written for this species.
Green sea turtle	*Chelonia mydas*	T	Green turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The turtles are attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting. Green turtles apparently have a strong nesting site fidelity and often make long distance migrations between feeding grounds and nesting beaches. A recovery plan has been written for this species.
Bog turtle	*Clemmys muhlenbergii*	T (S/A)	The bog turtle is endangered due to its popularity in the pet trade. It was therefore listed to protect it from collectors.
Leatherback sea turtle	*Dermochelys coriacea*	E	An open ocean species, it sometimes moves into shallow bays, estuaries and even river mouths. The leatherback needs sandy nesting beaches backed with plants and sloped so that the crawl to dry sand is not too far. A recovery plan has been written for this species.

Table 3.5. Protected Animal And Plant Species that Occur or Have The Potential to Occur within the Proposed CREP Area

Common Name	Scientific Name	Status	Background
Hawksbill turtle	*Eretmochelys imbricata*	E	The hawksbill is found along submerged rocky areas, reefs, shallow coastal areas, lagoons of oceanic islands and narrow creeks and passes. It is not often seen in water over 65 feet deep. The hawksbill is a bottom-feeder, foraging close to shores and reefs. A recovery plan has been written for this species.
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	Kemp's Ridley prefers shallow coastal waters, often with shorelines of red mangrove. A recovery plan has been written for this species.
Birds			
Piping plover	*Charadrius melodus melodus*	T	Piping plovers nest along the sandy beaches of the Atlantic Coast, the gravelly shorelines of the Great Lakes, and on river sandbars and alkali wetlands throughout the Great Plains region. They prefer to nest in sparsely vegetated areas that are slightly raised in elevation (like a beach berm). Piping plover breeding territories generally include a feeding area, such as a dune pond or slough, or near the lakeshore or ocean edge. These birds are primarily coastal during the winter, preferring areas with expansive sand or mudflats (feeding) in close proximity to a sandy beach (roosting). This species has designated critical habitat within five North Carolina counties, including Carteret, Dare, Hyde, Onslow and Pender. This habitat was set-aside for wintering piping plovers.
Bald eagle	*Haliaeetus leucocephalus*	T	This species has been proposed for delisting.
Red-cockaded woodpecker	*Picoides borealis*	E	Nesting and roosting habitat for this species includes open stands of pine containing trees 60 years old and older. Red-cockaded woodpeckers need live, large older pines in which to excavate their cavities. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. A recovery plan has been written for this species.
Roseate tern	*Sterna dougallii*	E	Roseate terns are occasional visitors along the Outer Banks, south of Cape Hatteras, particularly at Cape Point within Cape Hatteras National Seashore, during the months of July and August. They may be seen late spring and early summer on a rare occasion. A recovery plan has been written for this species.
Mammals			
Eastern Cougar	*Puma concolor cougar*	E	No preference for specific habitat types has been noted for the eastern cougar. The primary need is apparently for a large wilderness area with an adequate food supply.
Manatee	*Trichechus manatus*	E	Manatees inhabit both salt and fresh water of sufficient depth (1.5 meters to usually less than 6 meters) throughout their range. They may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles off the Florida Gulf coast. A recovery plan has been written for this species.
Red Wolf	*Canis Rufus*	EXP	The last red wolves were found in coastal prairie and marsh habitat because this was the last area in which the animals were allowed to remain. Any habitat area in the southeastern United States of sufficient size, which provides adequate food, water, and the basic cover requirement of heavy

Table 3.5. Protected Animal And Plant Species that Occur or Have The Potential to Occur within the Proposed CREP Area

Common Name	Scientific Name	Status	Background
			vegetation, should be suitable habitat for the red wolf. Telemetry studies indicate that red wolf home range requirements vary from about 25 to 50 square miles. A recovery plan has been written for this species. Federal and State Wildlife biologists have recently reintroduced the red wolf as part of a carefully controlled restoration project. The red wolf once ranged throughout the southeastern U.S., but by the early twentieth century, habitat destruction and predator control programs resulted in extermination of the wolf from much of its range (NCWRC Wildlife Profiles 2005). Habitat loss and predator control reduced the range of these wolves, allowing coyotes to move into their former range. Hybridization between red wolves and coyotes is usually accepted as the final factor that resulted in the near extinction of the red wolf. In September 1987, the FWS released four pairs of adult wolves to the Alligator River National Wildlife Refuge in Dare County, North Carolina. Today approximately 60 to 100 wolves inhabit 1.5 million acres of federal, private, and state lands in the study area (NCWRC Wildlife Profiles 2005).
Plants			
Sensitive jointvetch	*Aeschynomene virginica*	T	Sensitive joint-vetch is known from a total of 24 extant sites, including two in North Carolina (Hyde and Beaufort Counties. Sensitive joint-vetch grows in the intertidal zone where plants are flooded twice daily. Although populations fluctuate, there is an apparent trend for large populations to remain large and small populations to remain small.
Seabeach amaranth	*Amaranthus pumilus*	T	Seabeach amaranth occurs on barrier island beaches, where its primary habitat consists of overwash flats at accreting ends of islands and lower foredunes and upper strands of noneroding beaches. It occasionally establishes small temporary populations in other habitats, including sound-side beaches, blowouts in foredunes, and sand and shell material placed as beach replenishment or dredge spoil. Seabeach amaranth appears to be intolerant of competition and does not occur on well-vegetated sites. The species appears to need extensive areas of barrier island beaches and inlets, functioning in a relatively natural and dynamic manner. These characteristics allow it to move around in the landscape as a fugitive species, occupying suitable habitat as it becomes available. A recovery plan has been written for this species.
Small-anterhed bittercress	*Cardamine micranthera*	E	This species occurs in seepages, wet rock crevices, streambanks, sandbars, and wet woods along small streams, Dan River drainage. Threats include expanding agricultural and residential development, impoundment, channelization, exotic weeds, and toxic chemical spills..
Golden sedge	*Carex lutea*	E	*Carex lutea* grows in sandy soils overlying coquina limestone deposits, where the soil pH is unusually high for this region. Soils supporting this species are very wet to periodically shallowly inundated..
Smooth coneflower	*Echinacea laevigata*	E	The habitat of smooth coneflower is open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium- and calcium-rich soils associated with limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina), and marble (in South Carolina and Georgia). Sixty populations of smooth coneflower have

Table 3.5. Protected Animal And Plant Species that Occur or Have The Potential to Occur within the Proposed CREP Area

Common Name	Scientific Name	Status	Background
			been reported historically from 24 counties in 8 States. Over two-thirds of the historic populations have been eliminated. A recovery plan has been written for this species.
Schweinitzs sunflower	*Helianthus schweinitzii*	E	It is believed that this species formerly occupied prairie like habitats or Post Oak - Blackjack Oak savannas that were maintained by fire. Current habitats include roadsides, power line clearings, old pastures, woodland openings and other sunny or semi-sunny situations. Schweinitz's sunflower is threatened by fire suppression, highway construction, residential and industrial development, and maintenance activities in roadside and utlities rights of way.
Small whorled pogonia	*Isotria medeoloides*	T	In North Carolina, this species is typically found in montane oak-hickory or acidic cove forests. The current status of small whorled pogonia is attributed to loss of habitat and overutilization for scientific and private collections. However, some populations observed for a number of years have also declined for unknown reasons. A recovery plan has been written for this species.
Pondberry	*Lindera melissifolia*	E	Pondberry, for the most part, is associated with wetland habitats such as bottomland and hardwoods in the interior areas, and the margins of sinks, ponds and other depressions in the more coastal sites. The most significant threats are drainage ditching and subsequent conversion of its habitat to other uses. A recovery plan has been written for this species.
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	This species generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins (areas of dense shrub and vine growth usually on a wet, peaty, poorly drained soil) (Barry 1980), on moist to seasonally saturated sands and on shallow organic soils overlaying sand. Suppression of naturally-occurring fire in these ecotones results in shrubs increasing in density and height and expanding to eliminate the open edges required by this plant. A recovery plan has been written for this species.
Harperella	*Ptilinmium nodosum*	E	Harperella typically occurs in two habitat types: (1) rocky or gravel shoals and margins of clear, swift-flowing stream sections; and (2) edges of intermittent pineland ponds in the coastal plain. A recovery plan has been written for this species.
Michaux's sumac	*Rhus michauxii*	E	Michaux's sumac grows in sandy or rocky open woods in association with basic soils. Apparently, this plant survives best in areas where some form of disturbance has provided an open area. Perhaps the most crucial factor endangering this species is its low reproductive capacity. A recovery plan has been written for this species.
White irisette	*Sisyrinchium dichotomum*	E	Habitat for this species includes rich, basic soils probably weathered from amphibolite, in clearings and the edges of upland woods where the canopy is thin and often where downslope runoff has removed much of the deep litter layer ordinarily present on these sites. Highway and powerline maintenance and improvement; residential development, and exotic weed species are the threats to this species.
Cooleys meadowrue	*Thalictrum cooleyi*	E	Cooley's meadowrue occurs in moist to wet bogs and savannahs. It grows along fireplow lines, roadside ditches, woodland clearings, and powerline rights-of-way, and needs some type of disturbance to maintain its open habitat.

Table 3.5. Protected Animal And Plant Species that Occur or Have The Potential to Occur within the Proposed CREP Area

Common Name	Scientific Name	Status	Background
White fringeless orchid	*Platanthera integrilabea*	C	The white fringeless orchid grows in wetlands in the Blue Ridge Mountains and in the coastal plain region. Only one out of every one hundred plants produces seeds each year and many of the populations support far fewer than one hundred individuals.
Hirsts panic grass	*Panicum hirstii*	C	Hirst's panic grass occurs in coastal plain intermittent ponds, usually in wet savanna or pine barren habitats. The species relies on periods of standing water to keep competing species at a minimum.
Georgia aster	*Aster georgiana*	C	Georgia aster is generally found in upland oak-hickory forests and openings, sometimes with *Echinacea laevigata*. Relict of post oak savannahs; found on roads, woodland borders, and dry rocky woods.
Bog asphodel	*Narthecium americanum*	C	Bog asphodel is found in wet, boggy habitats including wet heaths, moors and raised, valley and blanket bogs. It is also found in wet acid habitats on mountains, up to altitudes of 1000m and is unable to tolerate shade.

E = Endangered

T = Threatened

C = Candidate

EXP = Experimental Population

T (S/A) =
Source: FWS 2003.

3.2 CULTURAL RESOURCES

3.2.1 ARCHAEOLOGICAL RESOURCES

Prehistoric and historic inhabitants of the area that is now North Carolina have left remnants of their occupations throughout the State. As part of projects that are Federal undertakings, such as the North Carolina CREP, historic properties are evaluated for their significance and importance to our understanding of the prehistory and history of an area and for their eligibility to be listed on the National Register of Historic Places (NRHP). A number of Federal laws and regulations apply in such cases, but the primary one are the National Historic Preservation Act of 1966, as amended (NHPA) and its implementing regulations (36 CFR 800) and NEPA, Additionally, under North Carolina law (G.S. 121-12(a)), the preservation of NRHP properties must be considered for all state undertakings. North Carolina law only applies to properties formally listed on the NRHP, not to properties determined eligible for listing on the NRHP by state or Federal agencies.

As defined in Federal regulations dictating the treatment of historic properties, these include places associated with events important to an area's history; places associated with people important to an area's history; and structures that are exceptional examples of a type of construction, are one of the few remaining examples of a type of structure, are the work of a master, or are otherwise significant for their physical characteristics. Many historic resources are found to be significant under one of these three criteria. Historic properties can also be significant because of their potential to provide data that will assist us in developing a greater understanding of prehistoric or historic periods in the area. Of the prehistoric resources that are determined to be significant for our understanding of the prehistory of an area, most are determined to be significant under this last criterion.

Historic properties in the North Carolina CREP area include prehistoric occupation sites; prehistoric and historic material cultural items; properties such as historic farms and plantations; cemeteries; historic ships; birthplaces of people important in North Carolina history; historic districts; and historical buildings such as courthouses, hotels, historic schools, and historic houses; and may include traditional cultural properties. The National Park Service currently lists more than 650 properties on the NRHP located within the North Carolina CREP area, including more than 100 NRHP Historic Districts and more than 25 National Historic Landmarks. 3.2.1 Archaeological Resources

3.2.1.1 Overview

Archaeological investigations into the prehistory of North Carolina have a long and varied history. Nineteenth century accounts show an interest in American Indian earthworks, including somewhat detailed descriptions of their layouts and contents, as well as interpretive attempts (Keel 2002; Thomas 1986). Research in the 20th century included that of the federally funded Works Progress Administration (WPA) program through which early surveys to identify archaeological sites were carried out (Lyon 1996:117-118).

The prehistory of North Carolina is generally divided into four distinct periods: the Paleoindian, the Archaic, the Woodland, and the Mississippian (Friends of North Carolina Archaeology 2005; Ward and Davis Jr. 1999:1).

The Paleoindian period in North Carolina is generally dated between 12,000 and 9,500 B.P. (Bense 1994:3; Friends of North Carolina Archaeology 2005; Ward and Davis Jr. 1999:2-4). North Carolina has a number of archaeological sites from which Paleoindian artifacts have been recovered, but firmly dated archaeological evidence from this period in North Carolina is fairly sparse (Bense 1994:4). Human activities during this time period are generally similar across the state of North Carolina, with little regional variation. The occupation pattern is generally one of mobile hunter-foragers.

The Archaic period in North Carolina is generally dated between 9,500 and 3,000–4,000 B.P. (Bense 1994:3,5; Friends of North Carolina Archaeology 2005; Ward and Davis Jr. 1999:2-4). Ground stone tools make an appearance during this period, including atlatl weights and axes (Bense 1994:5; Friends of North Carolina Archaeology 2005). Bowls carved from soapstone have been recovered from some sites (Friends of North Carolina Archaeology 2005). The earliest large base camps are dated to this period, and other types of occupations include small hunting camps, stone quarries, and seasonal campsites (Friends of North Carolina Archaeology 2005). Reliance on medium-sized game is increasingly common, in contrast to the previous Paleoindian period.

Following the Archaic period, the Woodland period in North Carolina is generally dated to between approximately 4,000 and 400 B.P. (Bense 1994:3; Friends of North Carolina Archaeology 2005; Ward and Davis Jr. 1999:2-4). Settlements began to concentrate in river valleys and along the coastal strip, and by the end of the period, platform mounds were frequent (Bense 1994:5; Hutchinson 2002:17).

The first evidence of agricultural activity is recovered from occupations dating to the Woodland period, which provide evidence of small-scale cultivation of corn, beans, squash, and sunflowers (Bense 1994:5; Friends of North Carolina Archaeology 2005). Overlapping with and subsequent to the Woodland period, the Mississippian period, which is generally dated to between 950–700 and 450–250 B.P., can be crudely understood as an intensification of practices begun during the Woodland period. More and larger permanent settlements are found, many of which include temple mounds (Bense 1994:6; Friends of North Carolina Archaeology 2005). Most of the sites with what would be considered classic Mississippian occupations are to the south and/or west of the North Carolina CREP area, but some characteristics of the period are found at occupations within the proposed CREP area.

The period of Contact between American Indians and Euroamericans began ca. 450 B.P., with the arrival of Euro-Americans in the area (Bense 1994:7). Trade items begin to appear in archaeological sites from this period; glass trade beads are found alongside more traditional items (Lyon 1996:118).

Around 1650 A.D., the first settlements were established in the area now known as North Carolina (Lazzerini 2006; State Library of North Carolina 2006). The first settlements followed the coastline with most of the settlers experiencing grave hardships (Lazzerini 2006). From the time of the first settlements, the Euro-American settlers often clashed with the Native American tribes of the area, primarily because of the appropriation of land by the Euro-Americans. Subsequent to the initial settlement of North Carolina, the Euro-American population in the area steadily increased over the following decades and centuries (Lazzerini 2006). The history of North Carolina is long and detailed, with many written sources available to supplement archaeological investigations. A complete summary of North Carolina history is beyond the scope of this document since the state's history is so dense and multifaceted. However, some of the general themes include the Revolutionary and Civil Wars, agricultural practice, historical settlement patterns (both Native American and Euro-American), plantation life, trans-Atlantic trade (including investigations into port towns), maritime archaeological investigations into shipwrecks, and the development of local industries (State Library of North Carolina 2006).

3.2.1.2 Existing Conditions within the Proposed CREP Area

Many of the archaeological sites and materials located within the North Carolina CREP area are significant to expanding the understanding of the prehistoric occupation of the area. As mentioned earlier, because this PEA is programmatic, it does not include data from any site specific surveys or data from previous projects since the specific locations in North Carolina of future contracts under FSA are not known at this time. Future enrollments of land in the North Carolina CREP should include site specific environmental reviews with site specific surveys for archaeological resources, as appropriate. Once the individual cultural resources are known for each contract area, specific mitigation measures can be implemented. Discussion of cultural resources at the level of individual properties is not within the purview of this PEA. Instead, the activities authorized for the four CPs proposed for this PEA will be discussed in Chapter 4 for their potential effect on prehistoric and historic cultural resources.

Although site specific reviews will be crucial to future assessments of the impact of implementation of the North Carolina CREP on cultural resources, some information is readily available at this time. Three archaeological resources are known to be located within the counties that are part of the North Carolina CREP area and are known to be currently listed on the NRHP (Table 3.6) (National Park Service 2005). Archaeological sites are infrequently listed formally on the NRHP; the number of sites determined to be eligible for listing on the NRHP within the North Carolina CREP area will be much higher than the three noted here. Those sites determined eligible for the NRHP but not formally listed on it would be identified as part of the file and literature search carried out when a particular acreage is enrolled in the North Carolina CREP.

Table 3.6. Archaeological Resources in the North Carolina CREP Area Listed on the National Register of Historic Places (NRHP)

County	Nearest City	Site #	Resource Name	Date Listed
Bertie	Hamilton	31BR90	Rhodes Site	8/28/1986
Chatham	Moncure	31CH366	Newkirk State	11/14/1983
Durham	Chapel Hill	31DH351	Little Creek Site	1/11/1985

3.2.2 ARCHITECTURAL RESOURCES

3.2.2.1 Overview

The regionalism that is such a strong characteristics in so many aspects of North Carolina's character is also present in its architecture (Lane 1985:9). Architects and builders in North Carolina took international trends and imposed a distinctive local character on them (Lane 1985:8-9). Early architecture in North Carolina has been characterized as:

> … modest in scale and small in quantity because the colony, despite an early start, had treacherous coasts, poor harbors and shallow rivers and developed slowly. After the Revolution, the upper counties…produced North Carolina's finest buildings…North Carolina's accumulating resources produced a greater variety and richness of public buildings in the mid-19th century. (Lane 1985:9).

