Natural Environment

This section discusses the natural resources in the environment, including farmlands, uplands, wetlands, invasive plant species, wildlife, protected species, water resources, floodplains, and uniformly affected resources. It also discusses how the Preferred and No-build Alternatives may impact each resource, and what permits would be necessary to construct the Preferred Alternative.

3.10 FARMLANDS

3.10.1 Why is farmland an important consideration?

South Carolina has a long history of farming and agricultural significance, especially within the project study area. Drawn by its abundant resources, this area was first settled by Native Americans who were later followed by English settlers who traveled inland from the Carolina Coast.[62] In Horry County, pine trees supported an industry centered on the production of tar, turpentine, and rosin from 1830 until the beginning of the twentieth century. The timber and turpentine industry were replaced by the tobacco industry which was initiated in this region in the 1890's. The project study area was known as a successful tobacco-growing region; however, due to new federal legislation limiting the amount of tobacco farmers can produce, other crops are now being grown.

Farming in South Carolina produces crops valued at over $1.5 billion annually. Dillon, Horry, and Marion Counties produce crops valued over $147.9 million, representing 10 percent of South Carolina's overall crop value.[63] Based on acreage, the top five crops grown in the three counties are soybeans, cotton, wheat for grain, corn for grain, and tobacco (refer to Table 3.34). Hog and poultry farming, along with producing landscape flowers and plants, are also important elements of South Carolina's agricultural industry in Dillon, Horry, and Marion Counties.

Table 3.34
Top Five Crops in Dillon, Horry, and Marion Counties in 2002
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

Crops	Dillon County	Horry County	Marion County
Soybeans (acres)	38,770	35,700	18,304
All Cotton (acres)	19,434	--	4,934
Wheat for grain (acres)	20,983	6,777	4,512
Corn for grain (acres)	6,676	13,813	5,028
Tobacco (acres)	2,763	7,636	3,868

Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

[62] Marion County Economic Development Commission, Marion County Profile Webpage, http://www.marioncountysc.com/communityprofile.html (September 24, 2007).
[63] USDA, 2002 Census of Agriculture.

Farmland Protection Policy Act

The *Farmland Protection Policy Act* was passed in 1981 to protect farmlands from conversion to non-agricultural uses by minimizing the impacts that federal programs have on farmlands.

3.10.2 How is farmland protected?

Congress recognized the importance of farmlands and passed the *Farmland Protection Policy Act* in 1981. The purpose of this statute is to prevent the conversion of farmlands to non-agricultural uses by minimizing the impacts that federal agencies have on farmlands. Prior to farmland being used for a federal project, an assessment must be completed to determine if prime, unique, or statewide or locally important farmlands would be converted to non-agricultural uses. If the assessment determines the use of farmland is in excess of the parameters defined by the NRCS, which is an agency of the U.S. Department of Agriculture (USDA), then the federal agency must take measures to minimize the impacts to these farmlands.

3.10.3 What are the different types of protected farmlands?

The NRCS is the lead agency that determines the suitability of farmlands. NRCS characterizes eligible farmland as being "prime", "unique", or of "statewide or local significance". The designations are based on NRCS soil type and are protected by federal legislation.

Protected Farmland Types

There are three different types of farmlands, Prime, Unique, and Statewide or Locally Important.

Prime farmlands are those lands that produce normal crops and require the least amount of inputs (i.e. fertilizer, pesticides, labor).

Unique farmlands are those lands other than prime farmlands used for production of specific high-value food or fiber crops such as nuts, fruits, or vegetables.

Statewide or Locally Important farmlands are those lands designated by state or local agencies as important for the production of crops in the area.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, or oil-seed and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor without intolerable soil erosion (7 U.S.C. §4201(c)(1)(A)). Prime farmland includes land that possesses the above characteristics and may include land currently used as cropland, pastureland, rangeland, or forestland. Prime farmland does not include land already in or committed to urban development or water storage.

Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops (7 U.S.C. §4201(c)(1)(B)). It has the special combination of soil quality, location, growing season, and moisture supply needed for acceptable farming methods to economically produce high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include lentils, nuts, annually cropped white wheat, cranberries, citrus and other fruits, olives, and vegetables.

Statewide or locally important farmland is land that has been designated of state or local importance for the production of food, feed, fiber, forage, or oil-seed crops, but is not of national significance (7 U.S.C. §4201(c)(1)(C)).

3.10.4 What are the types and amounts of farmland in the project study area?

The project study area represents 942,000 acres of Dillon, Horry and Marion Counties. The project study area consists of 225,915 acres of prime farmland and 293,676 acres of farmland of statewide importance.[64] No unique farmland soils exist in the project study area.

Within the portion of the project study area located in Dillon County, there are 11 soil types that have been designated as prime farmland and 15 soil types designated as farmland of statewide importance by the NRCS. These 26 soil types comprise approximately 191,117 acres, which equals 74 percent of Dillon County's total land area (refer to Table 3.35).

Table 3.35
Summary of Prime and Farmland of Statewide Importance Soils
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	Project Study Area	Dillon County	Horry County	Marion County
Prime Farmland (acres)	225,915	83,251	219,785	58,741
Farmland of Statewide Importance (acres)	293,676	107,866	252,679	131,899

Source: GIS data from NRCS, 2006

In Horry County, within the project study area, there are 12 soil types designated as prime farmland and 11 soil types designated as farmland of statewide importance by the NRCS. These 23 soil types comprise approximately 472,464 acres, which is 65 percent of Horry County's total land area (refer to Tables 3.36 and 3.37, pages 3-129 and 3-130, respectively).

In Marion County, within the project study area, there are 12 soil types designated as prime farmland and 12 soil types designated as farmland of statewide importance. These 24 soil types comprise approximately 190,640 acres, which is 61 percent of Marion County's total land area (refer to Tables 3.36 and 3.37, pages 3-129 and 3-130, respectively). A list of prime and statewide important soils found within the project study area is listed, by county, in Tables 3.36 and 3.37 (refer to pages 3-129 and 3-130, respectively).