Although the earliest colonists would have had to make do with tents, they quickly moved on to earthworks, then locally fired clay, and eventually framed wooden houses on simple brick foundations, though log cabins were frequently used for outbuildings and jails (Bishir 1990:3, 8; Lane 1985:11-13, 63; Lounsbury 1990a:16). Unfortunately, most examples of these early residences have not survived, due to the extensive use of wood and other perishable materials (Bishir 1990:9; Bishir and Southern 1996:17; Lounsbury 1990a:14).

The most common house plans were made with a three-room plan, which remained very common through the 18th century (Bishir 1990:13; Lane 1985:19). Even before the 18th century, piazzas, verandas, and porches of all types had become extremely popular, enough to make them a characteristic of many coastal North Carolina towns (Bishir 1990:2, 114-123).

After the American Revolutionary war and around the turn of the 19th century, the American Federal style became prevalent—a more delicate and refined style than the preceding Palladianism (Bishir 1990:51; Lane 1985:122). Slightly later, the Greek Revival style begin to take hold, particularly for important public buildings (Bishir 1990:163-194; Lane 1985:160-194). Gothic styles were periodically used during the 19th century as well, though most frequently for public buildings such as churches and schools (Lane 1985:197-210). Other Romantic styles, including Italianate, Modern Picturesque, and Urban Eclecticism also flourished in the nineteenth century (Bishir 1990:223; Lane 1985:212-233). These picturesque trends were adopted, for the most part, by a few elites: merchants, plants, and professionals (Bishir and Southern 1996:33). All of these trends overlapping extensively, and stylistic elements from one tradition would often be combined with elements from another tradition (Bishir 1990:53, 82).

After the American Civil War, as the south began to rebuild, architecture in North Carolina remained fairly conservative and modest, but still managed to adopt a new style: Industrial Picturesque (Bishir 1990a:275; Bishir and Southern 1996:48). The industrial age made mass production possible, including mass production of interior embellishments and the first large-scale contractors (Bishir 1990a:275; 1990c:130; Brown 1990a:240; Lounsbury 1990b). The Foursquare and Bungalow plans found a great deal of acceptance since they were easily built, adaptable, cheap, and could accommodate a variety of levels of elaboration (Bishir 1990:426). The International style has some examples of architecture in North Carolina, but does not dominate the landscape; it had its greatest success in institutional and governmental buildings (Bishir 1990:451-452; Brown 1990b:295; Wood 1990:355). In fact, many of the buildings constructed in the twentieth century contain neoclassical elements (Brown 1990b:298-299).

As most of these architectural styles came in and out of fashion, the majority of small town and rural domestic architecture continued to follow traditional construction and stylistic patterns (Bishir 1990:101). Such houses generally "…presented little external display of ornament and fashion." (Bishir 1990:101). Some regional clustering in the use of stylistic elements or floor plans can be noted (Bishir 1990:104).

3.2.2.2 Existing Conditions within the Proposed CREP Area

North Carolina, like many states in the Union, has experienced a gradual loss of open space and the conversion of traditionally agricultural land to developed residential or commercial properties. The pressures of this agriculture-urban interface, combined with the typical effect of some standard agricultural activities on the environment have, at least in part, contributed to the need for FSA program. The expansion of urban areas typically comes at the loss of area dedicated to agricultural practice. This can have myriad effects on the preservation of historically significant structures and landscapes evocative

of the rural lifestyle that traditionally held sway in large parts of North Carolina for much of its historical period.

The intensity of the agriculture-urban interface is not always detrimental to the historical cultural resources of an area. Often, at least some of the new producers will make efforts to preserve the historical character of an area, sometimes to the extent of preserving historical barns, outbuildings, churches, or other structures emblematic of the local history.

Hundreds of historic properties listed on the NRHP are present within the counties that are part of the North Carolina CREP area. This includes more than 100 NRHP historic districts (National Park Service 2005), hundreds of other NRHP historic properties, including architectural resources, cemeteries, and battlegrounds, and National Historic Landmarks (NHLs). See Appendix G for a listing of all historic districts, properties and landmarks.

3.2.3 TRADITIONAL CULTURAL PROPERTIES

3.2.3.1 Overview

Consultation with the North Carolina Division of State History and appropriate Indian Tribes on a project-by-project basis should ensure that the effects of the NC CREP on traditional cultural properties are adequately considered.

3.2.3.2 Existing Conditions within the Proposed CREP Area

Because of the lack of project-specific information with known locations, no specifics about traditional cultural properties are known for the North Carolina CREP area at this time. However, as a result of individual consultation processes that will be initiated for specific projects that tier to this PEA, some traditional cultural properties are expected to be identified within the proposed CREP area.

3.3 WATER RESOURCES

3.3.1 SURFACE WATER AND GROUNDWATER

3.3.1.1 Overview

The Clean Water Act (CWA) (1977) is jointly enforced by EPA and the U.S. Army Corps of Engineers (USACE), with final authority resting with the EPA.

The CWA was created to protect stream and wetland water quality. The Act established the basic structure for regulating discharges of pollutants into the waters of the U.S. It gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA also continued requirements to set water quality standards for all contaminants in surface waters. The CWA made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions. In conjunction with this broad goal, the 404 b(1)

guidelines require that all projects avoid or minimally impact waters of the U.S. Waters of the U.S. include rivers, streams, estuaries, coastal waters, and wetlands (wet meadows, swamps, bogs, etc.).

The North Carolina Division of Water Resources operates under a variety of legislative mandates that include a wide range of activities. The duties of the Division include protecting streams from urban development and growth, evaluating water project impacts on the waters of the State, keeping records of water users in the state, providing technical assistance to water systems, and planning for development of water supplies (NCDENR DWR 2005). The four basins within the proposed CREP area (including the Cape Fear Basin) drain approximately 26,000 square miles, primarily within the North Carolina. They include 258 municipalities and 69 counties and are also home to approximately 50 percent of the State's population (see Section 3.7, Socioeconomics).

3.3.1.2 Point Sources and Non-point Sources of Pollution

Point source pollution refers to discharges that enter a water body through a pipe, ditch, or well-defined location. Non-point pollution refers to pollutants that enter surface waters through run-off, snowmelt or atmospheric deposition (e.g., acid rain). Although point source pollution may contribute to the overall degradation of a water body, non-point pollution remains the proposed CREP area's largest contributor of surface water pollution (NCDENR DWQ 2004).

Within the proposed CREP area, non-point pollution is caused primarily by rainfall or snowmelt moving over and through the ground. The runoff that is created carries with it natural and human made pollutants, finally depositing them into lakes, wetlands, coastal waters, and even our underground sources of drinking water. Unlike the discrete discharges from point sources, non-point pollution comes from many sources (NCDENR DWQ 2004). Table 3.7 lists the primary non-point pollutants and their sources. EPA water quality inventory identifies agricultural runoff as the largest source of water quality degradation in the nation. Agricultural activities have the potential to introduce siltation, nutrients, pesticides, and organic matter that deplete oxygen into water bodies. These pollutants can have severe negative impacts on a wide range of aquatic ecosystems because of their potential to spoil habitat and remove the food base (EPA 2000).

In 2002, the North Carolina Division of Water Quality reported 2,047 spills from government or private waste-collection systems reaching surface waters, totaling 56.9 million gallons. Because of heavy rains in 2003, the total was much higher, totaling more than 96 million gallons of waste. Thirty-two lagoon ruptures reached surface waters in 2002, and there were 103 instances of misapplication of waste on agricultural fields (ASCE 2002).

Section 303(d) of the CWA requires a total maximum daily load (TMDL) for waters in each State that do not meet State water quality standards. EPA's water quality planning and management regulations that implement Section 303(d) of the Clean Water Act can be found in 40 CFR Section 130. Section 130.7 describes Total Maximum Daily Loads and the requirements for identifying and reporting water quality-limited waters (NCDENR DWQ 2004).

Table 3.7. Sources of Non-point Source Pollutants in Proposed CREP Area

Pollutant	Source of Pollutant
Sediment	Construction sites, disturbed areas, stream bank erosion and alterations, cultivated farmland
Nutrients	Fertilizer on agricultural, residential, commercial and recreational grassed areas, animal wastes, leaky sewers and septic tanks, atmospheric deposition
Bacteria	Failing septic tanks, leaky sewers, animal waste (wild and domestic)
Oxygen Demanding Substances	Animal waste, leaking sewers and septic tanks, gas stations
Oil and Grease	Leaking automobiles, industrial areas, illegal dumping
Trace Metals	Automobile wear and tear, exhaust, industrial or construction areas
Road Salt	Applications to snow and ice
Toxic and Synthetic Chemicals	Pesticide applications, automobile fluids, accidental spills, illegal dumping
Thermal Impacts	Heated landscape/impervious areas, tree removal, shallow ponds

Source: NCDENR DWQ 2004.

The North Carolina Department of Environment and Natural Resources (NCDENR), Division of Water Quality is responsible for applying these Federal regulations, implementing state water policy, and monitoring water quality. To this end, the 2004 North Carolina Water Quality Assessment and Impaired Waters List discusses water body use support and the impairment level, source category, and environmental stressors involved.

3.3.1.3 Surface Water within the Proposed CREP Area

Within the four river basins that comprise the CREP area, 12,894 miles of fresh water channels (including all tributaries) exist, as do 20,390 acres of lakes and/or reservoirs. North Carolina's 2004 Integrated 305(b) and 303(d) List includes a prioritized list of impaired water bodies requiring TMDL development. High priority water bodies are found in all four watersheds within the CREP study area. The causes of pollution vary but include bacteria, nutrients, and silt/sedimentation. See Tables 3.8 and 3.9 for causes and sources of impairment for freshwater streams and shorelines. Please note that the Jordan Reservoir Watershed is located within the much larger Cape Fear Watershed.

In 2000, the total water use within the proposed CREP area was approximately 2.3 billion gallons per day (bgd), including surface and groundwater supplies. Resource uses include public, domestic, irrigation, aquaculture, grazing, industrial, mining and thermoelectric. Of the total, approximately 2.0 bgd, or 87 percent, were from surface water supplies. Also in 2000, 128,000 agricultural acres were irrigated using both surface and groundwater resources. These irrigation practices totaled approximately 155 million gallons per day (mgd). Of this total, 115 million mgd or 75 percent were from surface water resources (USGS 2000).

Table 3.8. Major Causes of Impairment for Freshwater Streams and Shorelines within the CREP Area (Miles)

River Basin	Aquatic Weeds	Chlorophylla	Fecal Coliform	Fish Advisory Mercury	Impaired Biological Integrity	Low DO	pH	Turbidity	Metals	Other
Cape Fear		0.6	92.8	105.4	38.5			29.9		3.3
Chowan			53.7		164.9			86.6	1.7	9.6
Neuse	6.9	8.1	2.9	69.0	306.8	107.3	5.0	2.9		
Tar Pamlico			13.0		79.9	13.0				
Totals	6.9	8.7	162.4	174.4	590.1	120.3	5.0	92.4	1.7	12.9

Source: NCDENR DWQ 2004.

Table 3.9. Major Sources of Impairment for Freshwater Streams and Shorelines within the CREP Area (Miles)

River Basin	Agriculture	Atmospheric Deposition	Intensive Animal Feeding Operations	Major/Minor Municipal Point Source	Non-irrigated Crop Production	Non-urban Development	Off Farm Animal Holding/ Mgmt Area	Urban Runoff/Storm Sewers	Other
Cape Fear	1.9			4.7				4.7	1.9
Chowan	82.9	38.0		79.7		10.7		240.3	87.9
Neuse	229.1		112.3	37.2	20.4	1.5	89.7	126.8	146.6
Tar Pamlico	13.0			17.2	15.3			8.0	39.4
Totals	326.9	38.0	112.3	138.8	35.7	12.2	89.7	379.8	275.8

Source: NCDENR DWQ 2004.

3.3.1.4 Groundwater within the Proposed CREP Area

Approximately half of the 8.5 million residents of North Carolina rely on groundwater as a source of drinking water, making it an invaluable resource. Virtually all private residential drinking water supplies depend upon groundwater, as do over one million of the State's citizens that use community water systems. In many rural counties, more than 90 percent of the citizens rely on groundwater as their sole source of drinking water (NCDENR DWQ 1999).

The groundwater throughout the State is generally of a high quality and potable (NCDENR DWQ 1999). Within the proposed CREP area, the natural mineral content of the water throughout much of the Piedmont region is very low, having generally less than 100 mg/L total dissolved solids (TDS). In the eastern Piedmont and western Coastal regions, the TDS content ranges from approximately 100 to 300 mg/L. In the eastern part of the Coastal region, the mineral content of the water increases as its distance from the brackish coast decreases (NCDENR DWQ 1999).

Aquifers are hydraulically connected geologic materials (e.g., sands, limestone, and fractured rock) that provide water through a properly constructed well opening to those materials. The aquifers in North Carolina are highly varied in their character and water-producing capabilities. Several of these aquifers underlie large geographic areas and therefore form principal aquifers—significant sources of potable groundwater for agricultural or industrial uses throughout the State and, more specifically, the proposed CREP area. Principal aquifers, which include the lower Cape Fear, upper Cape Fear, Black Creek, Peedee, Castle Hayne, Yorktown, Surficial, and Bedrock aquifers, all of which are located within the CREP area (NCDENR DWQ 2005). Beaufort is the only minor aquifer found in the area.

As of 2004, approximately 14,000 cases of soil and groundwater pollution had been documented; with 70 percent of the cases being related to petroleum underground storage tanks. Many of the contaminated sites under State's Division of Water Quality, Ground Water Section's jurisdiction include non-petroleum contaminate plumes that are larger and sink deep into the subsurface, thus requiring intensive drilling and sampling programs for assessment (NCDENR DWQ 2004). A study of water supply wells in 1998 showed that half of the well owners throughout the State have no alternate safe drinking water supply if the wells become contaminated (NCDENR DWQ 2004).

The 1986 amendments to the Federal Safe Drinking Water Act established requirements for states to develop Well Head Protection Programs (WHPPs). A WHPP is a pollution prevention and management program used to protect underground sources of drinking water (NCDENR DWQ 2004). Although a WHPP was not mandatory in North Carolina, it was viewed by the State to be an asset to established groundwater protection programs. The state WHPP program was implemented 1993 to protect citizens who use groundwater as a drinking water supply and to eliminate channels for pollution into the subsurface. The 2004 well program initiatives include:

- Certifying well contractor competence through testing and continuing education;
- Partnering with county health department to keep them informed of the assistance that State staff can provide in identifying and resolving well problems that have adverse health implications;
- Cooperative well inspection and training programs for state and local health officials;
- Presentations to local officials of the advantages of adopting an ordinance and assistance in implementing water well protection programs;

- Technical assistance in regulatory compliance inspections;
- Letters to trade organizations that would benefit from information regarding what State and local well rules require; and
- Preparation of brochures or other documents that would be targeted to specific technical/regulatory issues and audiences (NCDENR DWQ 2004).

As mentioned in Section 3.3.1.3, Surface Water, within the CREP area, in 2000, the total water use as approximately 2.3 bgd, including surface and groundwater supplies. Of this total, close to 340 mgd, or 13 percent, were from groundwater supplies. Also in 2000, 128,000 acres were irrigated in the CREP area, using both surface and groundwater resources. Irrigation on these lands consumed approximately 155 mgd, of which approximately 39 mgd, or 25 percent, was groundwater (USGS 2000).

3.3.2 COASTAL ZONES

3.3.2.1 Overview

Nationwide, coastal counties represent only 13 percent of the country's land, but are home to more than 50 percent of the population. The mission of the Division of Coastal Management (DCM) of the NCDENR is to protect, conserve, and manage North Carolina's coastal resources through an integrated program of planning, permitting, education and research. DCM carries out the State's Coastal Area Management Act (CAMA), using rules and policies of the North Carolina Coastal Resources Commission, known as the CRC (NCDENR DCM 2005a). The CAMA establishes a cooperative program of coastal area management between local and state governments. Local government has the initiative for planning, while state government establishes areas of environmental concern. With regard to planning, State government acts primarily in a supportive, standard setting and review capacity, except where local governments do not elect to exercise their initiative. Enforcement is a concurrent state/local responsibility. Each land-use plan includes local policies that address growth issues such as the protection of productive resources (i.e., farmland, forest resources, fisheries), desired types of economic development, natural resource protection, and the reduction of storm hazards.

North Carolina's estuarine system is the third largest in the country and the largest of any Atlantic coastal state, encompassing more than 2.3 million acres (NCDENR DMF 2005d). The population along the nearly 4,000 miles of estuarine shoreline is approximately 710,000 and growing. The estuarine system is of prime economic importance to the coastal area; 90 percent of commercial seafood species caught spends at least half their lives in an estuary (National Estuarine Research System 2005). The State occupies the convergence of the northward-flowing Gulf Stream and the southward flowing Virginia (Labrador) current. The Gulf Stream carries species such as shrimp, king and Spanish mackerels, and snappers, while the Virginia Current carries northern species such as tautog, flounder and Atlantic mackerel (NCDENR DMF 2005d). The estuarine system provides fin and shellfish specific habitat to meet their needs for each particular stage in their life. The six coastal habitats are:

- Water Column. The quality of the water column is essential to the health of the aquatic life along the coast. Specific threats to the water column include excessive sedimentation and turbidity, excess nutrients, bacteria, toxins, trash, invasive species, and alteration of the natural flow of the water (NCDENR DMF 2005d).
- Wetlands. Wetlands in the coastal zones include coastal marshes, swamps and bogs. Coastal marshes span along 4,000 miles of shoreline along the States coastal rivers, creeks, and sounds. Threats to these wetlands include dredging, filling, and draining for development, intensive

agriculture and timber production, storm water runoff, boat wakes and bulkheads (NCDENR DMF 2005a).

- Submerged Aquatic Vegetation (SAV). SAV and grasses flourish in the shallow water of the sounds and estuaries. The health of the habitat is contingent upon clean clear water allowing sunlight to penetrate the surface. These beds are an important source of food and shelter for many aquatic species. Threats to SAV include boat prop damage, boat wakes, fishing gear, and polluted storm runoff (NCDENR DMF 2005a).
- Ocean Hard Bottom. The ocean hard bottom is located just off local beaches as well as offshore. These areas are characterized by exposed areas of rock or hardened sediments and provide spawning grounds and cover for reef fish as well as for food for a variety of fish species. These areas are threatened by fishing gear, boat anchors, beach renourishment, and ocean dumping (NCDENR DMF 2005a).
- Sand and Mud Bottoms. Sand and mud bottoms lack vegetation and provide important habitat for clams, mole crabs and worms. Mullet, blue crabs, shrimp, croaker, and king fishes feed along these bottoms and are in turn sustenance for larger species. These bottoms are threatened due to dredging, mining, toxic contamination of sediments from sewage discharges, and polluted stormwater runoff (NCDENR DMF 2005a).
- Shell Bottom (NCDENR DMF 2005a). Oysters live in shallow waters of tidal rivers, creeks and sounds. Oyster populations have dropped 90 percent in North Carolina over the past 100 years. Causes include disease, fishing gear, boat wakes, dredging, sedimentation, invasive species, and stormwater runoff.