3.10.5 What are the typical farm sizes in Dillon, Horry, and Marion Counties?

Data from the USDA's Census of Agriculture is only available at the county level; therefore, Dillon, Horry, and Marion County data is being used to characterize the project study area. Aerial photography specific to the project study area was also used to assess the agricultural land uses.

South Carolina's overall average of total land area in farms is approximately 25 percent. As shown in Table 3.38 (refer to page 3-130), Dillon County has a total land area in farms that is well above South Carolina's overall average, while Horry County has a total land area in farms that is roughly equal to the state's overall average and Marion County has approximately 29.8 percent of its land area in farms, just above the state's average.

[64] NRCS, GIS data, (2006).

Table 3.36
Types of Prime Farmland Soils in Project Study Area, by County
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

Soil Type	Location (by county)		
	Dillon	Horry	Marion
Brogdon	X		X
Cahaba			X
Clarendon	X		
Dothan	X		X
Duplin	X	X	X
Emporia		X	
Enunol		X	X
Faceville	X		
Foreston			X
Goldsboro		X	X
Hiwassee			X
Johns	X		
Lynchburg *	X	X	X
Nankin		X	
Nansemond		X	
Norfolk		X	
Orangeburg	X		
Persanti	X		X
Suffolk		X	
Summerton	X	X	X
Varina	X		X
Yauhannah		X	
Yemassee*		X	

Source: USDA, NRCS Soil Surveys for Dillon, Horry, and Marion Counties
* It is not considered prime farmland in its native state but is considered prime farmland if drained.

The USDA classifies all farms into size groups according to the total land area of the farm. The land area of a farm includes land owned and operated as well as land rented from others. Therefore, land rented was considered part of the tenant's farm and not part of the owner's. In the three-county region, farm size ranges from as small as one acre to over 1,000 acres or more. In 2002, the majority of farms in the three county-region ranged between 50 to 179 acres in size. The trends in the size and number of farms within Dillon, Horry, and Marion Counties from 1992 to 2002 show the number farms in all three counties have decreased between six and 34 percent.

3.10.6 What methodology was used to determine farmland impacts?

Formal consultation with the NRCS for compliance with the *Farmland Protection Policy Act* was completed. An evaluation utilizing the Farmland Impact Conversion Rating Form for Corridor Type Projects form (NRCS-CPA-106) was performed for the Preferred Alternative. The purpose of the farmland conversion impact rating form is to help identify and approximate the amount of farmland conversion that would be associated with the Preferred Alternative.

Table 3.37
Types of Soils of Statewide Importance in Project Study Area, by County
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

Soil Type	Location (by county)		
	Dillon	Horry	Marion
Bladen		X	
Brookeman		X	
Byars	X		X
Cantey	X		X
Chisolm		X	
Coxville	X	X	X
Dunbar	X		X
Fuquay	X		X
Hobcaw		X	
Kenansville	X	X	X
Lucy	X		
Lumbee	X		X
McColl	X		
Meggett		X	
Ogeechee		X	
Pantego	X		X
Pasvile	X		
Paxville			X
Pocalla	X		
Ponzer	X		X
Rains	X		X
Smithboro	X		X
Wahee		X	
Woodington		X	
Yonge		X	

Source: USDA, NRCS Soil Surveys for Dillon, Horry, and Marion Counties

Table 3.38
Total Land Area in Farms, 2002
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	Dillon County	Horry County	Marion County	Three County Area Total
Approximate Land Area (acres)	259,099	725,556	313,000	1,297,655
Land in Farms (acres)	112,262	188,311	93,262	393,835
(% of total area)	(43.3%)	(26.0%)	(29.8%)	(30.3%)
Number of Farms	197	988	213	1,398
Average Size of Farm (acres)	570	191	438	400
Average Value of Land and Buildings (farms), dollars	$768,990	$439,723	$617,759	$608,824

Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Potential impacts to farmlands have been quantitatively assessed for the Preferred Alternative based on the three counties' prime and farmland of statewide importance. The NRCS required that a separate farmland conversion impact rating form be submitted for each county, since each has different ratings for their prime and statewide important soils. As explained previously, no unique farmland is located within the project study area.

3.10.7 How would the Preferred Alternative impact farmlands?

Relative Value Determination

The average size of local farms, amount of prime and statewide important farmlands in the project study area corridor, and percentage of farmland to be converted by the alternatives were used to determine the *relative value* of the farmland to be converted.

Two values, the relative value and the corridor assessment value, were determined. The *relative value* category was completed by the NRCS, on a scale of 0-100, the relative value of farmland to be converted by the Preferred Alternative ranged from 71 to 86 points, depending on county (refer to Table 3.39). The *corridor assessment value* pertains to the use of land, the availability of farm support services, investments in existing farms, and the amount of land that could be rendered non-farmable due to construction of the corridor. The corridor assessment value had a scale of 0-160 points, the Preferred Alternative ranged from 56 in Horry County to 70 in Dillon County. By totaling the relative value and the corridor assessment value, it was determined that the total threshold set by NRCS, 160 points, was not exceeded by the Preferred Alternative in any of the three counties. The total value was 156 points in Dillon County, 127 points in Horry County and 142 points in Marion County. Since the 160-point threshold was not exceeded for any county by the Preferred Alternative, mitigation actions would not be required. Refer to Appendix H for the Farmland Impact Conversion Rating Forms for Corridor Type Projects form (NRCS-CPA-106).

Table 3.39
Relative and Corridor Assessment Values for the Preferred Alternative
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	Dillon	Horry	Marion
Relative Value	86	71	76
Corridor Assessment Value	70	56	66

Construction of the Preferred Alternative would result in the direct conversion of 1,915 acres of prime and statewide important farmland soils to a transportation facility (refer to Table 3.40). Within the project study area, 55 percent of the land is comprised of prime farmland or farmland of statewide importance. The conversion of farmland to right-of-way due to the construction of the interstate would convert 0.003 percent of the total agriculture land and would not be detrimental to the agricultural activities in the project study area.

Table 3.40
Impacts to Prime and Statewide Important Farmland Soils
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	Total Farmland (acres)	Dillon		Horry		Marion	
		Prime (acres)	Statewide Important (acres)	Prime (acres)	Statewide Important (acres)	Prime (acres)	Statewide Important (acres)
Preferred Alternative	1,915	373	283	362	136	451	310

The Preferred Alternative would also result in other impacts, such as divided farm parcels. If farm buildings or lands were divided from farming operations and access could not be provided, a loss may result. If access is affected, the farm operator may experience increased time and expense in order to conduct normal farming operations. The increased expense could include the need to transfer equipment, feed, and livestock between the divided parts of the farm.

Divided Farm Parcel

A "divided" farm parcel is an area divided either diagonally or laterally by the proposed right-of-way, thus dividing a single area of land into two or more plots.

Cropland parcels obtained from the USDA's Farm Service Agency (FSA) that could potentially be divided by the Preferred Alternative were identified. Given that the farm size in the project study area ranges from one acre to over 1,000 acres, it was determined that no parcel would be too small to farm. For every parcel that the Preferred Alternative traversed, three areas were calculated: the area within the 400-foot corridor and the two areas remaining on either side of the corridor. The area within the 400-foot corridor was calculated as a direct impact. It is assumed that the parcels divided by the Preferred Alternative could be acquired by a neighboring farm, so the land, even though it may be split, may not be removed from active production. The Preferred Alternative would have a total of 159 acres of direct impact to cropland, with 40 acres in Dillon County, 58 acres in Horry County, and 61 acres in Marion County (refer to Table 3.41).

Table 3.41
Divided Farmland Parcels in the Project Study Area
Interstate73 FEIS: I-95 to the Myrtle Beach Region

	Total (acres)	Dillon County (acres)	Horry County (acres)	Marion County (acres)
Preferred Alternative	159	40	58	61

In addition to identifying the impacts to parcels of cropland being farmed, the number of individual farms that would be impacted by the Preferred Alternative was evaluated. Since the identification of active farms along the Preferred Alternative presented several challenges, including changes to active farm tracts as crops are rotated and changes in ownership or land leases, tax parcel data was used to determine the number of individual farms potentially impacted.

Impacts to the number of farms were calculated with the use of GIS. Spatial data layers containing acreages of land currently being used as cropland were overlaid on the tax parcel data along the Preferred Alternative. The acreages of cropland parcels that fell within individual tax parcels were identified, combined, and calculated to create an individual farm. Along the Preferred Alternative, farm size ranges from 0.10 acre to 588 acres. A total of 280 farms would be impacted along the Preferred Alternative, and of those, 116 would be divided by the Preferred Alternative.

Overall, farming operations would be directly impacted from the construction of the proposed project. No farmlands, besides those directly acquired for right-of-way, would be rendered un-farmable. Access issues to divided farms/parcels will be evaluated and addressed during the right-of-way acquisition process.

3.10.8 What would be the potential indirect and cumulative impacts to farmlands?

Impacts from induced development and cumulative impacts were calculated with the use of GIS. Acreages of projected growth as a result of the Preferred Alternative (which were determined in the land use modeling, refer to Section 3.1, page 3-1) were compared to the NRCS soils data within the project study area. The acreages of projected growth that overlapped areas with prime farmlands or farmlands of statewide importance were identified and calculated.

3.10.8.1 What would be the potential impacts from induced development on farmlands?

In addition to the indirect impacts assessed on the Farmland Impact Conversion Rating Form for Corridor Type Projects (NRCS-CPA-106), impacts from induced development from the Preferred Alternative would be anticipated to result in 1,014 acres of additional development that would occur on lands that contain prime or statewide important farmland soils, with 90 acres occurring in Dillon County, 500 acres in Horry County, and 424 acres in Marion County (refer to Table 3.42).

3.10.8.2 What would be the potential cumulative impacts on farmlands?

Cumulative effects on farmland are caused by the aggregate of past, present, and reasonably foreseeable future actions. Cumulative impacts to farmlands would include development in the project study area that is expected to occur under No-build conditions, in addition to development that is expected to result from this and other projects. The No-build Alternative is expected to impact approximately 20,426 acres of farmlands, due to anticipated development in each county and the proposed 17,000 acres of development in Marion County (refer to Table 3.42). With the addition of direct and indirect impacts from the Preferred Alternative (1,915 acres and 1,014 acres, respectively), it is expected that 23,355 acres of prime or statewide farmland soils would be impacted.

Table 3.42
Indirect and Cumulative Impacts to Prime and Statewide Important Farmland Soils in the Project Study Area by the Preferred Alternative
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

		No-build Alternative (in acres)	Direct Impacts (in acres)	Indirect Impacts (in acres)	Cumulative Impacts (in acres)
Dillon County	Prime	28	373	43	444
	Statewide Important	20	283	47	350
	COUNTY TOTAL	48	656	90	794
Horry County	Prime	3,373	451	336	4,160
	Statewide Important	1,309	310	164	1,783
	COUNTY TOTAL	4,682	761	500	5,943
Marion County	Prime	3,179	362	230	3,771
	Statewide Important	12,523	136	194	12,853
	COUNTY TOTAL	15,702	498	424	16,624
Project Study Area Total	Prime	6,574	1,186	609	8,369
	Statewide Important	13,852	729	405	14,986
	OVERALL TOTAL	20,426	1,915	1,014	23,355

In addition to projected growth and land use changes, other transportation projects in the project study area contribute to the cumulative impacts on farmlands. In 2000, construction of the Conway Bypass from U.S. Route 501 in Conway to U.S. Route 17 in North Myrtle Beach was completed. The Conway Bypass was 28.5 miles of new location roadway and its construction impacted farmlands directly and/or by bisecting parcels, which is likely to have created access problems for some farm owners. The widening of S.C. Route 38 from I-95 to Marion is currently under construction. Upon completion, this project will widen an existing route from two to four lanes, which could have impacted minor amounts of farmlands adjacent to the road.