3.3.2.2 Existing Conditions within the Proposed CREP Area

Of the 20 CAMA counties, 14 are located within the proposed CREP area, comprising a majority of the North Carolina coast (see Figure 3.4 below for CAMA counties in the North Carolina CREP). All six coastal habitats are located along the coast of these 14 counties (see Table 3.10 for threats to these zones).

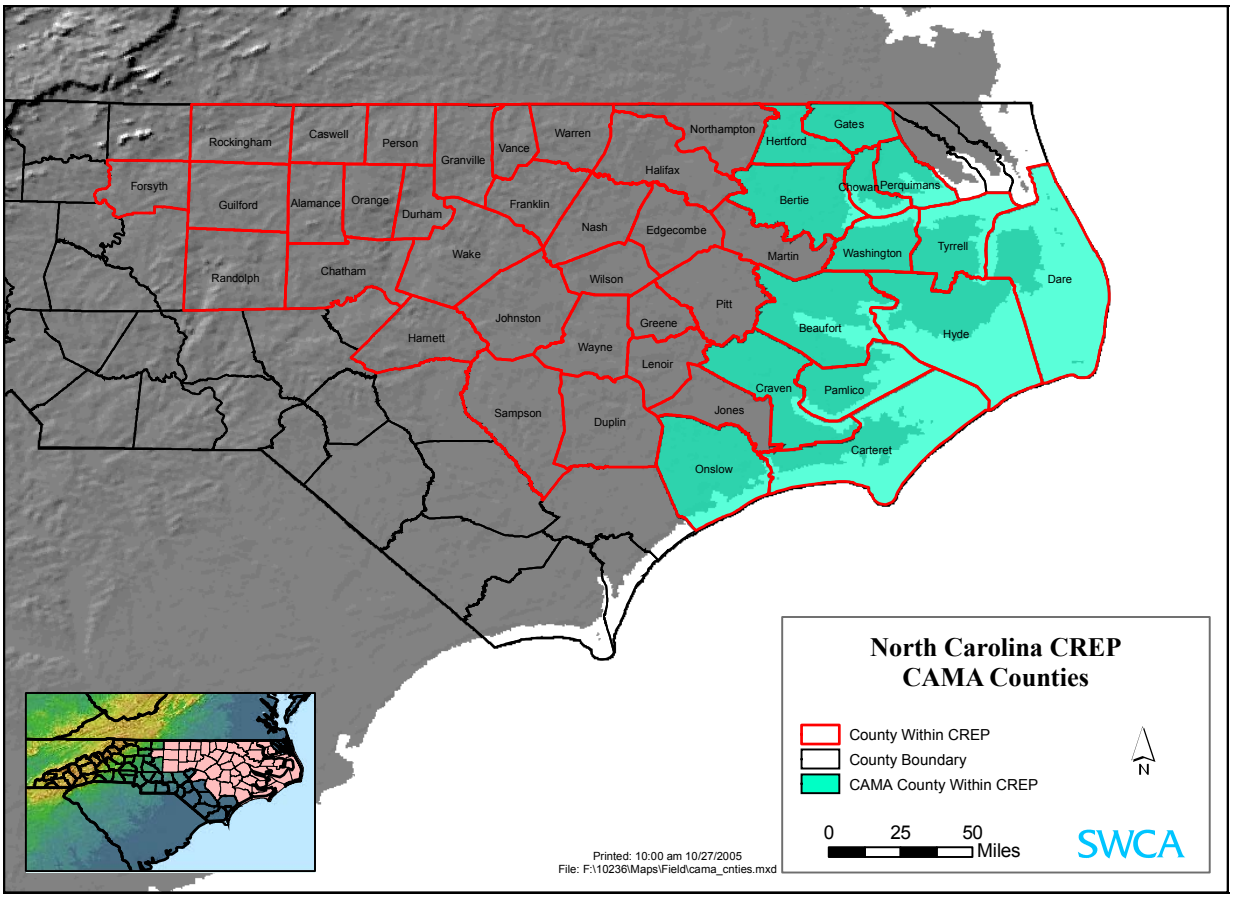

Figure 3.4. CAMA Counties in North Carolina.

Table 3.10. Threats to Coastal Zones

Threat Categories	Water Column	Shell Bottom	SAV	Wetlands	Soft Bottom	Ocean Hard Bottom
Natural Events						
Sea Level Rise				X		
Storm Events	X	X		X		
Physical Habitat Degradation or Loss						
Conversion to non-fish Habitat (filling)				X		
Dredging (navigation channels, marinas, basins)	X	X	X	X	X	X
Marinas/Docks/Piers	X	X	X	X	X	
Channelization/Ditching	X			X		
Flow Regulation/Obstruction	X					
Bottom Disturbing Fishing Gear	X	X	X		X	X

Table 3.10. Threats to Coastal Zones

Threat Categories	Water Column	Shell Bottom	SAV	Wetlands	Soft Bottom	Ocean Hard Bottom
Shoreline Hardening	X		X	X	X	
Beach Nourishment	X				X	X
Pipelines, Fiber Optic Cables			X			X
Mining Operations	X				X	
Water Quality Degradation						
Nutrient Enrichment and Oxygen Depletion	X	X	X		X	X
Toxic Chemical Contamination	X	X	X		X	X
Excessive Turbidity/Sedimentation	X	X	X		X	X
Bacterial Contamination	X	X				
Other Water Quality Degradation	X			X		
Other Threats						
Boating Activity			X	X		
Marine Debris	X					X
Transportation Infrastructure	X		X	X		
Introduced or Nuisance Species	X	X	X	X		
Disease		X	X			

Source: NCDENR DMF 2005c.

3.3.3 WETLANDS

3.3.3.1 Overview

Section (a) (16) of the Food Security Act, Public Law 99-198, December 23, 1985 defines a wetland as:

> The term 'wetland,' except when such term is part of the term 'converted wetland,' means land that has a predominance of hydric soils and that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

Numerous laws exist that govern FSA program actions in relation to wetlands. Included are the following:

- Executive Order (EO) 11990, Protection of Wetlands
- Clean Water Act

- Food Security Act

Wetlands perform numerous functions, such as removing excess nutrients from the water that flows through them. For example, the benefit derived from nutrient removal is improved or maintained water quality. This function, in turn, provides the natural and human environment with a number of benefits: clean drinking water, safe recreation, and clean and secure fish and wildlife habitat.

Wetlands have been shown to remove organic and inorganic nutrients and toxic materials from water (runoff) that flows across or through them. Through biogeochemical processes that are unique to wetlands, water outflow is frequently cleaner than water inflow. Wetlands are able to accomplish this through several ecological mechanisms:

- Reduced water velocity causes sediments and chemicals to drop out of the water column.
- Aerobic and anaerobic processes promote denitrification, chemical precipitation, and other chemical reaction that remove chemicals from water.
- High wetland productivity can lead to high rates of mineral and nutrient uptake by vegetation and subsequent burial in sediments when the plants die.
- Wetland sediments support a diversity of decomposers and decomposition processes.
- Accumulation of organic peat in many wetland systems can cause the permanent burial of chemicals (Mitsch and Gosselink 1993).

Nearly 50 percent of the wetlands in the U.S. are located in the Southeast, and wetland losses in the Southeast accounted for 84 percent of the total losses nationwide from the 1950s through the mid 1970s. North Carolina in particular is significant in the context of national wetland loss; the forested wetlands in eastern North Carolina have been identified as one of the areas suffering the most losses (Hefner and Brown 1985). Wetland conversion in the North Carolina coastal plain between 1950 and 1980 was due largely to forestry (52.8 percent of the total area altered), followed by agriculture (42.2 percent) and other types of development, such as urbanization and military construction (5 percent) (Cashin et al. 1992).

3.3.2.2 Existing Conditions within the Proposed CREP Area

Today there are approximately 4.6 million acres of wetlands including estuaries within the proposed CREP area (NWI 2005). Figure 3.5 below shows all wetlands identified within proposed CREP area. A high density of wetlands are found within the eastern Piedmont and Coastal Plain regions. The total number of wetlands acres are closely associated with the 5.6 million acres of hydric soils located within the proposed CREP area (see Section 3.4, Soil Resources). Below are the functions of wetlands within the proposed CREP area.

Water Quality Protection

Wetlands are natural buffers, filtering runoff from uplands before entering waterways. Runoff occurs during rainstorms, washing materials from agricultural and urban areas into the watershed system. This runoff may contain toxins, bacteria, sediment, or nutrients that can harm aquatic life and contaminate drinking water. Stormwater runoff is a major contributor to water quality problems in coastal North Carolina. By trapping sediment, removing nutrients and detoxifying chemicals, wetlands act as efficient and cost-effective filtration systems. When runoff enters a wetland, many of the harmful components are removed before the water enters a stream (NCDENR DCM 2005b).

Figure 3.5. North Carolina CREP wetlands.

Wooded wetland corridors along headwater creeks are the most important filters of agricultural runoff in the Coastal region. Bottomland hardwoods and swamp forests along rivers remove sediments, nutrients and toxic chemicals from the river when floodwaters run through them. Wetlands are vital for protecting the quality of coastal sounds because they remove upstream pollutants from the water (NCDENR DCM 2005b).

Flood Protection

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees, root mats, and other wetland vegetation also slow the speed of flood waters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion. The holding capacity of wetlands helps control floods and prevents water logging of crops. Preserving and restoring wetlands, together with other water retention, can often provide the level of flood control otherwise provided by expensive dredge operations and levees (EPA 2005b).

Wetlands of this function within and downstream of urban areas are particularly valuable, counteracting the greatly increased rate and volume of surface water runoff from pavement and buildings.

Shoreline Erosion Protection

Wetland vegetation is often very dense, both above and below ground. This plant cover can absorb energy from floods and wave action. By dissipating energy, binding soil and encouraging sediment deposition, wetlands stabilize shorelines along coastal streams, lakes and sounds (NCDENR DCM 2005b).

Fish and Wildlife Habitat

Wetlands provide essential habitat for many diverse species—fish, wildlife and plants. One-third of protected species across the country rely on wetlands for a variety of purposes (EPA 2005). In North Carolina, more than 70 percent of protected species depend on wetlands for survival. Many common species of waterfowl, fish, birds, mammals and amphibians live in wetlands during crucial stages of their lives (NCDENR DCM 2005b).

Coastal marshes provide nursery areas for finfish and shellfish. These marshes are among the most productive natural systems in the world, and this productivity makes the adjoining sounds some of America's richest fisheries. Bottomland hardwood wetlands provide abundant food, nesting sites, resting areas and escape cover for many wildlife species. Many fish species use spring-flooded bottomlands as spawning and feeding locations (NCDENR DCM 2005b).

Large pocosins (swamps) are a refuge for wilderness animals, such as black bear and bobcat. Carolina bays are critical habitat for many uncommon amphibians and reptiles. Pine savannas are host to numerous rare plants, such as insectivorous species, and to the endangered red-cockaded woodpecker (NCDENR DCM 2005b).

Economic Importance

North Carolina's commercial and sport fisheries rely heavily on wetlands. Fish, shellfish, blue crabs, and shrimp use coastal salt marshes for habitat as well as food. Inland freshwater wetlands also affect river and reservoir water quality influencing the quality and productivity of fresh and saltwater fisheries. Other traditional wetland uses of economic importance include hunting, fishing, and trapping. The water-filtration and flood-protection roles of wetlands are also of economic value, since they save money that would otherwise be spent on runoff control, water treatment, and property preservation (NCDENR DCM 2005b). In addition to hunting and fishing, many wetlands offer opportunities for bird watching, canoeing and photography. Almost all of the public recreation areas in the coastal area include significant wetlands. Visits to wetland wildlife refuges are an important part of the tourist economy in some coastal counties (NCDENR DCM 2005b).

An important use of freshwater wetlands in coastal North Carolina is timber production. Many wetland areas, if managed properly, can produce forest products without substantially detracting from their other wetland functions (NCDENR DCM 2005b).

3.3.4 FLOODPLAINS

3.3.4.1 Overview

All Federal actions must meet the standards of Executive Order (EO) 11988, Floodplain Management. The purpose of the EO is to avoid incompatible development in floodplain areas. It states, in part, that:

> Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

In accordance with the EO and prior to any action, Federal Emergency Management Agency (FEMA) floodplain maps will be reviewed to determine if the proposed action is located in or will affect a 100- or 500-year floodplain. Soil survey maps, aerial photography, and topographical maps should be used where no FEMA maps are available. FSA should complete surveys in areas where no flood hazard or flood elevation data are available and the amount of Federal investment in the proposed action is significant if the action could create a significant adverse effect on a floodplain.

3.3.4.2 Existing Conditions within the Proposed CREP Area

Floodplains are a rich mosaic of vegetation types, ages, and structures, dotted with wetlands and ponds (Opperman 2005). Because of these diverse habitats, floodplains are storehouses of biodiversity, supporting some of the highest numbers of species of any ecosystem in the world. Additionally, floodplains are extremely productive environments. For example, fishing communities have long depended on the productivity of floodplain rivers, which generally produce much larger fish harvests than do lakes, reservoirs, or rivers lacking floodplains (Opperman 2005).

Within the proposed CREP area, 33 counties were available for floodplain data. Within those 33 counties, 2,885,050 acres were located within the 100-year floodplain, while 141,851 were located within the 500-year floodplain (NC DOT 2005).

3.4 SOIL RESOURCES

3.4.1 OVERVIEW

Soil erosion, has been a major cause of soil degradation in North Carolina (Cook 1996). Damage to water quality occurs when the eroded soil settles out in a body of water, a process called sedimentation. Sedimentation occurs when water carrying eroded soil particles slows long enough to allow soil particles to settle out. The smaller the particle, the longer it stays in suspension. Larger, heavier particles such as gravel and sand settle out sooner than smaller, lighter particles such as clay. Clay may stay in suspension for very long periods, contributing significantly to water turbidity. Sediment comes from many sources: agricultural fields, woodlands, highway road banks, construction sites, and mining operations (Cook 1996).

By volume, sediment is the largest water pollutant in North Carolina (Cook 1996). It affects water quality physically, chemically, and biologically. Damage from sediment has both economic and environmental impacts. Sedimentation destroys fish spawning beds, reduces useful storage volume in reservoirs, clogs streams, and makes costly filtration necessary for municipal water supplies (Cook 1996). Suspended sediment can reduce photosynthesis and alter a stream's ecology. Because the environmental damage from sediment is often additive, the ultimate effects and costs may not be evident for years. The consequences of off-site sedimentation can be severe, both for those immediately affected and for those who must cope with subsequent problems. Sediment often carries organic matter, animal or industrial wastes, adsorbed nutrients, and toxic chemicals. The most troublesome nutrient element is phosphorus: it stimulates the production of algae blooms that can choke out beneficial plants and smother aquatic animals. Excessive phosphorus may come from such sources as fertilizers, organic matter, and animal manure. Because phosphorus is concentrated in the top few inches of soil, it is very susceptible to erosion and likely to be present in sediment (Cook 1996).

Approximately 2,000 named soils in the U.S. occur in wetlands (See Section 3.3.4). Such soils, called hydric soils, have characteristics that show they developed in conditions where the presence of water has limited soil oxygen for long periods during the growing season. Hydric soil indicators include:

- Soil consists predominantly of decomposed plant material (peats or mucks).
- Soil has a thick layer of decomposing plant material on the surface.
- Soil has a bluish gray or gray color below the surface, or the major color of the soil at this depth is dark (brownish black or black) and dull.
- Soil has the odor of rotten eggs.
- Soil is sandy and has a layer of decomposing plant material at the soil surface.
- Soil is sandy and has dark stains or dark streaks of organic material in the upper layer below the soil surface.

3.4.1 EXISTING CONDITIONS WITHIN THE PROPOSED CREP AREA

The increased population and subsequent development in North Carolina has resulted in a net loss of prime agricultural land and open space (FIC 2005). Prime agricultural land as defined by USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In general, agricultural land has adequate supply of moisture, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content and few or no rocks (NRCS 2005). All counties within the proposed CREP area contain prime farm/agricultural land.

Between 1992 and 1997, 143,000 acres of agricultural land was converted to developed uses within the State. Of that total, 59,800 acres of prime agricultural land was converted (FIC 2005). Developed land exhausts agricultural uses and increases impervious surfaces (Carver and Yahner 1996). These new surfaces decrease infiltration and increases overland flow, which increases the frequency and height of flood peaks during heavy storms. This means that more topsoil is washed away easier, erosion potential increases on open land and there is also less recharge to groundwater bodies (Carver and Yahner 1996).

North Carolina's well-drained soils belong mainly to the group known as the red-yellow podzolic soils, that covers the southeastern U.S. Most of the soils of the Atlantic Coastal Plain are light colored and of sandy texture. They are low in most elements essential to plant growth (calcium and phosphorous) and are moderate to strongly acidic (MSN, Encarta 2005). However, these soils respond well to fertilizer practices and have the ability to be productive (MSN, Encarta 2005).

Some of the Piedmont's best crop soils are derived from water-laid, or alluvial, materials on river floodplains and terraces. Clay and clay loam textures typify Piedmont soils, and stoniness is common. Many of the flatter upland areas and some basins have light-colored sandy and sandy loam soils. The parent material, which is derived from old deeply weathered crystalline rocks, is high in iron oxide, which gives most Piedmont soils their distinctive red color. Piedmont soils are richer in most essential elements than are most Coastal Plain soils (Encarta 2005). See a list of soil type acreage per county in Appendix G.

Approximately 5.6 million acres of hydric soils are located within the proposed CREP area (see Figure 3.6 below), comprising approximately 33 percent of the total acres.

3.5 RECREATION

3.5.1 OVERVIEW

North Carolina offers a variety of recreational opportunities for residents as well as visitors. The State is home to 29 State parks, 12 Wilderness Areas, 4 National Forests, 10 National Wildlife Refuges, 11 National Parks, 13 National Natural Landmarks, 1 National Heritage Area, numerous other natural areas, and 29 scenic byways. Recreational opportunities available in the proposed CREP area include wildlife viewing, hunting, camping, hiking, paddling/kayaking, fishing, climbing, and historic interpretation, to name a few (see Section 3.1.1, Wildlife and Fisheries, and Section 3.2, Cultural Resources). Indeed, recreation is one of North Carolina's largest industries and remains a valuable sector of the State, county, and local economies (see Section 3.9, Socioeconomics, for further detail).

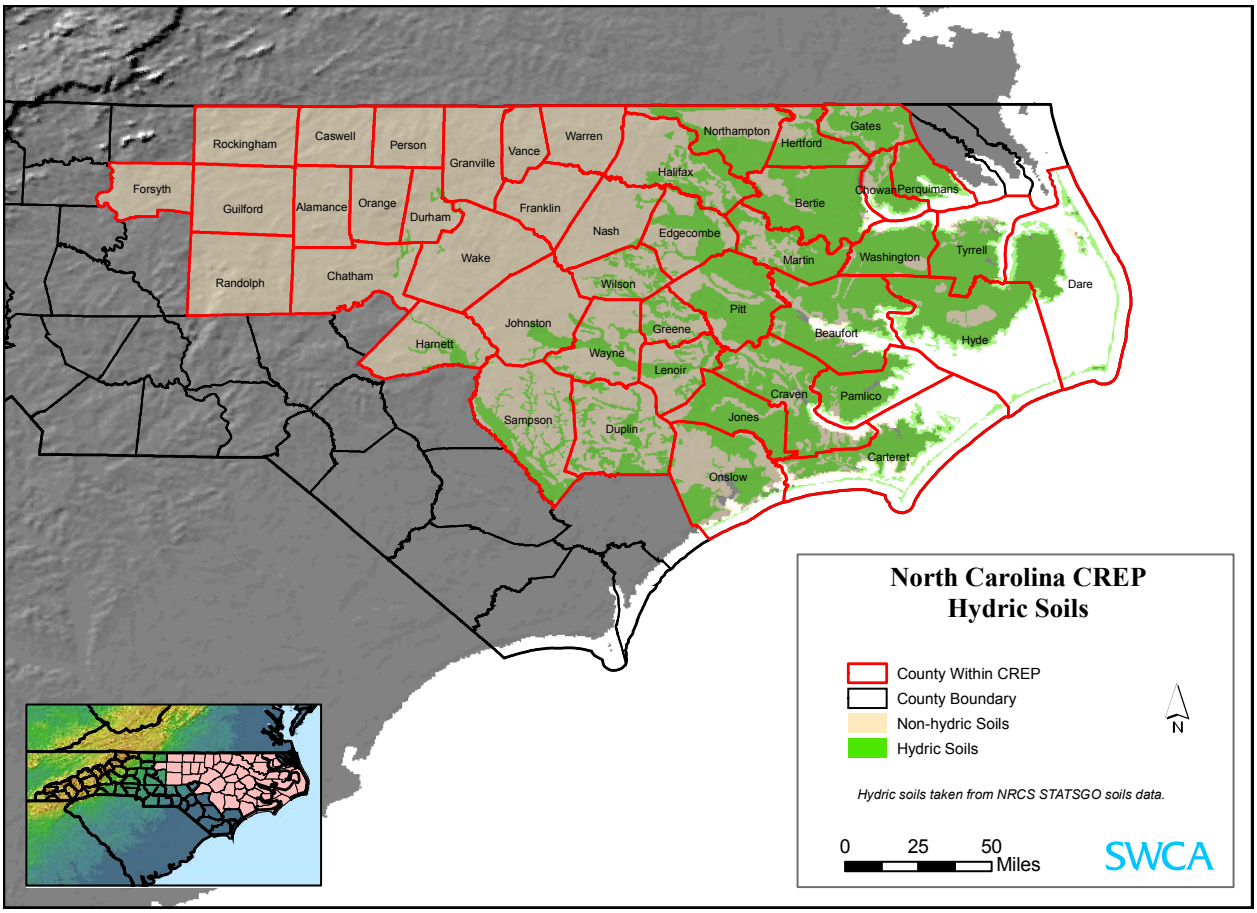

Figure 3.6. Hydric soils in proposed CREP area.

Source: Natural Resources Conservation Service 2005.

Results from the North Carolina Outdoor Recreation Participation Survey indicate that the five most popular recreational activities in North Carolina are walking for pleasure, driving for pleasure, viewing scenery, beach activities and visiting historical sites (NCORP 2003). Over 50 percent of the households responding also participated in swimming in lakes, rivers or oceans, visiting natural areas, picnicking, attending sporting events, visiting zoos and freshwater fishing (NCORP 2003). Long term trends indicate that bird watching, camping, and backpacking have had the most significant increases in the past 20 years and will continue to grow in popularity (NCORP 2003). See Table 3.11 below.

Table 3.11. Increase in Outdoor Recreation – 1982–2000.

Activity	Millions in 1982	Growth in Millions	Millions in 2001	Percent Increase
Bird watching	21.2	50.0	71.2	235.9
Camping	24.7	48.4	73.1	195.9
Backpacking	8.8	14.6	23.4	165.9

Source: NC DPR 2003.

3.5.2 EXISTING CONDITIONS WITHIN THE PROPOSED CREP AREA

All of the above-mentioned recreational activities can be experienced in both the Coastal and Piedmont regions of the proposed CREP area. Within the proposed CREP area, there are four National Natural Landmarks, five Wilderness Areas, two National Forests, nine National Wildlife Refuges, five National Parks and several state parks, as well as numerous historic sites on the NRHP (see Section 3.2, Cultural Resources). The majority of these areas are located along the coast of the proposed CREP area (See Figure 3.5 in Section 3.9 below).

The Coastal and Piedmont regions of the proposed CREP area are composed of small creeks, rivers and estuarine environments. Hiking and paddling along these numerous routes provide a myriad of recreational opportunities throughout the river as well as along the coast. Today there are over 200 mapped paddling trails throughout 8 coastal regions in proposed CREP area. See Figure 3.7 below.

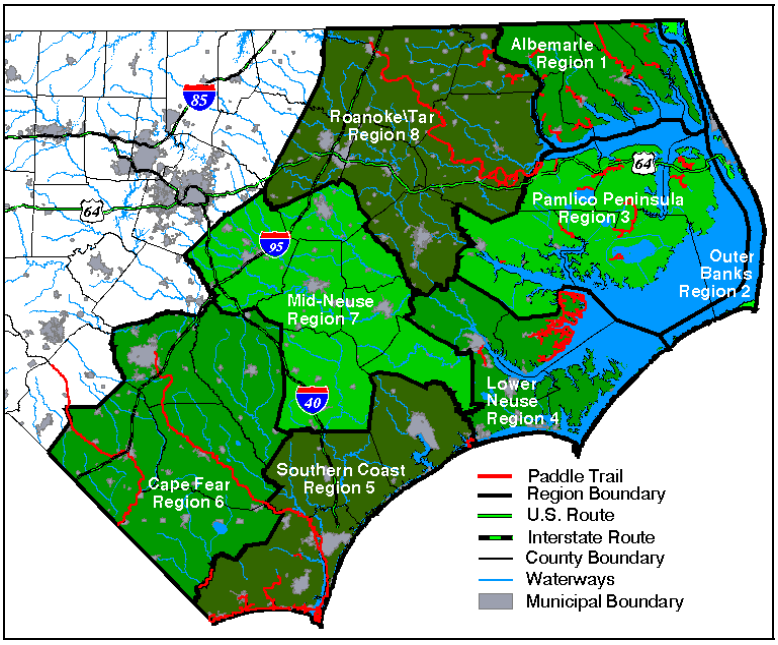

Figure 3.7. Paddling trails in the proposed CREP area.

Source: NCSU 2005.

Although trails exist from the mountains to the coast, the not-yet-completed Mountains to Sea Trail is by far the longest. The 900-mile-long trail when complete will consist of footpaths, roads, and state bike routes (Figure 3.8). The Trail will pass through 37 counties, including the following 19 with in the proposed CREP area: Forsyth, Guilford, Alamance, Orange, Durham, Wake, Franklin, Nash, Wilson, Johnston, Wayne, Greene, Lenoir, Jones, Crave, Pamlico, Cartaret, Hyde, and Dare (Friends of Mountains to Sea Trail 2005).

Figure 3.8. Mountains to Sea Trail.

Source: Friends of Mountains to Sea Trail 2005.

3.6 HUMAN HEALTH AND SAFETY

3.6.1 OVERVIEW

Clean water is a basic necessity for all life on earth. However, within the proposed CREP area, freshwater sources historically have been and continue to be threatened from over-exploitation, poor management, and environmental degradation.

Excessive pollutants in the water system can cause a number of health problems for both animals and humans. Organophosphates and carbonates found in pesticides affect and damage the nervous system and can cause cancer. Some of the pesticides contain carcinogens that exceed recommended levels, containing chlorides that cause reproductive and endocrinal damage (Edugreen 2005). Drinking water contaminated with nitrates can be fatal to infants, are linked to digestive tract cancers, and cause algal blooms resulting in the eutrophication in surface waters (Edugreen 2005).

The main sources of freshwater pollution in the proposed CREP area can be attributed to discharge of untreated waste, dumping of industrial effluent, and run-off from agricultural fields.

3.6.2 EXISTING CONDITIONS WITHIN THE PROPOSED CREP AREA

Unhealthy levels of nitrogen and phosphorous have accumulated in the rivers, estuaries and sounds that characterize much of the proposed CREP area (NRDC 2005). A variety of sources contribute to the nitrogen and phosphorus pollution: municipal wastewater treatment plants, manufacturing discharges, urban runoff, golf courses, residential lawns, and agricultural land. Land use models show agriculture is the leading source, accounting for 56 percent of the pollution loads into the Neuse River estuary, and 76 percent into the Tar-Pamlico River (NRDC 2005). The pollution has been implicated in contributing to the occurrence of *Pfiesteria*, a microbe lethal to fish and toxic in humans (NRDC 2005).

Agricultural practices such as the application of nitrogen and phosphorous rich manure to land for fertilizer and the heavy reliance on pesticides increases the potential for leaching into groundwater sources and runoff into nearby streams and wetland areas. Concern about groundwater contamination led the North Carolina Department of Environment, Health and Natural Resources to investigate 1,595 drinking water wells located on property adjacent to hog and poultry production facilities. An August 1998 report documenting the well testing program showed that 10.2 percent of the wells tested were contaminated with nitrate above the current drinking water standard of 10 parts per million (ppm), and 34.2 percent of the wells tested exhibited nitrate levels in excess of 2 ppm or greater. Nitrate levels ranged as high as 110 ppm. (NRDC 2005). However, implementation of sound agricultural practices can reduce the excessive nutrients into groundwater and surface water systems.

3.7 SOCIOECONOMICS

3.7.1 OVERVIEW

NEPA and its implementing regulations and guidelines require consideration of the social and economic impacts of Federal actions in preparation of environmental documents. Regarding such impacts, section 1508.8 of the CEQ's Regulations for Implementing NEPA states that:

> Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

This section presents regional and local information on the existing socioeconomic conditions in North Carolina in general and the proposed CREP area in particular.

3.7.2 EXISTING CONDITIONS WITHIN THE PROPOSED CREP AREA

The State of North Carolina saw a 21 percent increase in population from 1990 to 2000 from 6.6 million to 8.1 million (See Figure 3.9). The population within the proposed CREP area increased 13 percent from its 1990 level, to 3.6 million in 2000, with a population density of 134 persons per square mile. The population located within urban areas (all territory, population and housing units in urbanized areas and in places of more than 2,500) totaled approximately 2.3 million, while 1.3 million persons lived in rural areas. Of the rural population, approximately 36,000 (1 percent of the total population) lived on farms (Census 2000).

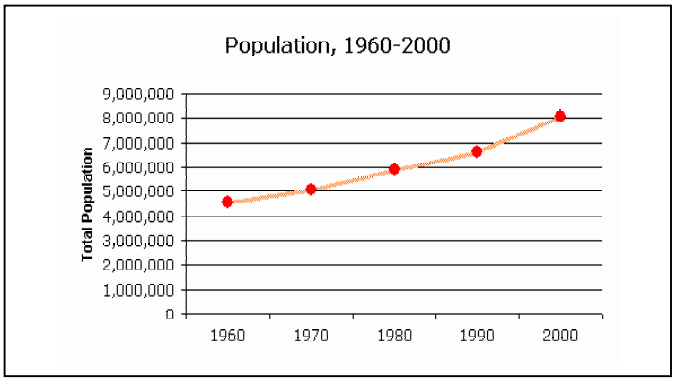

Figure 3.9. North Carolina population growth.

Source: Census 2000.

3.7.2.1 Agriculture

As of 2004, there were 52,000 farms in North Carolina (down from 57,000 in 2000), which produced and sold approximately $8.2 billion worth of farm products. As mentioned, the number of farms decreased slightly in 2004 from previous years, but the total amount of land in agriculture remained steady at approximately 9 million acres. Although the number of farms has decreased, the value per acre of farmland grew between 1999 and 2004, from $2,240 to $3,300. In 2004, 6 counties (Duplin, Greene, Johnston, Randolph, Sampson and Wayne) within in CREP area were among the top 10 agricultural producers in the State. Tobacco farming is the State's largest commodity, followed by sweet potatoes (NCAGR 2005). North Carolina produces more tobacco and sweet potatoes than any other state and ranks second in the production of hogs, turkeys, Christmas trees, and trout (NCAGR 2005).

Both crop and animal output experienced increases from 2003 to 2004 (ERS 2005). Net farm income increased by 67 percent from $1.7 million to over $2.9 million from 2003 to 2004, due in large part to a $1.2 million increase in animal output. Value added to the North Carolina economy was near $1 billion in 2004, up from $8.6 million in 2003 (ERS 2005).

According to the Agriculture Census of 2002, a total of 22,306 farms, including livestock and crops, are in operation within the proposed CREP area. These farms comprise 4.9 million acres (33 percent) of the 14.9 million acres in the proposed CREP area (NCAGR 2005). The total cash receipts from these operations totaled approximately $3.1 billion in sales.

3.7.2.2 Recreation and Tourism

Tourism is one of North Carolina's largest industries. Approximately 49 million visitors traveled to North Carolina, ranking the State eighth in person-trip volume by State, behind California, Florida, Texas, Pennsylvania, New York, Illinois, and Ohio (TravelScope 2005). In 2004, domestic tourists spent $13.3 billion in the State—a 4.9 percent increase from 2003. Domestic tourism expenditures directly supported 182,950 jobs for North Carolina residents and contributed $3.6 billion to the State's payroll in 2004 (TravelScope 2005). Traveler spending generated over $2.1 billion in tax receipts, approximately half of which were Federal taxes and half of which were state and local taxes. The food service and lodging

sectors experienced the largest impact in 2004, with $4.5 and $2.4 billion, respectively (TravelScope 2005).

The State boasts a vital, outdoor-recreation economy. The 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation revealed that 2.8 million North Carolina residents and non-residents 16 years and older participated in wildlife activities such as fishing, hunting, and wildlife viewing. Of the total, 48 percent participated in fishing or hunting while 75 percent participated in wildlife viewing or both wildlife viewing and hunting/fishing (FWS 2001).

In 2000, State residents and non-residents spent $2.4 billion on wildlife-related recreation in North Carolina. Of that total, trip-related expenditures totaled $701 million and equipment purchases were $1.5 billion. The remaining amount was spent on licenses, contributions, land ownership and leasing, and other items and services (FWS 2001).

3.8 ENVIRONMENTAL JUSTICE

3.8.1 OVERVIEW

All Federal programs, including the North Carolina CREP, must comply with Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Federal agencies are required to incorporate environmental justice into their overall agency missions.

The goal of EO 12898 is to ensure that all people, regardless of race, color, national origin, or income, receive the following treatment:

1. Are provided with fair treatment and meaningful involvement with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies;
2. Have the opportunity to express comments or concerns before decisions are rendered on the Federal programs, policies, procedures, or activities affecting them; and
3. Share in the benefits of, are not excluded from, and are not adversely or disproportionately affected by Federal programs, procedures, policies, or activities. Application for the North Carolina CREP will require the completion of a site specific environmental review. Environmental justice issues are addressed on the FSA-850 in question 9. If a site specific proposed action tiered to this PEA is found to have the potential to cause disproportionately adverse human health or environmental effects to minority or low-income communities, a discussion of the negative impacts must be attached.

3.8.2 EXISTING CONDITIONS WITHIN THE PROPOSED CREP AREA

North Carolina is a racially diverse State. According to census data, there are 8.1 million citizens of North Carolina; of these, approximately 2.2 million (27 percent) are considered minorities. In 2002, state farm operations numbered 53,930, with 1,685 (3 percent) operated by a member of a minority group (NASS 2005). Approximately 3,177, or 4 percent of a total of 74,229, are considered minorities as well (NASS 2005).

According to the 2002 Census of Agriculture, there were 107,828 migrant and season workers working on 3,461 farms within the state. Sixty-four percent of these workers were migrants, while the remaining 36 percent were seasonal (NFWM 2005). Pay rates varied depending on whether the worker was paid an hourly rate or piece rate. Federal laws require that workers earn a minimum wage of $5.15 per hour. Workers paid by piece rates can earn more money based on their individual productivity. On the whole, farm laborers in North Carolina were paid approximately 50 cents below the national average of $8.88 (NASS 2003).

3.9 NATURAL LANDMARKS, WILDERNESS AREAS AND WILDLIFE REFUGES

North Carolina is a State where natural resources abound. In addition to the resources mentioned above, other protected resources include federally designated National Natural Landmarks, and Wilderness Areas, which are preserved so that generations of Americans can experience their notably pristine natural values. See Figure 3.10 below for the locations of these protected resources within the proposed CREP area (see Section 3.5, Recreation, and Section 3.7, Socioeconomics). The majority of protected resources found within the proposed CREP area are located within the Albermarle-Pamlico estuary system. In 1989, the DEM estimated that at least 40 percent of the streams that flow into the estuary have been degraded by non-point pollutants; of that 40 percent, over half are from agricultural sources. (Lilly 1996). See Figure 3.11 below.

3.9.1 NATIONAL NATURAL LANDMARKS

3.9.1.1 Overview

The National Natural Landmarks (NNL) Program recognizes and encourages the conservation of outstanding examples of the country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. NNLs are designated by the Secretary of the Interior, with the owner's or administrator's concurrence. To date, fewer than 600 sites have been designated. The National Park Service administers the NNL program and, if requested, assists NNL owners and managers with the conservation of these important sites (NPS 2005).

3.9.1.2 Existing Conditions within the Proposed CREP Area

Of the 13 National Natural Landmarks within the state, 4 are located within the proposed CREP area (Table 3.12).

- Goose Creek State Park Natural Area, located in Beaufort County, offers a variety of outdoor recreational activities; including camping, fishing, wildlife viewing and boating. The park boasts an array of habitat types and is used by a myriad of wildlife including, bobcats, black bear and waterfowl (NC DPR 2005).
- Nags Head Woods and Jockey Ridge are located in Dare County. Nags Head Woods is considered one of the best remaining examples of a mid-Atlantic maritime forest with deciduous hardwoods. This pine and hardwood forest harbors trees up to 500 years old and has an extensive system of dunes, interdune ponds, and wetlands. Jockey Ridge is the tallest sand dune on the east coast. Depending on the weather, the dune ranges from 110 to 140 feet (NC DPR 2005).