Two proposed transportation projects within the vicinity of the project study area include the Southern Evacuation Life Line (SELL) project and Interstate 73: from I-95 to I-74 in North Carolina. The SELL project proposes a new roadway that would begin at the Conway Bypass near U.S. Route 501, travel through Horry County, and terminate either at S.C. Route 544 or at the U.S. Route 17 Bypass. Alternatives are being evaluated for this project at this time and a Preferred Alternative is anticipated in

spring 2008. Potential farmland impacts of the SELL Project are not know at this time. Interstate 73: from I-95 to I-74 in North Carolina proposes a new interstate on new location that would begin at I-95, travel though Dillon and Marlboro County, South Carolina, and terminate at I-74 in Richmond County, North Carolina. The Draft EIS completed on July 19, 2007, stated that the Preferred Alternative would impact 1,505 acres of prime (805 acres) and statewide important (700 acres) farmlands. The Draft EIS also indicated that the Preferred Alternative for this project would be anticipated to cumulatively impact 2,446 acres of lands with prime and statewide important soils.

3.10.9 What Federal/USDA farmland programs are active or found in the project study area and how would they be impacted by the Preferred Alternative?

In addition to prime, unique, and statewide or locally important farmlands, the NRCS has developed other programs for farmlands that provide incentive for landowners to protect, enhance, or conserve their properties. Below are the different types of programs being used in the project study area (refer to Figure 3-28). Table 3.43 lists the amount of acreage for each program within the project study area.

Table 3.43
Land Enrolled in Federal Conservation Programs
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	Dillon County	Horry County	Marion County
Conservation Reserve Program (acres)	3,083	7,374	1,720
Farm and Ranch Lands Protection Program (acres)	74	698	1,046
Wetland Reserve Program (acres)	409	1,660	2,361

Source: USDA, NRCS South Carolina Office

3.10.9.1 Conservation Reserve Program

The Conservation Reserve Program (CRP) was established in 1985 and takes land prone to erosion out of production for 10 to 15 years and devotes it to conservation. In return, farmers receive an annual payment for applying approved conservation practices on the acreage. Under CRP contracts, farmers are compensated for planting permanent covers of grass and trees on land subject to erosion. This vegetation can improve water quality or habitat for wildlife in the area. The FSA administers this voluntary program.

There are over 200 CRP contracts in the project study area (refer to Figure 3-28), and the Preferred Alternative would intersect a total of 28 easements with approximately 33 acres of land being impacted (refer to Table 3.44, page 3-137). Land in the affected contracts that falls outside of the right-of-way for the Preferred Alternative would remain in the program. During right-of-way acquisition, the landowner will be provided an eminent domain notice. Once the FSA receives a copy of this notice,

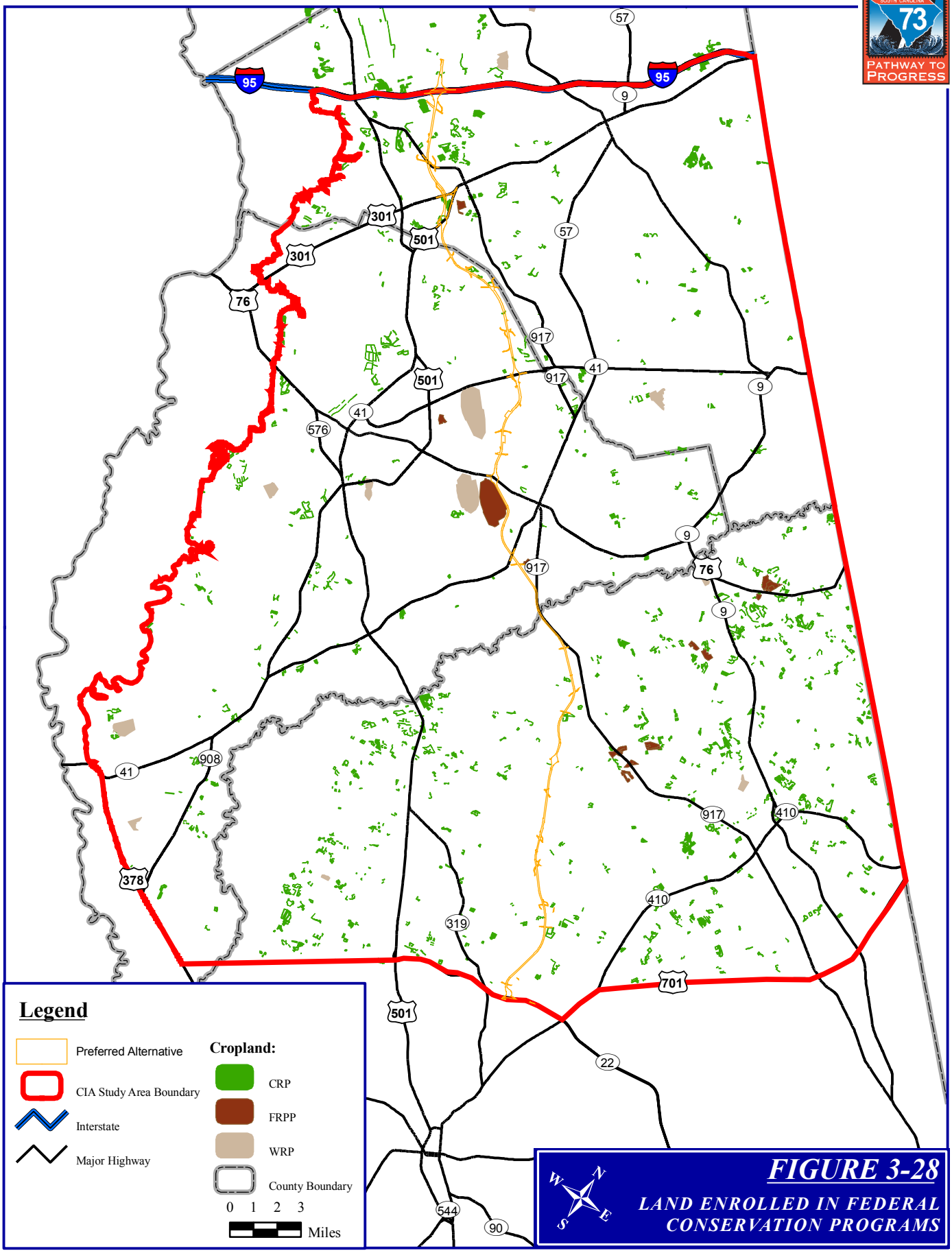

FIGURE 3-28

LAND ENROLLED IN FEDERAL CONSERVATION PROGRAMS

Table 3.44
Conservation Reserve Program Contracts Impacted by the Preferred Alternative
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	Number of contracts impacted	Amount of acres impacted
Dillon County	16	24
Horry County	6	2
Marion County	6	7
Project Study Area Total	**28**	**33**

the current contract with the landowner will be cancelled. FSA will then execute a new contract for the property covered under the old contract that falls outside of the right-of-way for the remaining term of the old contract.

3.10.9.2 Farm and Ranch Lands Protection Program

The FRPP is a voluntary program managed by NRCS that helps farmers and ranchers keep their land in agriculture. Matching funds are provided by the program to State, Tribal, local governments, and non-governmental organizations with existing farm and ranch land protection programs to purchase conservation easements. The FRPP was reauthorized in the Farm Bill to protect working agricultural land from conversion to non-agricultural uses.[65]

Originally, the Preferred Alternative impacted two FRPP sites, one located directly southwest of Mullins at Little Sister Bay, and the other located south of Mullins on SC-34-31 (Old Stage Road). Since the release of the Draft EIS, coordination with the NRCS occurred and the alignment was shifted to avoid both of these FRPP sites (refer to Chapter 2, Section 2.8.2, page 2-72). As a result of this, no FRPP sites would be impacted by the Preferred Alternative.

3.10.9.3 Wetlands Reserve Program

The Wetlands Reserve Program (WRP) is another voluntary program administered by the NRCS, which offers landowners financial incentives to enhance wetlands by retiring marginal agricultural land. To be eligible, land must be restorable and provide significant wetland and wildlife habitat. The program offers landowners three options: restoration cost-share agreements of a minimum 10-year duration, 30-year easements, or permanent easements. Although there is land in the WRP within the project study area, no easements would be impacted by the Preferred Alternative.

[65] Farm Bill, 2002.

3.11 UPLANDS

3.11.1 What are upland communities?

Upland communities generally are lands not characterized by the presence of streams or wetlands. These areas support plant and animal species that are adapted for survival in dry conditions, such as plants that have developed long tap roots to reach deep water tables and burrowing mammals that make their homes underground. South Carolina's coastal plain contains many types of natural upland communities. Each community is characterized by its vegetative composition, landscape position, soil type, and hydrologic regime. To gather baseline data for potential impacts to natural communities, uplands were identified in a 600-foot wide corridor (Preferred Alternative study corridor) along the Preferred Alternative extending from I-95 to S.C. Route 22.

3.11.2 Why are uplands important?

Upland communities can provide a variety of benefits for both the human and natural environments. Based on a review of the aerial photography, vast amounts of land within the project study area are currently used for crop and timber production. Most industrial, commercial, and residential development occurs on uplands, especially since the advent of the Section 404 permitting program. Furthermore, naturally vegetated uplands serve as recreational areas for outdoor activities such as hunting, hiking, camping, bird watching, and nature photography.

While natural, unaltered upland communities are sparsely scattered throughout the project study area, they provide essential habitat for wildlife to nest, raise young, forage, and hide from predators. Forested areas along the major waterways such as the Little Pee Dee River and Lake Swamp provide safe corridors for animal species that move frequently in search of food sources. Continuous or un-fragmented natural corridors are the most beneficial to these mobile species. Upland communities also provide resting and foraging habitat for migratory bird species that move through South Carolina on their way to northern summer nesting areas or southern over-wintering areas.

Forested and other permanently vegetated upland habitats located adjacent to wetlands and streams also provide water quality enhancement. Stormwater runoff from roadways, farm fields, and parking lots flows through these areas before reaching the waterbodies, which helps filter sediments and other pollutants. These vegetated buffer areas also stabilize the soils adjacent to wetlands and streams, reducing the likelihood of erosion that degrades or destroys aquatic species habitat. In addition, shading from forested upland communities along streams allow for cooler water temperatures, which some aquatic species require.

3.11.3 How were upland communities identified in the Preferred Alternative study corridor?

Initially, the SCDNR's Gap Analysis Program (GAP) data and the NWI maps were used to identify the upland community types within the Preferred Alternative study corridor. The 2005 infrared aerial photography was reviewed within a 600-foot wide corridor for the Preferred Alternative and the GAP database was updated based on the current land use conditions depicted. Upland biotic communities identified within the

Preferred Alternative study corridor were classified based on their vegetative composition as described in *The Natural Communities of South Carolina.*[66] The mapping was verified during the wetland and protected species surveys and the GAP data was corrected to correlate the GAP habitat designations with the Nelson habitat descriptions. Changes made to the mapping included updating agricultural fields that were converted to pine plantations or housing developments, changing former pine dominated forests that have transitioned to mixed pine/hardwood forests, updating areas previously identified as wetlands, and revising forested areas that have been clear-cut and are in early successional condition.

GAP Analysis Program

The Gap Analysis Program (GAP) is a nationwide program in which dominant natural vegetation is mapped using satellite imagery, as well as other sources, and native vertebrate species are mapped based on museum and agency collection records. GAP data can be used in conjunction with GIS as a planning tool to identify the distribution of plant communities and animals.