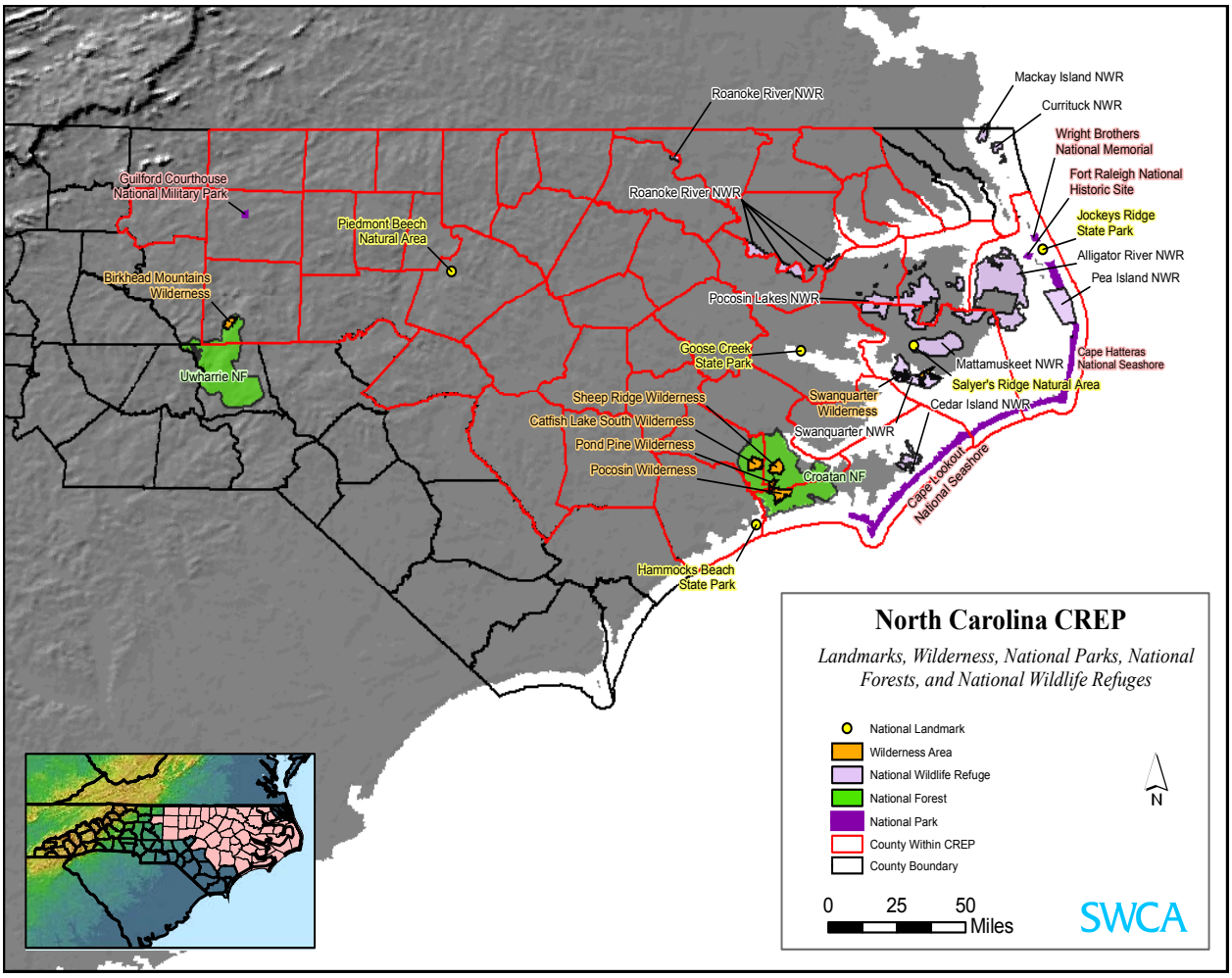

Figure 3.10. Protected areas within the proposed CREP area.

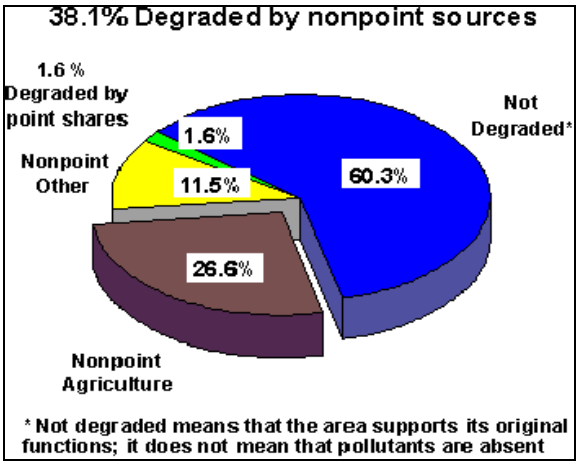

Figure 3.11. Water quality status of the streams draining into the Albemarle-Pamlico estuary as estimated by the North Carolina Division of Environmental Management.

Source: NCSU Cooperative Extension Service 2005.

Table 3.12. National Natural Landmarks in CREP Area and Acreages

National Natural Landmark	County	Acres
Goose Creek State Park Natural Area	Beaufort County	1,665
Nags Head Woods and Jockey Ridge	Dare County	1,092
Salyers Ridge Natural Area	Hyde County	153
Piedmont Beech Natural Area	Wake County	50
Total		**2,960**

Source: NPS 2005.

- Salyers Ridge Natural Area, located in Hyde County, is a rare example of mature loblolly pine forest in process of succession towards a deciduous forest (NC DPR 2005).
- Piedmont Beech Natural Area, located in William Umstead State Park in Wake County, is perhaps the finest example of mixed mesophytic forest in the eastern Piedmont of North Carolina, with unusually fine climax stands of beech in the state (NC DPR 2005).

3.9.2 WILDERNESS

3.9.2.1 Overview

The Wilderness Act of 1964 established the National Wilderness Preservation System to permanently protect natural and undisturbed places in America and provide opportunities for solitude. Congress must designate wilderness; however, anyone can petition or recommend areas for wilderness designation.

3.9.2.2 Existing Conditions within the Proposed CREP Area

There are 12 designated North Carolina wilderness areas in North Carolina, of which 5 are located within the proposed CREP area. All are managed by the Forest Service except for Swanquarter Wilderness, which is managed by the FWS (Table 3.13).

- Swanquarter Wilderness Area, established in 1932, is a satellite of Mattamuskeet National Wildlife Refuge, encompassing 16,411 acres of islands and coastal marshland on the north side of Pamlico Sound. Another 27,082 acres of nearby open water protects migratory birds under Presidential Proclamation (Wilerness.net 2005).
- Sheep Ridge is a raised bogland or pocosin that lies in the heart of Croatan National Forest, with Catfish Lake Road to the north and Great and Long Lakes to the south. A high water table keeps the pocosin wet and agreeable enough to grow dwarf swamp vegetation (Wilderness.net 2005).
- Catfish Lake South Wilderness is primarily raised bogland within the Croatan National Forest. The American alligator and the cottonmouth, canebrake rattler, eastern diamondback rattler, pygmy rattler, copperhead, and other poisonous snakes area all indigenous to the area. The area also hosts deer, bears, squirrels, rabbits, raccoons, sleek muskrats, minks, and otters. On the Atlantic Flyway, Catfish Lake attracts ducks and geese while egrets, flycatchers, woodpeckers, hawks, woodcocks, owls, and ospreys have been spotted (Wilderness.net 2005).
- Pond Pine Wilderness is the smallest of North Carolina's designated wilderness areas and is also located in Croatan National Forest. The wilderness is home to alligators, biting insects, poisonous snakes, and tangled masses of vines and shrubs.

- Pocosin Wilderness is located in Croatan National Forest as well. Pocosin, which means "Swamp on a hill," is a raised bog. The thickness of the muck varies from several inches at the edge to several feet at the center. Growth on the outer rim is typically pond pine with a dense understory, the shrub Zenobia (unique to pocosins), and an impenetrable jungle of greenbrier vines.

Table 3.13. Wilderness Areas in CREP Area and Acreages

Wilderness Area	Managing Entity	County	Acres
Swanquarter	FWS	Pamlico County	8,785
Sheep Ridge	Forest Service	Craven County	9,297
Catfish Lake South	Forest Service	Craven County	8,530
Pond Pine	Forest Service	Craven County	1,685
Pocosin	Forest Service	Craven County	11,709
Total			**40,006**

Wilderness.net 2005.

3.9.3 WILDLIFE REFUGES

3.9.3.1 Overview

The National Wildlife Refuge System (NWRS) has been in existence for over 100 years. Beginning with Pelican Island in 1903, the purpose of the NWRS is to protect and conserve land for fish, wildlife and their habitat.

3.9.3.2 Existing Conditions in the Proposed CREP Area

Today there are 10 National Wildlife Refuges in North Carolina, 9 of which are located in the coastal counties within the proposed CREP area totaling approximately 366,200 acres (see Table 3.14). The purpose of these refuges is to provide protection and habitat for birds, raptors, terrestrial and aquatic species.

- Alligator River – Alligator River NWR encompasses 152,000 acres and is the largest in the Albermarle/Pamlico Region. Inhabitants include alligators, bald eagles and red-cockaded woodpeckers (GORP 2005).
- Cedar Island – The 14,480 acre refuge consists of approximately 11,000 acres of irregularly-flooded, brackish marsh and 3,480 acres of pocosin and woodland habitat. The dominant marsh plants include black needlerush, saltmarsh cordgrass, saltmeadow hay, and saltgrass. The woodland areas are dominated by loblolly pine, longleaf and pond pine. Live oak is also abundant on some upland sites (GORP 2005).
- Mattamuskeet – Mattamuskeet is comprised of 50,000 acres of water, marsh timber and croplands. It is also home to the State's largest natural lake. The refuge is a vital wintering area for waterfowl, and is home to 240 species of birds and other wildlife (GORP 2005).
- Pea Island – Pea Island is comprised of approximately 6,000 acres of ocean beach, barrier dunes, salt marshes, fresh and brackish water ponds and impoundments, as well as tidal creeks and bays.

The refuge also encompasses 25,000 acres of Pamlico Sound waters. Wildlife include waterfowl, shore birds, and various mammals (GORP 2005).

- Pocosin Lakes – This 110,000 acre refuge is comprised of shrub bog , a 12,000 acre waterfowl management area and an extensive wetland restoration project. Wildlife viewing opportunities include the tundra swan, snow geese, a variety of ducks black bear and various smaller mammals (GORP 2005).
- Roanoke River – This 16,000 acre refuge includes bottomland hardwood forest, levee forests and cypress swamps and is considered to be the largest intact bottomland forest in the Mid-Atlantic ecosystem. Wildlife include 191 species of birds, and a number of reptile, amphibian and mammal species (GORP 2005).
- Swanquarter – The refuge is 15,643 acres of saltmarsh islands and forested wetland interspersed with potholes, creeks, and drains. Presidential Proclamation closes an additional 27,082 acres of adjacent, non-refuge open water to the taking of migratory birds. Approximately 8,800 acres are included in the NWPS. The refuge provides habitat for a number of waterfowl. Additionally, it provides habitat for nesting osprey and colonial water birds and supports one of the northernmost populations of the American alligator (GORP 2005).

Table 3.14. National Wildlife Refuges in the CREP Area and Acreages

Wilderness Area	Managing Entity	County	Acres
Alligator River	FWS	Dare/Hyde	152,000
Cedar Island	FWS	Carteret	14,500
Mattamuskeet	FWS	7 Counties in CREP Area	50,000
Pea Island	FWS	Dare	5,800
Pocosin Lakes	FWS	Tyrell	110,000
Roanoke River	FWS	Bertie/Tyrell/Washington	17,500
Swanquarter	FWS	Bertie	16,400
Total			**366,200**

Wilderness.net 2005.

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CHAPTER 4.0 ENVIRONMENTAL CONSEQUENCES

4.1 BIOLOGICAL RESOURCES

4.1.1 WILDLIFE AND FISHERIES

4.1.1.1 Level of Impact

Site specific environmental reviews will be completed for each CREP contract and will review process would include the quality of restored or enhanced riparian and wetland habitat, water quality and the number of wildlife and aquatic species affected in and around the enrolled acreage.

4.1.1.2 Alternative A – Implementation of Amended CREP

Implementation of Alternative A would contribute to the restoration and enhancement of native habitats and improvement of water quality. Some minimal and localized negative impacts may occur to riparian and associated habitats during CP installation and temporarily displace wildlife; however, since Alternative A would only temporarily affect previously cropped land and the resulting CPs would ultimately provide better habitat, these impacts would be minimal and transient.

Specifically, Alternative A is expected to result in beneficial impacts to habitat and population numbers of large game, upland and smaller species, from the black bear (*Ursus Americanus*) and the white-tailed deer (*Odocoileus viriginianus*) to smaller species such as mink (*Mustela vison*) and the many reptile and amphibian species found in the project area. All of these species would benefit from restored, enhanced and increased habitat achieved through the implementation of CPs (Klapproth and Johnson 2000).

The establishment of hardwood trees (CP3A), filter strips (CP21), riparian buffers (CP22), and wetland restoration (CP23) would enhance aquatic biodiversity in the CREP area and downstream (Anderson and Masters 2005). By protecting and enhancing water quality through the reduction of nutrient and sediment loading and runoff from agricultural activity into nearby surface waters, aquatic biodiversity and habitat in the proposed CREP project area would benefit. Lower nutrient concentrations in the streams would improve the health of fish and invertebrate communities, as well as the quality of the stream corridor used by these species for migration.

Each CREP contract would have a site specific environmental review completed by FSA to determine if any threatened or endangered species are present and would be potentially affected by the proposed action. If so, consultation with the FWS or NMFS would be initiated. In addition, any CREP activity that may result in the disturbance of non-cropped areas adjacent to a proposed project site would be coordinated with FWS or NMFS.

Direct benefits to wildlife and aquatic species would occur by implementing any of the CPs and concurrent activities as follows:

- CP3A - Subsequent improvement in water quality is expected to improve habitat of receiving waterbodies. Restoration of forested areas would also provide important terrestrial habitat for

wildlife such as raptors and migratory, wading, shorebirds and waterfowl. (Klapproth and Johnson 2000).

- CP21 - By reducing runoff flow velocity, enhancing infiltration of water, sediment and chemicals into the soil, enhancing the absorption of chemicals onto the vegetation, litter and surface layer of soil, and increasing opportunity for chemical transformation or plant uptake between runoff events (Fogle et al 1994), filter strips would help reduce the amount of nutrients, sediments, and other non-point pollutants that enter the aquatic environment. It is expected that the implementation of this CP would not only reduce pollutants and erosion, but also benefit the aquatic habitat and species in the project area. The numerous species of terrestrial wildlife would also benefit from improved water quality.
- CP22 - Riparian vegetation buffers would assist in creating shade to lower water temperature, thus improving habitat for aquatic organisms (Anderson and Masters 2005). They also would provide a source of detritus and large woody debris for aquatic organisms. Buffers also would provide important terrestrial habitat for wildlife, and it is anticipated that broader buffers could provide wildlife corridors connecting native plant and animal populations (Anderson and Masters 2005).
- CP23 - Wetland restoration reestablishes native vegetation, a sustainable food source for wildlife, provides breeding grounds for waterfowl, connects wildlife corridors, reduces downstream flooding, reduces stream bank and shoreline erosion, improves water quality, protects fish and shellfish harvests, enhances threatened and endangered species habitat, and provides recreational and educational opportunities (Gordon 1996).

Generally, selection of Alternative A would likely result in long-term, moderate to high benefits to the project area's fish and wildlife species. Implementation would provide additional habitat and enhance existing native terrestrial and aquatic habitat by improving water quality and restoring native plant communities. All four of the objectives in Section 1.3 would be met.

4.1.1.3 Alternative B – No Action

The implementation of the No Action alternative would allow the health of the watershed and habitat to continually degrade, impacting all wildlife and fish species that live within or migrate through the project area. Under the No Action alternative, long-term adverse effects would continue. Terrestrial wildlife habitat would not benefit from the leveraged effects of habitat restoration and watershed improvement CPs and may continue to decline. Selection of Alternative B would not contribute to the achievement of any of the objectives cited in Section 1.3.

4.1.2 PROTECTED SPECIES AND HABITAT

4.1.2.1 Level of Impact

Site-specific environmental reviews would tier to this PEA. Specific indicators used to measure the effects upon threatened, endangered, or other federally or state protected species during the environmental review process would include the quality and amount of critical habitat, including that surrounding riparian and wetland resources that are in need of restoration or enhancement, and the number of protected species in and around enrolled acreages, and the quality of water resources within critical habitat areas.

Under the requirements of Section 7 of the Endangered Species Act (ESA), the FWS, Raleigh Field Office states in a letter dated January 9,2005 (See Appendix F), that if site-specific environmental reviews contain suitable habitat for any of the federally listed species known to be present within the county where the project will occur, the proposed action has the potential to adversely affect those species. As such, the FWS recommends that a qualified biologist conduct surveys to determine the species' presence within the project area. Specifically, red cockaded woodpecker cavity trees should be conducted within a one-half mile radius of the proposed project site. Surveys for Federally listed aquatic species (mussels and fish) must be conducted by a qualified biologist with the appropriate state and federal permits.

4.1.2.2 Alternative A – Implementation of Amended CREP

Implementation of Alternative A would have a positive impact on protected species (See complete list of protected species in the project area in Section 3.1.2). Long term direct benefits to threatened and endangered species would occur by implementing any of the CPs below. Estuarine environments would directly benefit from the implementation of CPs upstream as well. However, temporary disruptions to existing habitat may occur and localized water quality impacts may result from runoff during activities associated with the installation of the proposed conservation practices.

The threatened and endangered species identified in the proposed CREP area are all dependent on healthy water quality. All of the species listed below (see table 4.1) may be directly or indirectly affected by the implementation of any of the CPs. Benefits would be realized shortly after implementation of CPs and would increase in the long term, as areas of suitable habitat across the project area increase. In addition, any CREP activity that may result in the disturbance of non-cropped areas adjacent to a proposed project site would be coordinated with FWS or NMFS.

Invertebrates

The three protected invertebrates listed in Section 3.1.2 (Dwarf wedgemussel, Tar River spinymussel, and James spinymussel) are all freshwater species that inhabit riverine systems. The implementation of hardwood plantings (CP3A), filter strips (CP21), and riparian buffers (CP22) would all improve potential habitat by stabilizing stream banks, reducing nutrients and sedimentation, and improving overall water quality (Anderson and Masters 2005; Fogle et al 1994; Klapproth and Johnson 2000).

Fish

The Cape Fear shiner inhabits slower moving riverine systems with coarse substrates. The shortnose sturgeon inhabits the lower portions of large rivers, estuarine and coastal waters. Both species would be indirectly and beneficially affected by CPs 3A, 21, 22 that reduce non-point source pollution of nutrients and sedimentation in these systems (Anderson and Masters 2005; Fogle et al 1994; Klapproth and Johnson 2000).

Reptiles

The turtles listed in Section 3.1.2 prefer marine or coastal environments and can be found near reefs, shallow coastal areas, lagoons, etc. These turtle species may be indirectly and beneficially affected by CPs 3A, 21, 22 that reduce downstream non-point source pollution in freshwater streams (Anderson and Masters 2005; Fogle et al 1994; Klapproth and Johnson 2000) that flow to coastal areas. CPs implemented in coastal counties may have a greater beneficial impact due to proximity. The American alligator is found more in freshwater systems, but can also tolerate some salt water. They would also be

directly and indirectly benefited by CPs 3A, 21, 22, and 23 due to improved water quality and wetlands construction.

Birds

The piping plover and roseate tern prefer coastal habitats, though the plover also nests along river sandbars and alkali wetlands. The implementation of CPs 21 and 22 would improve potential habitat by stabilizing stream banks and reducing nutrient loading and sedimentation, and improving overall water quality (Anderson and Masters 2005; Fogle et al 1994). CP 23 would enhance habitat by increasing the amount of wetlands in the Project Area (Gordon 1996). Hardwood plantings (CP3A) would improve habitat for bald eagles by providing a source for snags for perching (Klapproth and Johnson 2000). Red-cockaded woodpeckers would be unaffected as they rely predominately on pine stands for habitat requirements.

Mammals

The manatee inhabits shallow water coastal and estuarine environments. This species would be indirectly and beneficially affected by CPs 3A, 21, 22 that reduce downstream non-point source pollution of nutrients and sedimentation in these systems (Anderson and Masters 2005; Fogle et al 1994; Klapproth and Johnson 2000). This improvement in water quality would also affect the aquatic plants that constitute manatees diet.

The eastern cougar and red wolf do not have many specific habitat requirements. They need sufficient food, water, and cover in relatively large, contiguous habitats that are ideally removed from developed areas. It is unlikely that CREP implementation would have any direct effects on these species. Wetland restoration and riparian buffers reestablishes native vegetation, and provides habitat requirements for prey species, provides breeding grounds for waterfowl and connects wildlife corridors (Gordon 1996), all are important factors for these predator species.

Plants

Twelve protected plant species (Sensitive jointvetch, Seabeach amaranth, Small-anterhed bittercress, Golden sedge, Smooth coneflower, Schweinitzs sunflower, Small whorled pogonia, Pondberry, Rough-leaved loosestrife, Harperella, Michaux's sumac, Cooleys meadowrue), and three candidate species (White fringeless orchid, Hirsts panic grass, Bog asphodel) grow in low lying hydric environments. These species would be beneficially affected by CPs 3A, 21, 22, 23 through reduction of nutrients and sedimentation, the creation of new habitat and the increased capacity for flood water storage (Anderson and Masters 2005; Fogle et al 1994; Klapproth and Johnson 2000).

The Georgia aster and White irisette are both occupy dry upland habitats and are not believed to be affected by the implementation of the CREP CPs.

Selection of Alternative A would result in long-term moderate to high benefits to North Carolina's protected fish and wildlife species. Implementation would provide additional habitat and enhance existing native terrestrial and aquatic habitat by improving water quality and restoring native plant communities. Selection of Alternative A would contribute to the achievement of the four objectives cited in Section 1.3.

4.1.2.3 Alternative B – No Action

Under the No Action alternative, threatened, endangered, or other protected species listings would continue as newly jeopardized species are identified. These new listings and the declining habitat conditions of the currently listed species are part of a general trend of slow decline of species as human actions conflict with and adversely affect those species and their habitats. Under Alternative B, the following impacts would be anticipated:

- Habitat values would continue to degrade
- Population growth would continue to crowd natural ecosystems
- Pollution levels in agricultural runoff would remain high

Under the No Action alternative, long-term, adverse effects would continue. Protected species and their habitat would not benefit from the leveraged effects of habitat restoration and watershed improvement CPs and may continue to decline.

4.2 CULTURAL RESOURCES

4.2.1 ARCHAEOLOGICAL RESOURCES

4.2.1.1 Level of Impact

The level of impact for assessing the effects of the alternatives upon cultural resources should be a quantitative analysis of the number and type of archaeological resources affected and the degree to which they are affected. However, such analysis awaits the site-specific environmental reviews tiering to this PEA that would be carried out when a given acreage is enrolled in the North Carolina CREP. Therefore, for the comparisons of the impact of the alternatives on archaeological resources, the relative impacts of the alternatives are compared.

In an effort to gain further understanding of cultural resources and historic properties within the study area, a consultation letter was sent to the North Carolina State Historic Preservation Officer on October 10, 2005 (See Appendix F). A response to this letter was not received during the 30 day comment period, therefore FSA assumes SHPO's concurrence.

4.2.1.2 Alternative A – Implementation of Amended CREP

Depending on the specific characteristics of the enrolled acreage and the archaeological resources known or suspected to be present in the area, FSA may require that an inventory be conducted before the contract can be finalized. This would provide the opportunity to avoid archaeological sites or mitigate the impact of implementation of the CPs. Although a survey for historic properties on the ground surface would not identify subsurface archaeological resources, the impact of a contract on subsurface resources could be assessed by using monitors during ground disturbing activities in areas where there is a high likelihood that subsurface archaeological resources may be present.

CPs 3A, 21, and 22 are intended to reduce or eliminate erosional environments, which would probably beneficially impact the preservation of resources. Restricting the access of livestock to riverbanks would

probably reduce artifact trampling and erosion of archaeological sites, if any are located along riverbanks. The impact of chemicals used in fertilizers and pesticides on the preservation of material remains has not yet been assessed. However, reduction of such chemicals may have beneficial consequences for the preservation of material remains. Under Alternative A, which would have the largest enrollment, these beneficial effects would be maximized.

All of the proposed CPs may include ground disturbing activities, which have the potential to adversely affect the integrity of an archaeological site. Under Alternative A, which would have the maximum acreage enrolled in the North Carolina CREP, the potential for these activities to have an adverse effect on the integrity of archaeological sites would be maximized.

Aside from issues of preservation and disturbance, the simple identification of an archaeological site along with basic information about the type of site, types of materials, features, structures, and other information would beneficially impact archaeological research in the area and/or region. Knowing the location, type, and possibly dates of sites identified in association with implementation of the CPs for a contract could be a contribution to research on settlement patterns in the area. Additionally, Alternative A could have an additional positive impact on archaeological resources. If an archaeological resource were identified on private land because of a survey carried out for the North Carolina CREP, it would provide the opportunity to begin a dialogue with the producer on the research value and significance of archaeological resources. Opportunities for public outreach with producers can be used to increase their knowledge about the preservation and protection of archaeological resources.

4.2.1.3 Alternative B – No Action

Under the No Action alternative, no lands would be enrolled in CREP, and no CPs would be implemented. Alternative B would have a detrimental effect on archaeological resources in two main ways: absence of Federal protection and continued adverse impacts from farming and land development activities.

The absence of a project for which Federal funds, permits, or lands are involved, as well as the absence of any factor bringing state laws into play, means that no identification or evaluation of archaeological resources would occur. Under this alternative, there is no impetus to identify these resources in the portions of the project area where agriculture is being practiced. This means that adverse impacts to archaeological sites could be occurring as a result of ongoing, agricultural land uses, without any knowledge of the types or degrees of impacts to archaeological resources. On most of this privately owned land, archaeological sites may not necessarily be identified even when agricultural land is converted to residential or commercial land uses, which could cause destruction of archaeological resources. Even if archaeological materials are identified, no requirement to report their existence to the appropriate state or Federal agencies is in place for private producers. Finally, the adverse effects on archaeological resources could not be measured since no identification or assessment would be required.

Traditional agricultural practices can have a detrimental effect on many archaeological resources (Hess and Wapnish 1985; Orton 2000:57-63; Stevenson 1991). Prehistoric and historic occupation sites can become quite disturbed by the plow, plant, and till cycle of modern agriculture, particularly the spatial distribution of artifacts and the disturbance of delicate features (Hess and Wapnish 1985; Orton 2000:57-63). Moreover, the effect of livestock movement over archaeological sites can be quite destructive. Trampling by humans and animals is known to affect the physical integrity and spatial patterning of lithic, ceramic, bone, brick, and wood artifacts within a site (Davis 1987; Dibble et al. 1997; Ebert and Kohler

1988; Hess and Wapnish 1985; McBrearty et al. 1998; Nielson 1991; Stevenson 1991) and such effects could presumably be assumed to affect more delicate artifacts as well such as wooden, hide, or basketry artifacts. Traditional agricultural practices and livestock trampling both have the effect of creating an erosional environment, which is detrimental to the integrity of archaeological resources, particularly those along the banks of ditches, streams, or other waterways (Gray and Sotir 1996:10; Kauffman and Krueger 1984).

Of the three alternatives proposed in this PEA, the No Action alternative would allow erosional environments to continue to exist, which would likely adversely affect archaeological resources. Additionally, because of the lack of Federal or State interest in private agricultural properties, the producers would not be under any obligation to identify or protect archaeological resources, which may lead to additional adverse effects.

4.2.2. ARCHITECTURAL RESOURCES

4.2.2.1 Level of Impact

The level of impact for assessing the effects of the alternatives upon architectural resources should be a quantitative analysis of the number of architectural resources affected and the ways in which and degrees by which they are affected. However, such analysis must await the site specific environmental reviews that would be carried out when a particular acreage is enrolled in the North Carolina CREP. Therefore, at the programmatic level of analysis in this PEA, the impacts of the alternatives on architectural resources are primarily qualitatively assessed, in terms of the viewshed of architectural resources, the potential of the alternatives to change erosional processes around the architectural resources, and the consequences of the process of Federal involvement leading to the identification of historic architectural resources.

4.2.2.2 Alternative A – Implementation of Amended CREP

Under Alternative A, Federal regulations would require the identification and evaluation of architectural resources in a contract area, as well as an assessment of the contract's impact on cultural resources. Depending on the specific characteristics of the area of a contract, and the architectural resources known or suspected to be present in the area, FSA may require that a reconnaissance or intensive level architectural inventory be conducted before the contract can be finalized. This would provide the opportunity to avoid architectural resources or mitigate the impact of the CPs on the architectural resources.

If historic architectural properties are located within a specific contract area, an assessment of the impact of the CPs upon the view shed of the specific architectural properties should be carried out at that time. However, some assessment of the effects of the CPs on the view sheds of architectural properties can be done at the programmatic level, without knowledge of specific enrollments or architectural properties.

For the majority of examples of historic architecture in or near an enrolled acreage, many of the actions authorized under the four CPs proposed in this PEA are unlikely to have an adverse impact upon an example of historic architecture unless done in such close proximity to the historic property that the plantings interfere with or impinge upon historical landscaping associated with the property. The use of animal control damage devices, plastic mulch, water control features, construction of pipelines and

watering facilities, construction of fencing, and earth-moving to reshape the landscape could be modern intrusions into what might be an otherwise historic view shed of a historic property.

The authorized actions for the four CPs would attempt to reduce or eliminate erosional environments, which would have the potential to beneficially impact the preservation of architectural resources, particularly those situated along or near the banks of rivers, streams, canals, or ditches.

Aside from issues of preservation, the simple identification of architectural resources would have a positive impact for architectural research in the area. Knowing the location, type, and possibly dates of historic structures could contribute to research on settlement patterns, styles of buildings, or other research questions for the area and/or region. The involvement of the Federal and state governments would also provide the opportunity to begin a dialogue with the producer on the significance of historic structures identified in association with implementation of the CPs for a contract on the producer's property. Such opportunities for public outreach with producers can be used to increase their knowledge about the preservation and protection of historic structures.

4.2.2.3 Alternative B – No Action

Under Alternative B – No Action, traditional agricultural practices would continue with no involvement on the part of state or Federal agencies. Traditional agricultural practices and animal trampling both have the effect of creating an erosional environment, which is potentially detrimental to architectural resources, particularly those along the banks of ditches, streams, or other waterways. Of the alternatives proposed in this Environmental Assessment, the No Action alternative would allow the most extensive erosional environments to persist, which has the potential to adversely affect architectural resources.

The No Action alternative would have a detrimental effect on architectural resources in the area in another way. The absence of a project for which Federal funds, permits, or lands are involved, and the absence of any factor bringing state laws into play means that no identification or evaluation of architectural resources would occur. Under this alternative, there is no impetus is to identify architectural resources in the area where agriculture is being practiced. This means that adverse impacts to architectural resources could be occurring without any knowledge of the types or degrees of impacts. Because of the lack of Federal or state involvement in traditional agricultural practices, architectural resources may not necessarily be identified even when agricultural land is converted to residential or commercial land uses, which would cause destruction of the architectural resources. Even if architectural resources are identified, no requirement to report their existence to the appropriate state or Federal agencies is in place for private producers. Not only does this alternative have potentially the greatest detrimental effect on architectural resources, the extent of the effects could not be measured since no identification or assessment would be required.

Alternative B would not produce any beneficial effect on architectural resources and would result in two types of adverse effect on architectural resources.

4.2.3 TRADITIONAL CULTURAL PROPERTIES

4.2.3.1 Level of Impact

Since no traditional cultural properties have been identified to date within the North Carolina CREP project area, it is difficult to determine a mechanism for measuring the level of impact the different alternatives would have on this resource type.

4.2.3.2 Alternative A – Implementation of Amended CREP

Federal regulations require consultation with American Indian tribes about traditional cultural properties the tribe might have in the project area. Under Alternative A, the need to identify traditional cultural properties in a particular contract area enrolled in CREP, as well as an assessment of the contract's impact on the property, could be interpreted by the tribe as an adverse affect on the integrity of the traditional cultural property or its uses.

In spite of the need to address sensitive tribal information, the reduction or elimination of erosional environments would probably beneficially impact any traditional cultural properties that might be present in a proposed contract area, particularly those situated along or near the banks of rivers, streams, canals, or ditches.

Because Alternative A would result in the largest amount of acreage enrolled in the North Carolina CREP, both beneficial and adverse effects would be maximized under this alternative.

4.2.3.3 Alternative B – No Action

The absence of a project for which Federal funds, permits, or lands are involved, as well as the absence of any factor bringing state laws into play, means that no consultation with American Indian tribes would be carried out and no identification of traditional cultural properties would occur. This would result in the tribes' continued ability to restrict knowledge of the locations and natures of any traditional cultural properties valued by the tribes. However, because of the lack of Federal or state involvement in agricultural practice on private land, traditional cultural properties may not necessarily be identified even when agricultural land is converted to residential or commercial land uses, which has the potential to cause destruction of traditional cultural properties without any notification of American Indian tribes. This would be an adverse effect in comparison with Alternative A.

Traditional agricultural practices and animal trampling both have the effect of creating an erosional environment, which is detrimental to many resources, particularly those along the banks of ditches, streams, or other waterways. If any traditional cultural properties are located in such environments, Alternative B would have the greatest adverse effect on the preservation of those properties. Of the alternatives proposed in this PEA, the No Action alternative would allow the most erosional environments to be continued or newly created, which in turn would probably adversely affect any traditional cultural properties in those erosional locales.

Alternative B could have both beneficial and adverse effects on traditional cultural properties, but the adverse effects have the potential to be greater than the beneficial effects.

4.3 WATER RESOURCES

4.3.1 SURFACE WATER

4.3.1.1 Level of Impact

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used to measure the effects of the alternatives upon surface water during the environmental review process should include an analysis of the number of impaired stream miles or acres enrolled, and the levels of point and non-point pollution within the affected area.

4.3.1.2 Alternative A – Implementation of Amended CREP

The quality of surface water across the project area would likely moderately improve under Alternative A. Direct benefits to surface water quality would occur by implementing any of the CPs and concurrent activities as follows:

- CP3A -This CP would begin to correct the conversion of forest to agricultural lands that has led to high soil erosion and a decrease in groundwater recharge. Hardwood tree plantings would help reduce soil erosion and increase infiltration. In a North Carolina study, it was estimated that up to 90 percent of the sediment from cultivated agricultural fields could be trapped in an adjoining deciduous hardwood riparian area (Klapproth and Johnson 2000).
- CP21 - The introduction of filter strips reduces runoff flow velocity, enhancing infiltration of water, sediment, and chemicals into the soil profile; enhancing the absorption of chemicals into the vegetation, litter, and surface layer of soil; and increasing opportunity for chemical transformation or plant uptake between runoff events (Fogle et al 1994), filter strips would help reduce the amount of nutrients, sediments, and other non-point pollutants that may normally enter the aquatic environment (Fogle et al 1994).
- CP22 - Riparian buffers reduce stream band erosion and slow runoff from upland sites allowing water borne sediments, nutrients and toxicants to settle out (Anderson and Masters 2005).
- CP23 - Wetland restoration reestablishes native vegetation, reduces downstream flooding, reduces stream bank and shoreline erosion, and improves water quality (Gordon 1996).

Specifically, the implementation of the CPs under Alternative A would reduce the miles of impaired streams and shorelines (see Table 3.9). The implementation of the above-mentioned CPs may substantially reduce the miles of impaired surface waters throughout the entire project area through the reduction of sedimentation as well as nutrients entering surface waters (Fogle et al 1994). Selection of Alternative A would contribute to the achievement of the objectives cited in Section 1.3.

4.3.1.3 Alternative B – No Action

No implementation of CREP, and the associated continuation of agricultural activities and retention of other point and non-point pollutants, has the potential to significantly impact surface water quality via the continued introduction of silts, nutrients, pesticides and other organic matter into surface water bodies throughout the project area. Under the No Action alternative, CPs would not be implemented, allowing continued degradation of 564 miles of impaired streams throughout the project area (see Table 3.8 for

impaired stream miles from agricultural practices). Selection of Alternative B would not contribute to the achievement of any of the objectives cited in Section 1.3.

4.3.2 GROUNDWATER

4.3.2.1 Level of Impact

For site specific environmental reviews that are to tier to this PEA, the indicators used to measure the effects of the alternatives upon groundwater should include an analysis of the number of impaired stream miles or acres enrolled, the level of point and non-point pollution within the proposed CREP project area and the quality surface waters in and around wellhead recharge areas.

4.3.2.2 Alternative A – Implementation of Amended CREP

Similar to surface water above (Section 4.3.1), the implementation of the approved CPs under Alternative A, would offer long-term, beneficial effects to groundwater resource integrity. As previously established, all the CPs would improve surface water quality (Fogle et al 1994, Anderson and Masters 2005, Klapproth and Johnson 2000, and Gordon 1996), thus indirectly improving groundwater quality as aquifers are recharged from surface sources. Wellhead areas and areas that contribute to aquifer recharge may be enrolled in CREP, which would potentially result in a small, positive impact on preserving recharge areas. The implementation of CPs could produce a beneficial impact on groundwater and would help contribute to achieving the CREP objectives discussed in Section 1.3.

4.3.2.3 Alternative B – No Action

Alternative B and the associated continuation of agricultural practices have the potential to constitute a moderate, negative impact on the project area's affected groundwater resources via the non-point discharge of nutrients and pesticide residues. Pollutants and agricultural runoff would continue, with pesticides, excessive nutrients (nitrogen and phosphorus), and waterborne pathogens from animal waste being the primary concerns. Without the use of filter strips and other CPs, there would be minor, long-term, adverse effects on groundwater resources by allowing groundwater contaminants to continue to run into wellhead areas. Selection of Alternative B would not contribute materially to the achievement of any of the CREP objectives cited in Section 1.3.