3.11.4 What upland natural community types were identified within the Preferred Alternative study corridor?

During the review of GAP data, NWI maps, aerial photography, and results of the field investigations, the following natural upland communities were identified in the 600-foot wide Preferred Alternative study corridor:

- Mesic mixed hardwood forest;
- Oak-hickory forest;
- Pine flatwoods;
- Pine-scrub oak sandhill; and,
- Xeric sandhill scrub.

Since the project study area has a rich history of agriculture and timber production, only a few upland communities were identified that could be considered natural. In addition, many of the natural communities have been fragmented by agricultural practices and development.

3.11.4.1 Mesic mixed hardwood forest

Mesic mixed hardwood forests are uplands primarily on slopes and ravines in the Piedmont, but also occurring on the Coastal Plain on north-facing river bluffs. The canopy and understory is composed of a rich variety of

Mesic mixed hardwood forest

[66] Nelson, John B., *The Natural Communities of South Carolina: Initial Classification and Description*. (Columbia, SC: S.C. Wildlife & Marine Resources Department Division of Wildlife and Freshwater Fisheries, 1986).

Overstory, Shrub Layer, Herbaceous Layer

The overstory is composed of plants that are mature trees, and are typically the top layer of leafy growth.

The shrub layer and herbaceous layer make up the understory. The shrub layer consists of plants that are small woody species or saplings of larger trees.

The herbaceous layer includes plants that are not made up of woody material, and include herbs and grasses.

hardwoods, and the herbaceous and shrub species are numerous. It may be difficult or impossible to recognize a single dominant species.[67] These forests identified within the Preferred Alternative study corridor during the field investigations were dominated by tulip-poplar (*Liriodendron tulipifera*), sweet-gum (*Liquidambar styraciflua)*, red maple (*Acer rubrum*), tupelo (*Nyssa sylvatica*), and white oak (*Quercus alba*), with the occasional chestnut oak (*Q. michauxii*) and beech (*Fagus grandifolia*). The understory had arrowwood (*Viburnum dentatum*), hornbeam (*Carpinus caroliniana*), American holly (*Ilex opaca)*, horse-sugar or sweetleaf (*Symplocos tinctoria*), red mulberry (*Morus rubra*), and flowering dogwood (*Cornus florida*). The herbaceous layer included partridgeberry (*Mitchella repens*), heartleaf (*Hexastylis arifolia*), and pipsissewa (*Chimaphila maculata*).

3.11.4.2 Oak-hickory forest

Oak-hickory forests are uplands occurring on slopes between rivers and tributaries, and dominated by a canopy of oaks, hickories, and a few other species of hardwoods in combination with pines. It is an abundant community type.[68] Those identified within the Preferred Alternative study corridor during the field investigations were dominated by several oaks: water oak (*Quercus nigra*), willow oak (*Q. phellos*), southern red oak (*Q. falcata*), white oak, and post oak (*Q. stellata*), as well as mockernut (*Carya tomentosa*) and pignut hickory (*C. glabra*). Co-dominants were loblolly pine (*Pinus taeda*), sweet-gum, red maple, and the occasional tulip-poplar, persimmon (*Diospyros virginiana*), and winged elm (*Ulmus alata*). The understory was comprised of sapling canopy species, plus sweetleaf, American holly, eastern red-cedar (*Juniperus virginiana*), flowering dogwood, sweet pepperbush (*Clethra alnifolia*), and black cherry (*Prunus serotina*). Woody vines were common, and included muscadine (*Vitis rotundifolia*), yellow jessamine (*Gelsemium sempervirens*), Virginia creeper (*Parthenocissus quinquefolia*), poison-ivy (*Toxicodendron radicans*), Japanese honeysuckle (*Lonicera japonica*), trumpet-vine (*Campsis radicans*), and Jackson-vine (*Smilax smallii*). The herbaceous layer was sparse, with partridgeberry, ebony spleenwort (*Asplenium platyneuron*), blackberry (*Rubus* spp.), and the occasional pipsissewa and elephant's-foot (*Elephantopus tomentosus*).

Oak-hickory forest

[67] *Ibid.*
[68] *Ibid.*

3.11.4.3 Pine flatwoods

Pine flatwoods

Pine flatwoods are uplands with an essentially flat or rolling terrain, sandy soil, and a high water table. They have a canopy of pines and a well-developed sub-canopy of several tall shrub species. These habitats are successional from the abandonment of cropland, and quickly succeed to deciduous hardwood-dominated forests. If fire is maintained, they frequently grade into pine savannah habitat.[69] Those identified within the Preferred Alternative study corridor during the field investigations were dominated by loblolly pine, water oak, tupelo, red maple, black cherry, and sweet-gum in the canopy or near-canopy layer. The understory consisted of sweetleaf, sparkleberry (*Vaccinium arboreum*), wax-myrtle (*Myrica cerifera*), persimmon, and beauty-berry (*Callicarpa americana*), with the occasional eastern red-cedar, chokeberry (*Aronia arbutifolia*), highbush blueberry (*V. corymbosum*), and sassafras (*Sassafras albidum*). Woody vines included briers (*Smilax rotundifolia, S. bona-nox,* and S. *glauca*), yellow jessamine, muscadine, poison-ivy, and Japanese honeysuckle. The herbaceous layer was dominated by bracken fern (*Pteridium aquilinum*), Silver-leaved-grass (*Heterotheca graminifolia*), and ebony spleenwort. This was the dominant natural upland habitat in the Preferred Alternative study corridor.