4.3.3 COASTAL ZONES

4.3.3.1 Level of Impact

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used to measure the effects of the alternatives upon coastal zones during the environmental review process should include an analysis of the number of impaired stream miles or acres enrolled throughout the project area, the level of point and non-point pollution throughout the project area, and the impacts of these pollutants on the six coastal habitats throughout the coastal zone.

4.3.3.2 Alternative A – Implementation of Amended CREP

By implementing the CPs, Alternative A could offer long-term beneficial effects to the six coastal habitats discussed in Section 3.3.3. All the CPs would directly improve water quality of surface water, thus directly enhancing North Carolina's coastal zones downstream.

- CP3A - Hardwood tree planting would reduce agricultural erosion and sedimentation (Klapproth and Johnson 2000). Stream sediment loads would decrease and subsequently lead to decreases in downstream deposition and agradation in coastal and estuarine environments.
- CP21 - Filter strips would reduce runoff flow velocity, enhancing infiltration of water, sediment and chemicals into the soil, enhancing the absorption of chemicals onto the vegetation, litter and surface layer of soil, and increasing opportunity for chemical transformation or plant uptake between runoff events (Fogle et al 1994), filter strips would help reduce the amount of nutrients, sediments, and other non-point pollutants that enter streams and are transported downstream to coastal aquatic environments.
- CP22 - Riparian buffers reduce stream bank erosion and slow runoff from upland sites allowing water borne sediments, nutrients and toxicants to settle out (Anderson and Masters 2005), thus enhancing water quality in downstream coastal environments.
- CP23 - Wetland restoration reestablishes native vegetation, reduces downstream flooding, reduces stream bank and shoreline erosion, and improves water quality (Gordon 1996).

The implementation of CREP would contribute to achieving the CREP objectives discussed in Section 1.3.

4.3.3.3 Alternative B – No Action

Alternative B and the associated continuation of agricultural activities and retention of other point and non-point pollutants, has the potential to significantly impact the estuarine environment that characterizes the coastal zone of the project area. Under the No Action Alternative, the six coastal habitats would continue to be impacted from sedimentation and nutrient loading. Without the implementation of CPs, long-term, adverse effects on the coastal zones will continue.

The selection of Alternative B would not achieve any of the CREP objectives cited in Section 1.3.

4.3.4 WETLANDS

4.3.4.1 Level of Impact

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA Specific indicators used to measure the effects of the alternatives upon wetlands during the environmental review should include an analysis of the number of impaired acres of wetlands enrolled, the level of point and non-point pollution within enrolled acres as well as the project area, and the improvement or stability of wetlands-dependent species' population numbers.

4.3.4.2 Alternative A – Implementation of Amended CREP

Under Alternative A, the total acreage of wetlands across the project area would likely increase moderately in quality and quantity. The amount of actual acreage that would be gained is undetermined at this time; however, to achieve the project objectives, it is expected that wetlands would be a significant part of CREP enrolled lands.

Implementation of CP23 (Wetland Restoration) as well as the three other approved CPs in the affected North Carolina counties could improve water quality (Gordon 1996). Marginal acres would be removed from agricultural production or converted from fallow land to constructed wetlands. Constructed wetlands would help prevent a portion of agricultural runoff from reaching surface and groundwater resources, aid in flood and shoreline protection, provide habitat for fish and wildlife, and enhance water quality (Gordon 1996).

Direct effects of Alternative A would include the creation of new habitat and the improvement of existing habitat for riparian species and aquatic species in the combined watersheds and improve sport and commercial fishing (CTIC 2005). CREP implementation would provide long-term, beneficial effects to the proposed CREP area through the restoration of wetlands (Gordon 1996).

4.3.4.3 Alternative B – No Action

With the selection of the No Action Alternative, current wetlands will remain, however, conservation practices would not be implemented to restore or construct wetlands. As agriculture has been identified as a primary non-point pollutant, existing and projected agricultural runoff would likely continue to affect surface and ground water sources without the benefit of constructed or restored wetlands or other CPs. Given ongoing Federal involvement, total wetland acres would likely be stable or slightly reduced under Alternative B because the Clean Water Act and other Federal laws are very restrictive in allowing draining or conversion of existing wetlands for other uses. EO 11990, Protection of Wetlands, applies to private lands and would also promote the stability of wetland acreage.

Alternative B would not contribute to the achievement any of the objectives listed in Section 1.3 and would result in little change to the state's wetlands.

4.3.5 FLOODPLAINS

4.3.5.1 Level of Impact

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used to measure the effects of the alternatives upon floodplains during the environmental review process should include an analysis of the number of acres within the 100-year floodplain enrolled with stabilization CPs implemented and the storage capacity and integrity of restored floodplains.

4.3.5.2 Alternative A – Implementation of Amended CREP

Improvements in floodplain areas and stream profiles would occur under this alternative. CREP funds would be used to increase floodwater storage capacity through wetland restoration, floodplain stabilization, restorative plantings, and installation of structures within existing floodplains. Construction projects may be implemented that would alter floodplain flow, capacity, or other functions. Appropriate FSA oversight would help ensure the proper design and installation of structures, thus limiting adverse effects to flowage areas and minimizing indirect effects to areas outside of the 100-year floodplain. Analysis of the impact on floodplains, per EO 11988, would require the structures to be able to withstand 100-year flood events and remain functioning. These practices would help control flood events and improve floodplain values.

- CP 3A - Peak flows and sediment loads of streams would decrease and reduce the destruction of riparian buffers and the erosion of stream banks during periodic flooding. (Klapproth and Johnson 2000).
- CP21 - Although filter strips reduce the amount of pollutants entering surface waters (Fogle et al 1994), filter strips also provide flood damage protection during major flooding events (Green and Haney 2005).
- CP22 - Riparian buffers associated with river and stream floodplains act as water storage areas that can significantly reduce the height of floods downstream (Anderson and Masters 2005),
- CP23 - Wetland restoration reestablishes native vegetation, reduces downstream flooding by releasing flood waters gradually, and reduces stream bank and shoreline erosion during flooding events, (Gordon 1996).

CPs that involve construction activities, substantial earth movement, diking, or other means of altering the flowage area (i.e., CP23 Wetland Restoration) would need to be reviewed and appropriate public notice provided. Applicable development permits must be obtained from local authorities prior to construction activities within a floodplain. Alternatives would be carefully considered by FSA at the time that site specific environmental review is developed for each CREP contract. The direct impacts of all CPs would be generally positive, result in minor long-term improvements to floodplains and would contribute to achieving CREP objectives discussed in Section 1.3.

4.3.5.3 Alternative B – No Action

Under this alternative, floodplain areas would not change, and stream profiles (a major factor in the determination of floodplain areas) would not change based on Federal actions. Under the No Action alternative, CREP funds would not be available to implement CPs that may have beneficial effects on floodplain conditions, especially the ability of floodplains to store floodwaters. Some construction may occur that would positively or negatively alter floodplain flowage, capacity, or other functions. Without FSA oversight, poor design of structures could affect flowage areas, thereby shifting the floodplain and impacting areas outside the existing 100-year floodplain.

Alternative B would not contribute to the achievement any of the objectives listed in Section 1.3.

4.4 SOIL RESOURCES

4.4.1 LEVEL OF IMPACT

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used to measure the effects of the alternatives upon soil resources during the environmental review process would include the number of acres enrolled, number of acres of soil types susceptible to erosion, and estimated tons of soils lost per year within the proposed CREP area.

4.4.2 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

Implementation of the proposed CPs and the ensuing reduction in erosion and runoff would result in localized stabilization of soils and control of nutrients.

- CP3A - Hardwood tree plantings would help reduce soil erosion, increase infiltration, and trap stream-bound sediments, thus limiting the loss of agricultural soils (Klapproth and Johnson 2000).
- CP21 - By reducing runoff flow velocity, enhancing infiltration of water, sediment and chemicals into the soil, enhancing the adsorption of chemicals onto the vegetation, litter and surface layer of soil, and increasing opportunity for chemical transformation or plant uptake between runoff events (Fogle et al 1994), filter strips would help reduce the amount of nutrients, sediments, and other non-point pollutants that enter the aquatic environment.
- CP22 - Riparian buffers reduce stream bank erosion and slow runoff from upland sites allowing water borne sediments, nutrients and toxicants to settle out (Anderson and Masters 2005).
- CP23 - Wetland restoration reestablishes native vegetation, reduces downstream flooding, reduces stream bank and shoreline erosion, while improving water quality (Gordon 1996).

In pasturelands, exclusion of cattle from streams and riparian areas bordering streams would increase stream bank stability, resulting in reduced rates of and bank erosion and sedimentation and subsequent improvements to soil and water quality (see Section 4.3 for a discussion of surface water quality). Hydric soils would be stabilized and rehabilitated as CRP enrollment criteria requires hydric soils to be present for CP implementation.

Establishing permanent vegetation on former croplands would reduce soil erosion by wind and water. Short-term disturbance to soils could include tilling, or installation of various structures such as fences, breakwaters, and roads that may be necessary in association with the implementation of CPs. These activities may result in temporary, minor increases in soil erosion, particularly prior to the establishment of new vegetation and during heavy rainfall or flooding events.

The potential impacts to soil associated with specific tracts of agricultural land and their suitability for implementation of the conservation practices included in the North Carolina CREP would be evaluated as provided for in Part 10 USDA/FSA *Agriculture Resource Conservation Program* (Handbook 2-CRP).

4.4.3 ALTERNATIVE B – NO ACTION

Under Alternative B, the implementation of the approved CREP CPs would not occur, and continued erosion would be expected to occur, causing continued loss of hydric soils and agricultural soils. Alternative B would not contribute to the achievement any of the objectives listed in Section 1.3.

4.5 RECREATION

4.5.1 LEVEL OF IMPACT

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Indicators used for assessing the effects of the recreation alternatives should include an analysis of the number of impaired stream miles or acres enrolled, and the CPs impact on connectivity of trails as well as the number of users.

4.5.2 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

A large percent of citizens and tourists North Carolina rely on the health of the natural environment to meet their recreational objectives. Alternative A would have the following impacts on recreation:

- Habitat restoration for a variety of terrestrial species as well as threatened and endangered species;
- Improvement to primary nurseries; and
- Improvement to spawning habitat (CTIC 2005).

As discussed in Sections 3.1.1 and 3.1.2, the implementation of Alternative A would have a positive long-term impact on game species of birds, fish and mammals, thereby having positive impact on recreational resources. Installation of the proposed CPs would increase habitat for game bird and mammal species (CTIC 2005). Increased wildlife populations, especially game birds and deer, could enhance the socioeconomic value of agricultural and adjacent lands for hunting, wildlife watching, and other outdoor recreational activities. Although CPs are implemented on private land, practices could provide added aesthetics to trails such as the Mountains to Sea Trail as they follow riparian areas. CPs may also provide opportunity for nature trails in the future as natural corridors are rehabilitated. The quantity of access easements may also enhance trail connectivity and economically benefit producers through tax benefits.

Protected lands such as those discussed in Section 3.9, would benefit from increased water quality as well. Improvements of these natural landmarks and wilderness areas would offer more opportunities for wildlife viewing. However, the expected returns would not be realized until several years after implementation of the proposed CREP because of the time required for development of vegetation and travel corridors.

An increase in water quality would allow for the replenishment of game fish species increasing the popularity and yields of sport fishing. The CPs would increase the desirability of land and surface waters to be used for hiking, boating or camping by improving aesthetics and reducing human health factors as the level of pollutants decrease (see Section 3.6). A short-term negative impact to recreational activities

may occur during the installation of the proposed conservation practices due to unsightly construction activities or displacement of game species.

4.5.3 ALTERNATIVE B – NO ACTION

Under the No Action, recreation and tourism would continue at the current trend. Continued degradation has the potential to negatively impact existing and future growth in the recreation and tourism sector as the possibility for wildlife and habitat impacts increase. Because of the importance of recreation and tourism to the state economy, significant income provided by tourism, recreation, fishing, boating, and other water-related businesses would decrease.

Alternative B would not contribute to the achievement any of the objectives listed in Section 1.3, and may negatively impact recreational opportunities within the study as well as the recreational business sector.

4.6 HUMAN HEALTH AND SAFETY

4.6.1 LEVEL OF IMPACT

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used for assessing the effects of the alternatives on Human Health and Safety during the environmental review process would include an analysis of the number of impaired stream miles or acres enrolled and the reduction of non-point source pollution throughout the proposed CREP area.

4.6.2 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

Untreated waste and agricultural run-off can degrade clean water sources, causing a variety of human health and safety issues ranging from fevers and stomach aches to birth defects and cancer via bacterial, viral and protozoan infections (Edugreen 2005). As mentioned above, the implementation of CPs in Alternative A would likely have a beneficial impact on the quality of water, thus reducing the number of illnesses discussed in Section 3.6 caused by the unhealthy level of nitrogen and phosphorous from fertilizer and pesticides used in agricultural practices, as well as other sources. The implementation of CPs would also reduce162 miles of streams, when fully subscribed, from fecal coliform impairment throughout the project area (See Table 3.8). These improvements under the implementation of Alternative A would contribute to the achievement of the objectives listed in Section 1.3 by reducing the excessive number of pollutants along the 560 impaired stream miles (See Table 3.9).

4.6.3 ALTERNATIVE B – NO ACTION

Agricultural and other point and non-point pollution sources continually degraded water quality through run-off, leaching and dumping. As pollution levels rise, the risk and incidence of human illness increases. Illness can occur in a variety of ways including coming in contact with polluted water, the consumption of water, or the consumption of wildlife that relies on polluted water sources. Manifestations of illness can involve symptoms ranging from skin irritation to serious disease, such as cancer (Edugreen 2005). Under the No Action alternative, runoff from agricultural sources would continue to degrade water quality at

current rates, potentially raising the risk of human illness in affected populations. Alternative B would not contribute to the achievement any of the objectives listed in Section 1.3.

4.7 SOCIOECONOMICS

4.7.1 LEVEL OF IMPACT

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used measure the effects of alternatives on socioeconomics during the environmental review process would include an analysis of non-enrolled and enrolled land values, the amount of cropland taken out of production, the local and state economic impacts from a reduction in harvests and restoration of riparian and wetland resources, and the number of jobs lost due to a reduced number of acres harvested.

4.7.2 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

Though ultimately beneficial, long-term economic effects from CREP implementation would be minimal. The 100,000 acres that would be potentially enrolled represent only 2 percent of the total acres of cropland that are harvested each year in the State. Implementation of Alternative A would likely have the following socioeconomic effects:

The local economic impact due to implementation of CREP would be minimal. The rental rates and land values of North Carolina's acreage would continue to be affected by development values and population density and would not be impacted by Alternative A. Alternative A would not result in changes to total number of North Carolina farms. CREP implementation would not substantially impact the state's economy. Agriculture would continue to contribute roughly the same value to the overall economy.

CREP enrolled lands would provide residual income to enrollees, supporting the overall local economy although possibly at a slightly reduced rate compared to harvest values on the enrolled land. However, this slight reduction, spread across the project area, would have an inconsequential effect on the total economy. North Carolina's state economy would continue to be affected by market forces and would not be impacted by Alternative A. Any trends or cycles evident in the labor market would continue and provide the same number of jobs, with fluctuations due to market conditions and have little to no effect on the agricultural labor market. Implementation of Alternative A has the potential to slightly reduce total agricultural acreage across the state because CREP-enrolled land is removed from production. However, even at full enrollment, CREP would only affect two percent of the state's harvested cropland. Through enrollment, the producer may be able to reduce the overall input costs of farming operations, and in some cases, actually maintain or increase production by being able to concentrate resources on the remaining farmland. These two factors would likely result in minimal to no effects across the state.

With the implementation of CPs, alternative A has the potential to increase opportunities for hunting and fishing in these areas and may lead to localized increases in the sale of hunting and fishing equipment and licenses. Similar effects may occur in other local resource-based recreation industries (e.g., fishing, outfitters). The State Implementation Program under Alternative A offers an additional land preservation program to the state's producers, the benefits of which can be added to those provided by the current

programs. This may slow the future rate of large-scale land use changes in the state (i.e., agricultural land conversion) and the socioeconomic impacts associated with these changes.

Another potential effect is the financial incentive for producers to maintain open space, which may help enhance the value and desirability of surrounding residential and commercial land. Disproportionate effects on minority or underrepresented groups are unlikely, because most CREP agreements are likely to be widely separated by intervening non-CREP land holdings. Alternative A would assist the state in its efforts to meet the CREP objectives outlined in Section 1.3.

4.7.3 ALTERNATIVE B – NO ACTION

Under Alternative B, agricultural practices would continue as they have for years. The degradation of water quality that currently results from agricultural practices, which leads to ancillary impact to wetlands, wildlife, tourism, etc., would continue into the future. Alternative B would not result in any state water quality improvements, unless existing programs are greatly expanded. Implementation of Alternative B would likely have the following effects: The total amount of agricultural production in North Carolina would continue to respond to market forces and the economy of the state. The rental rates and land values of North Carolina acreage would continue to be affected by development values and population density.

The total number of North Carolina farms would continue to respond to market forces and the economy of the state and agriculture would continue to contribute roughly the same value to the overall economy. Any trends or cycles evident in the labor market would continue and provide the same number of jobs, with fluctuations due to market conditions. Alternative B would not offer mechanisms to improve the water quality of North Carolina. Because of the significant income provided by tourism, recreation, fishing, boating, and other water-related businesses, this continued degradation has the potential to negatively impact existing and future growth in the recreation and tourism sector. Alternative B offers no additional land preservation than the current programs offer. This may result in continued land use changes in the state (i.e., agricultural land conversion) and the socioeconomic impacts associated with these changes would continue.

4.8 ENVIRONMENTAL JUSTICE

4.8.1 LEVEL OF IMPACT

Site specific environmental reviews would be completed for each CREP contract and would tier to this PEA. Specific indicators used measure the effects of alternatives on environmental justice issues would include the number of displaced minority or disadvantaged farm workers and number of affected minority producers.

4.8.2 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

There would likely be no displacement of migrant farm workers. Agricultural production would continue to respond to market forces and the economy of the state and not be significantly impacted by Alternative A. There is a possibility for a slight beneficial effect to farm incomes from the steady and guaranteed receipt of CREP funds by enrolled producers. As discussed above, producers are more likely to enroll

marginally productive lands and the residual income from CREP may result in slightly more or at least consistent income than the acreage was capable of producing as farmland. These values, if they occur, would not have a significant impact across the state.

4.8.2 ALTERNATIVE B – NO ACTION

The total number of North Carolina farms would continue to respond to market forces and the economy of the state and agriculture would continue to contribute roughly the same value to the overall economy. Any trends or cycles evident in the labor market would continue and provide the same level and quality of employment. Alternative B also offers no additional land preservation opportunities other than what current programs offer. This may result in continued land use changes in the state (i.e., agricultural land conversion) thus impacting the number of employment opportunities associated with agricultural practices.