3.11.4.4 Pine–scrub oak sandhill

Pine-scrub oak sandhill

Pine-scrub oak sandhills are found in the following topographical areas; on flat or hilly terrain located either on lower slopes of fall-line sandhills, scattered Coastal Plain sand ridges, with relatively high amounts of organic matter, or on higher terrain where moisture occurs. A canopy of longleaf pine occurs with many scrub oaks. Several shrubs that require acidic soils such as rhododendrons and azaleas form the low shrub layer, while the herbaceous layer is dominated by grasses.[70] Communities identified within the Preferred Alternative study corridor are dominated by a canopy of longleaf pine, with an understory almost exclusively of the scrub oak species: blackjack oak (*Quercus marilandica*), bluejack oak (*Q. incana*), post oak (*Q. stellata*), and turkey oak, with the occasional sparkleberry. The shrub layer is restricted to deerberry (*Vaccinium stamineum*), dwarf

[69] *Ibid.*
[70] *Ibid.*

huckleberry, and low-bush blueberry. Vines are scarce, limited primarily to yellow jessamine. The herbaceous layer is dominated by wiregrass (*Aristida stricta*) and broom-sedge (*Andropogon virginica*), but also reindeer moss (*Cladonia* spp.), bracken fern, and the occasional tread-softly (*Cnidoscolus stimulosus*).

3.11.4.5 Xeric sandhill scrub

Xeric sandhill scrubs are uplands in flat or hilly areas of the Fall-line sandhills or Coastal Plain. They usually occur in the driest parts of deep, well-drained sands. The canopy is dominated by longleaf pine (*Pinus palustris*), with turkey oak (*Quercus laevis*) and other shrubby oaks underneath. Additional shrubs and a sparse herbaceous layer are often present. Fire is very important to maintain this community type.[71] Those identified within the Preferred Alternative study corridor during the field investigations were dominated by a canopy of longleaf pine, with an understory almost exclusively of the scrub oak species turkey oak, bluejack oak (*Quercus incana*), blackjack oak (*Q. marilandica*), and scrubby post oak (*Q. margaretta*), with the occasional sparkleberry, sassafras, and persimmon. The shrub layer was restricted to dangleberry (*Gaylussacia frondosa*), deerberry (*Vaccinium stamineum*), dwarf huckleberry (*G. dumosa*), and lowbush blueberry (*V. tenellum*). Vines were scarce, limited primarily to yellow jessamine. The herbaceous layer was dominated by grasses, notably wire grass (*Aristida stricta*) and broomsedge (*Andropogon virginica*), but also reindeer-moss (a lichen, *Cladonia* spp.), bracken fern, and the occasional tread-softly (*Cnidoscolus stimulosus*).

Xeric sandhill scrub

Three upland communities that have been altered from their natural state, and one formerly functioning as a wetland system, were identified in the Preferred Alternative study corridor. These are:

- Agricultural fields;
- Timberlands;
- Disturbed areas; and,
- Drained bottomland hardwoods.

Although timberlands and drained bottomland hardwoods are altered areas, they continue to provide wildlife habitat and recreational opportunities as described earlier. Selective harvesting of trees from forested areas provides openings in the overstory, which allows sunlight to reach the ground. This promotes growth of shrubby and herbaceous plant species, thereby making the forest habitat more diverse, which in turn provides additional nesting and foraging opportunities for wildlife such as small mammals and birds.

[71] *Ibid.*

3.11.4.6 Agricultural fields and timberlands

Agricultural fields and timberlands are not natural communities. However, these upland communities are significant elements within the corridor and therefore are included. Agricultural fields are lands either currently planted with crops or fallow fields that have not yet succeeded to another community type. Timberlands include pine plantations, which are managed primarily for pulpwood. Typically, these areas are planted with loblolly pine or slash pine (*Pinus elliottii*).

Timberland

3.11.4.7 Disturbed areas

Disturbed areas are those lands that have been highly impacted by the activities of man or are built upon for residential or commercial purposes. These include early successional fields/woods, hedgerows/fencerows, pastureland, man-made ditches and ponds, abandoned homesites, maintained lawns, residences, parking lots, vacant lots, industrial yards, and commercial buildings.

3.11.4.8 Drained bottomland hardwoods

A bottomland hardwood is typically defined as a forested wetland area occurring on floodplains and in drainage areas. However, many bottomland hardwoods identified during the field investigations have had their hydrology altered and no longer function as wetlands. Typical tree species include sweetgum, red maple, water oak, laurel oak (*Quercus laurifolia*), and loblolly pine. The shrub layer consists of gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), sweet-bay (*Magnolia virginiana*), red-bay (*Persea borbonia*), and arrowwood.

3.11.5 How would natural upland communities be impacted?

Impacts to upland natural communities would consist of clearing and grubbing of vegetation within the construction limits in preparation of construction of the road. Excavation and/or the placement of fill material would occur to construct the roadbed. The Preferred Alternative would impact a total of 576.5 acres in six forested upland communities. These consist of mesic mixed hardwood forest, oak-hickory forest, pine flatwoods, pine-scrub oak sandhills, xeric sandhill scrub, and timberland. The majority of the upland impacts from the Preferred Alternative would occur to agricultural and developed lands. The portion of forested uplands that would be impacted would consist of approximately 29 percent of the total upland impacts.

Upland community impacts would result in the removal of wildlife habitat as discussed in Section 3.14, (refer to page 3-172). Of the forested uplands that would be impacted, the mesic mixed hardwood forest would support the most wildlife diversity due to the presence of mast producing species, on which animal

species such as turkey, squirrels, and white tailed deer feed. The Preferred Alternative would impact four acres of mesic mixed hardwood forest.

The oak-hickory forest would be the second-most diverse upland community for wildlife. It too harbors oaks and hickories, as well as other tree and shrub species, that serve as food for many species of wildlife. The Preferred Alternative would impact 205 acres of oak-hickory forest.

Pine flatwoods typically have a much-reduced understory compared to the previous two communities, but do provide cover and browse for white tailed deer and other wildlife. These areas also provide nesting and forage habitat for a variety of perching bird species. The Preferred Alternative would impact 70 acres of pine flatwoods.

Pine-scrub oak sandhills and xeric sandhill scrub are the least diverse of the upland habitats from a wildlife standpoint. A few species utilize these habitats for food or shelter, however, particularly in the fall when acorns are plentiful. The Preferred Alternative would impact 29 acres of pine-scrub oak sandhills and xeric sandhill scrub habitat.