4.9 NATIONAL NATURAL LANDMARKS, WILDERNESS, AND WILDLIFE REFUGES

4.9.1 LEVEL OF IMPACT

Site specific environmental reviews would be completed for CREP contracts and would tier to this PEA. Specific indicators used to measure the effects of alternatives on these resources would include the quality of water resources and habitat within and around these protected resources.

4.9.2 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

Although implementation of CPs would not occur directly on federally and state protected lands, the beneficial impacts from the implementation of CPs throughout the project area including, improved and additional habitat and improved water quality would impact protected resources adjacent to or within the same watershed as enrolled lands.

Currently there are 19 federally and state protected areas within the proposed CREP area (see Section 3.8 for list of protected lands). These areas are protected for their aesthetic, biological, and recreational characteristics and values. Not only do these areas provide important habitat for wildlife, including protected species and migratory birds and shore birds, but they are also an important asset to the regional and state economies.

Alternative A would assist the state in their efforts to meet the CREP objectives outlined in Section 1.3.

4.9.3 ALTERNATIVE B – NO ACTION

The implementation of the No Action alternative would allow the health of the watershed and habitat to continually degrade, impacting all wildlife and fish species that live within the project area, including the 19 federally and state protected lands. Under the No Action alternative, long-term adverse effects would continue. Wildlife terrestrial habitat would not benefit from the leveraged effects of habitat restoration

and watershed improvement CPs and may continue to decline. This alternative would negate cumulative effect for ecosystem protection afforded by the implementation of CREP. Selection of Alternative B would not contribute to the achievement of any of the objectives cited in Section 1.3.

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CHAPTER 5.0 CUMULATIVE EFFECTS

5.1 INTRODUCTION

CEQ regulations stipulate that the cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present and reasonably foreseeable actions regardless of what agency or person undertakes such other actions." CEQ guidance in considering cumulative effects affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the proposed action. The scope must consider geographic and temporal overlaps among the proposed action and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects most likely arise when a relationship exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping relationship than those more geographically separated. Similarly, actions that coincide, even partially, in time tend to have potential for cumulative effects. For the purposes of this analysis, the goals and plans of Federal programs designed to mitigate the risks of degradation of natural resources are the primary sources of information used in identifying past, present, and reasonably foreseeable actions.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

In addition to CRP and the regional CREP, NRCS maintains and implements numerous programs in the State of North Carolina to conserve and enhance natural resources. These programs include, but are not limited to, the Wildlife Habitat Incentives Program, Grassland Reserve Program, Environmental Quality Incentives Program, Farm and Ranchlands Protection Program, and the Wetlands Reserve Program.

The Wildlife Habitat Incentives Program (WHIP) offers opportunities to private producers to improve and protect wildlife habitat. Through the program, NRCS provides technical and financial assistance to producers to develop upland, wetland, riparian, and aquatic habitat areas on their property. Cost sharing reimburses up to 75 percent of costs, with an emphasis in aiding in the recovery of all threatened and endangered species and restoring habitat.

The Grassland Reserve Program (GRP) helps producers and operators restore and protect grassland, including rangeland and pastureland, while maintaining grazing operations. The program offers 10, 15, 20, 30 year and permanent easement options with varying financial assistance for implementing conservation practices that emphasize support for grazing operations, plant and animal biodiversity, and pasture and hay land under the greatest threat of conversion. Offers for enrollment must contain at least 10 contiguous acres. Nationwide, the goal is to preserve 2 million acres.

The Environmental Quality Incentives Program (EQIP) provides technical, financial, and educational assistance for producers engaged in agricultural production to implement conservation practices. Program activities are carried out according to an environmental quality incentives program plan of operations. The plan of operations is developed in conjunction with the producer that identifies the appropriate conservation practice to address the resource concerns. NRCS may cost-share up to 75 percent of the costs of conservation practices.

The Farm and Ranch Lands Protection Program (FRPP) protects working agricultural land from conversion to nonagricultural uses. The program provides matching funds to State and local governments and nongovernmental organizations with farm and ranch land protection programs to purchase permanent conservation easements. Within the proposed CREP area, the Forsyth County FPP has provided $331,144 to protect 343 acres. Since 1987, nearly $3 million of Forsyth County funds have been issued to buy or lease development rights on 1,605 acres of farmland. To date, 27 farms have enrolled in the program with county expenditures at approximately $2.5 million.

The Wetlands Reserve Program (WRP) is an environmentally beneficial and cost-effective program allowing producers to receive financial incentives for the restoration, protection and enhancement of wetlands in exchange for retiring marginal land from agriculture. The program allows producers to participate in 10 year restoration agreements, as well as 30 year and permanent easement programs. As of 2002, the North Carolina WRP enrolled 20,000 acres of marginal farmland.

The North Carolina Division of Water Quality manages the State Storm Water Management Program. The program requires developments to protect sensitive waters by maintaining a low density of impervious surfaces, maintain vegetative buffers, and transporting runoff through vegetative conveyances. If low density design criteria cannot be met, then high density development requires the installation of structural best management practices (BMPs) to collect and treat stormwater runoff from the project.

The Neuse River Nutrient Sensitive Waters Management Strategy established the goal of reducing the annual average load of nitrogen delivered to the Neuse River Estuary from point and non-point sources by an average of 30 percent. This rule also requires the 15 largest local governments within the Neuse River Basin to reduce their runoff by 30 percent.

The North Carolina SHPO, with State and Federal funding, has sponsored, reviewed, or provided assistance on projects to identify, preserve, or restore historic properties.. Certified Local Governments also may carry out some cultural resource related projects with funds from the Federal Historic Preservation Fund. Such projects are typically limited to surveys unrelated to development projects or the preparation of nominations of properties for the National Register of Historic Places, and are not carried out on a regular basis. Additionally, the North Carolina General Assembly may make one-time authorizations of funds for historic property inventories, reports, and National Register of Historic Places nominations, but this is not done on a regular basis. Local governments and organizations may apply for and receive Federal grants of matching funds for historic property surveys, reports, or other activities, but these are not awarded on a regular basis. Although all of these activities are dependent on the availability of funds, and their frequency and size vary from year to year, they comprise the existing activities to which the North Carolina CREP alternatives effects on cultural resources can be compared.

The Conservation Trust for North Carolina protects land and water resources through protection efforts with willing landowners and assistance to the state’s network of 23 local and regional land trusts.

5.3 CUMULATIVE EFFECTS

5.3.1 ALTERNATIVE A – IMPLEMENTATION OF AMENDED CREP

Working in conjunction with existing State and Federal programs, including those listed in Section 5.2, CREP implementation would contribute to the cumulative improvement of the State's water quality. Likewise, the enhancement of wildlife habitat across CREP watersheds would add to the State's resources and provide additional protection for listed State and Federal species. Wetlands, groundwater, aquatic resources, wildlife, cultural resources, etc. would all benefit from the cumulative effects of protection and enhancement that CREP would provide in conjunction with other conservation efforts being implemented at both the State and Federal level. Alternative A of the North Carolina CREP would provide the necessity and the funding for the identification, documentation, and preservation of historic properties that would complement and expand upon the existing efforts of the North Carolina Division of State History and Certified Local Governments.

5.3.2 ALTERNATIVE B – NO ACTION

Existing State and Federal programs would strive to collectively have a positive impact on the State's water resources and the ancillary benefits that come from clean water. However, without CREP, a powerful tool in improving water quality, the current iterations of these programs would continue to be only as effective as they have in the past at improving statewide water quality. Implementation of Alternative B would result the continuation of current observable trends in non-point source pollution and resource degradation and the cumulative effects that accompany these problems.

The lack of Federal or state involvement through the North Carolina CREP would result in no addition to or enhancement of the efforts by the North Carolina SHPO and Certified Local Governments to identify, document, and preserve cultural resources. The No Action alternative would result in no additional cause to assess cultural resources, and no additional funding to do so.

5.3.3 CUMULATIVE EFFECTS MATRIX

Table 5.1. Cumulative Effects Matrix

	Alternative A Proposed Action	Alternative B No Action
Wildlife and Fisheries	Current Federal conservation programs such as the WHIP would continue to improve the quality of North Carolina's wildlife and fisheries through the development and restoration of wetland and riparian areas. The implementation of CREP would further enhance these habitat restoration efforts.	Incremental benefits that would accrue to state wildlife and fisheries with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.
Threatened and Endangered Species	Current Federal conservation programs such as the WHIP would continue to improve the quality of North Carolina's wildlife and fisheries through the development and restoration of wetland and riparian areas. The implementation of CREP would further enhance these habitat restoration efforts.	Incremental benefits that would accrue to state wildlife and fisheries with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.
Cultural Resources	With State and Federal Funding, the North Carolina SHPO would work with state and local governments to identify, document, and preserve historic properties The implementation of CREP would expand upon and add to that work, raising the number of cultural resources assessments throughout North Carolina.	The lack of Federal or state involvement via CREP implementation means that no additional historic properties assessments would be carried out.
Surface Water	All of the current Federal conservation programs mentioned above would continue to improve the quality of North Carolina's surface water through the implementation of conservation practices and the preservation of agricultural land. The implementation of CREP would further enhance riparian and wetland restoration efforts, raising overall state water quality.	Incremental benefits that would accrue to state surface water resources with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.
Ground Water	As the Federal conservation programs mentioned above continue to improve quality of surface water in the State, North Carolina's groundwater supplies would improve as well through aquifer recharge. The implementation of CREP would further enhance riparian and wetland restoration efforts, improving the quality of groundwater	Incremental benefits that would accrue to state groundwater resources with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.
Floodplains	CREP working in conjunction with current Federal conservation programs mentioned above would continue to improve upland, wetland and riparian areas and to reduce erosion/sedimentation and property loss.	Incremental benefits that would accrue to 100-year floodplains with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.

Table 5.1. Cumulative Effects Matrix

	Alternative A Proposed Action	**Alternative B No Action**
Wetlands	The Wetlands Reserve Program (WRP) as well as the other Current Federal conservation programs mentioned above would continue to enhance the quality and number of wetlands in North Carolina. The implementation of CREP would further enhance wetland restoration efforts, increasing water quality, habitat for fish and wildlife and protected species, and floodwater retention.	Incremental benefits that would accrue to state wetlands with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.
Recreation	Current Federal conservation programs mentioned above would continue to improve the State's outdoor recreation industry through continued habitat and water quality restoration efforts. The implementation of CREP would further enhance recreational opportunities through the cumulative improvements to habitat, natural areas, watchable wildlife, and water quality throughout the proposed CREP area.	Incremental benefits that would accrue to state recreational opportunities with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.
Health and Human Safety	Current Federal conservation programs mentioned above would continue to reduce the level of non-point pollutants entering water resources, thus reducing the number of health related issues caused by a degraded water system. Implementing CREP would only enhance these efforts.	Incremental benefits that would accrue to health and human safety with implementation of CREP CPs would not occur; however, risk reduction efforts related to other conservation programs would continue.
Socioeconomics and Environmental Justice	No cumulative impacts have been identified.	No cumulative impacts have been identified.
Protected Lands	The current Federal conservation programs mentioned above would continue to improve water quality and habitat for fish and wildlife including TES, thus improving the quality of public lands and user experience in the proposed CREP area. The implementation of CREP would enhance these efforts, further enhancing the utility of these public lands.	Incremental benefits that would accrue to Federal and State protected lands with implementation of CREP CPs would not occur; however, restoration efforts would continue under other conservation programs.

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CHAPTER 6.0 MITIGATION MEASURES

6.1 ROLES AND RESPONSIBILITIES

Farm Service Agency, USDA – The Farm Service Agency would oversee proper implementation of CREP and coordination with State Incentive Program to minimize impacts on natural resources stemming from the implementation of CPs on a site specific basis.

Natural Resources Conservation Service, USDA –NRCS would assist producers and provide technical information in the implementation of CPs. Works onsite to provide FSA with technical assistance which includes assistance in completing the site specific environmental reviews.

United States Fish and Wildlife Service, DOI – The FWS is responsible for the administration of the Endangered Species Act and ensuring that Federal actions do not jeopardize or destroy threatened or endangered species.

North Carolina State Historic Preservation Office (SHPO) – The SHPO would consult and review actions potentially affecting impacting historic properties in the State.

6.2 MITIGATION

Mitigation measures would be decided on a site specific basis. Avoiding or minimizing the possible impacts to natural resources stemming from the implementation of CREP CPs is a key component to the success of CREP. Before CREP is implemented a site specific environmental review must be conducted on all lands as a condition of CREP contract approval. As a part of the site specific environmental review process, coordination of specific actions and consultation with the appropriate agencies would be conducted to reduce or eliminate the incidence or risk to the specific resources identified in the environmental review. To minimize impacts efforts would include consultation with the North Carolina SHPO to identify historic properties and with FWS to identify T&E and critical habitat needs.

Specific mitigation measures could include but are not limited to:

- Spatial or temporal boundaries around active raptor nests;
- Limited human disturbance during waterfowl presence;
- Periodic or rotational harvest of riparian buffers to restore productivity
- The avoidance of existing riparian vegetation during construction/implementation of CPs;
- Silt fencing to reduce stream sedimentation;
- Timely reseeding/revegetation after major flood events; and
- Strict enforcement of proper uses of herbicides, pesticides, fertilizers in the implementation of CPs.

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CHAPTER 7.0 LIST OF PREPARERS

Table 7.1. List of Preparers

Name	Organization	Education	Years of Experience
James Fortner	USDA/FSA/CEPD	B.S. Agricultural and Extension Education	20
Jason Green	SWCA	B.S. Anthropology; B.S. Urban Planning	3
Janet Guinn	SWCA	B.S. Psychology and Anthropology	5
Thomas Hale	SWCA	B.L.A., M.L.A., Landscape Architecture; M.S. Natural Resource Management	15
Tim Jones	USDA/FSA	B.S. Industrial Relations	23
Tom King	SWCA	Ph.D. Anthropology	37
Kristin Knippenberg	SWCA	M.F.A., Creative Writing	7
George Pless	USDA/FSA	B.S. Animal Science	23
Mathew Ponish	USDA/FSA/CEPD	B.S. Wildlife/Fisheries Biology & Management	7
Kathleen Schammel	USDA/FSA/CEPD	B.A. Anthropology; M.A. Anthropology	19
Heather Stettler	SWCA	Ph.D. Anthropology	7

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CHAPTER 8.0 PERSONS AND AGENCIES CONTACTED

Table 8.1. Federal Agencies Contacted

Federal Agencies
National Wetlands Inventory, FWS
Farm Service Agency, USDA
NRCS, USDA
USDA
National Oceanic and Atmospheric Administration, National Marines Fisheries Service, USDC
Federal Emergency Management Agency

Table 8.2. State Agencies Contacted

State Agencies
North Carolina State Historic Preservation Office
Division of Parks and Recreation, NCDENR
North Carolina Floodplain Mapping Program

Table 8.3. Organizations Contacted

Organizations Contacted
The Nature Conservancy

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CHAPTER 9.0 GLOSSARY

Aquifer: A geologic formation that is water bearing. A geological formation or structure that stores and/or transmits water, such as to wells and springs. Use of the term is usually restricted to those water-bearing formations capable of yielding water in sufficient quantity to constitute a usable supply for people's uses.

Categorical Exclusions: An agency-defined category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by the agency pursuant to NEPA. Projects qualifying for a "categorical exclusion" are not required to undergo additional NEPA analysis or documentation.

Conservation Practices: A series of NRCS approved agricultural practices and management techniques designed to control nonpoint pollution.

Environmental Assessment: A concise public document, prepared in compliance with NEPA, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (FONSI).

Environmental Impact Statement: A detailed written statement required by section 102(2)(C) of NEPA, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources. A *programmatic* EIS or EA: covers general matters in broader terms and analyzes conceptual or planning alternatives. In such cases, at least one more level of site specific NEPA analysis is necessary before implementation can proceed.

Erosion: A geomorphic process that describes the wearing away of the land surface by wind, water, ice or other geologic agents. Erosion occurs naturally from weather or runoff but is often intensified by human land use practices.

Estuary: A partially enclosed body of water formed where freshwater from rivers and streams flows into the ocean, mixing with the salty sea water. Provides an important habitat for fish and wildlife.

Eutrophication: The natural and artificial addition of nitrogen and phosphorous (nutrients) to bodies of water, increasing algal growth. As the algae die, the decomposing microorganisms consume dissolved oxygen in the water, reducing the amount available to fish and other aquatic organisms. Ultimately, this can result in a dead lake or pond: a system where no larger aquatic organisms can survive.

Exotic species: A species occurring in an area outside of its historically known natural range as a result of intentional or accidental dispersal by human activities. Also known as an *introduced species*.

Groundwater: The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

Groundwater Recharge: Refers to water entering and replenishing an underground aquifer through faults, fractures, or direct absorption.

Hydric soils: Soil that, in its undrained state, is flooded long enough during a growing season to develop anaerobic (lacking air – saturated) conditions that support the growth and regeneration of hydrophytic vegetation.

Hydrophytic vegetation: Plants specialized to grow in water or in soil too waterlogged for most plants to survive.

Listed species: Under the Endangered Species Act, or similar State statute, those species officially designated as threatened or endangered through all or a significant portion of their range. See also: *Threatened and endangered species*.

Nonpoint source (pollution): Cause of water pollution that is not associated with point (fixed) sources. Nonpoint sources include runoff from agricultural, urban, construction, and mining sites, as well as septic systems and landfills.

Nutrients: Chemical compounds in a usable form and have nutritive value for plants and/or animals.

Riparian: Refers to a stream and all the vegetation on its banks.

Sediment loading: Describes the excessive inputs of sediment into a waterbody.

Siltation: The deposition of finely divided soil and rock particles upon the bottom of stream and river beds and reservoirs.

Stormwater runoff: Water from precipitation that runs straight off the ground without first soaking into it. It does not infiltrate into the ground or evaporate due to impervious land surfaces, but instead flows onto adjacent land or water areas.

Threatened and endangered species: Under the Endangered Species Act, those species officially designated by the National Marine Fisheries Service or U.S. Fish and Wildlife Service as being in danger of extinction (i.e., endangered) or likely to become endangered (i.e., threatened) within the foreseeable future through all or a significant portion of their range. Threatened and endangered species are protected by law. See also: *Listed species*.

Traditional Cultural Properties: Places that are eligible for inclusion in the National Register of Historic Places because of their "association with cultural practices or beliefs of a living community that

are rooted in that community's history and are important in maintaining the continuing cultural identity of the community."

Watershed: 1.) Describes a cohesive, hydrologically-linked landscape that is drained by a waterway leading to a lake or reservoir. 2.) A geographic area delineated by its peaks and ridgelines, which divide surface water flow into two or more directions.

Wild and Scenic Rivers: Congress created the National Wild and Scenic Rivers System in October of 1968, pronouncing that "*certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations*."

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