The largest portion of the upland forest impacts would occur to timberlands, or managed pine stands, which typically have low wildlife diversity when compared to the other upland types that would be impacted. Also, these forested areas are frequently disturbed by logging operations during which wildlife is displaced to adjoining upland communities. Timberlands could provide foraging habitat for red-cockaded woodpeckers. However, these forests generally are harvested before they reach maturity which is required for suitable red-cockaded woodpecker nest colonies. The Preferred Alternative would impact 268.5 acres of timberlands.

3.12 WETLANDS

3.12.1 What are wetlands?

The USACE and USEPA define wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands typically include swamps, marshes, bogs, and similar areas."[72]

The USACE, through Section 404 of the *Clean Water Act,* has regulatory authority over waters of the United States, including wetlands. This authority empowers the USACE to identify wetland/upland boundaries and to regulate alterations of jurisdictional wetlands. These boundaries are established in accordance with the methodology in the *1987 Corps of Engineers Wetlands Delineation Manual*.[73] An

[72] U.S. Army Waterways Experimental Station Environmental Laboratory, *Corps of Engineers Wetlands Delineation Manual* (Washington, D.C.: Department of the Army, USACE, 1987) Technical Report Y-87-1; (33 CFR §328.3[b]) and USEPA 40 CFR §230.3[t].
[73] *Ibid.*

area must exhibit evidence of wetland vegetation, wetland soil, and wetland hydrology to be considered a wetland. Wetlands in the project study area are shown on Figure 3-29 (refer to page 3-147).

Wetland Characteristics

Areas must have the following three characteristics to be considered wetlands:

- **Wetland vegetation**
- **Wetland soil type**
- **Wetland hydrology**

3.12.2 Why are wetlands important?

Wetlands are specifically protected by law because of the functions and values they provide with respect to:

- Hydrology (e.g., flood control, groundwater recharge and discharge, and dissipation of erosive forces);
- Water quality (e.g., removal of sediments, toxins, and nutrients);
- Food chain support and nutrient cycling (e.g., primary production and nutrient export/utilization);
- Wildlife habitat (e.g., breeding, rearing, and feeding grounds for fish and wildlife species); and,
- Socioeconomics (e.g., recreational, educational, aesthetic, and consumptive uses).

3.12.3 How were wetlands identified for this project?

The following GIS data layers were obtained for the purpose of identifying wetlands within the project study area:

- NWI Maps;
- Soil data layers;
- U.S. Geological Survey (USGS) topographic maps;
- GIS data layer of the first and second order streams (obtained from SCDNR);
- 1999 false-color infrared aerial photography; and,
- 2005 false-color infrared aerial photography.

First and Second Order Streams

First Order Streams are headwaters with no tributaries.
Second Order Streams are formed by the confluence of two or more first order streams.

The NWI wetland layer was used to define wetlands until the Build Alternatives were developed. At that point, the wetland boundaries were re-evaluated. For the eight Build Alternatives, NWI mapping was overlain onto the aerial photography and a desktop review was performed using the soil maps, NWI maps, and aerial photography. Questionable areas that were indicated as wetland on the NWI map, but did not exhibit typical wetland signatures on the aerial photography were identified. The USGS topographic maps and the SCDNR stream data layer were used to map second and third order streams within the project study area. Field visits were then performed and the questionable areas were groundtruthed. During the field visit, it was noted that some former wetland areas were effectively drained by ditches. Field notes were recorded at these locations and the project wetland map was revised to reflect these changes. Likewise, areas that were identified as upland on the NWI map, but were found to be wetland during the field visits, were

revised on the wetland map accordingly. Additional information collected during the field visit included other impacts to wetland communities such as changes in the vegetative communities (i.e., former forested wetlands that have been cut and are currently secondary growth communities) and areas that have been ditched, but still meet the three basic criteria of jurisdictional wetlands.

As discussed in Chapter 2, each NWI wetland type within the project study area was assigned a numerical value between 1 and 10 by the ACT. This value was based on the potential quality of the wetland type. Areas that had been altered were also given a different value based on the wetland type and extent of impact in accordance with the values assigned to wetland types by the ACT members and changes were made to the database accordingly. The values of the wetlands were updated on the mapping when observations from the field visits concluded that the vegetative composition of a wetland had been altered by practices such as conversions to maintained utility corridors or silviculture. Once the updates to the wetland mapping were completed, the CAT used the resulting wetland base map to avoid and minimize impacts as well as quantify impacts.

A field delineation was performed within the Preferred Alternative study corridor between July 2006 and May 2007. The Preferred Alternative study corridor extends 300 feet on both sides of the proposed centerline and for a length of approximately 44 miles. Proposed overpasses were included in the project corridor, and extended 100 feet in width from the centerline of the existing roadway on both sides of the existing roadway. Also included are proposed interchanges with existing roads. Interchange study areas were defined by offsetting the centerline of the on and off ramps 100 feet to the outside of the interchange. Wetland areas within the interchange defined by the off ramps were also delineated. Wetland boundaries were determined using the methodology described in the *1987 Corps of Engineers Wetlands Delineation Manual,*[74] and marked with surveyors flagging labeled "Wetland Boundary". The wetland boundaries were mapped using sub-meter accuracy Global Positioning System (GPS) equipment and a wetland map for the corridor was produced. The wetland map and supporting documentation was submitted to the USACE on June 1, 2007, and a request for a wetland approximation was included. In light of the recent court decision concerning the USACE jurisdiction over isolated wetlands (Rapanos v. United States, 547 U.S. ___ (2006)), the delineation is being re-evaluated by the USACE and an approval has not been received at this time.

3.12.4 What wetland communities were identified within the corridor?

Wetlands and waters of the United States were categorized by general types according to various standard classification systems including *The Classification of Wetlands and Deepwater Habitats of the United States*[75] and Nelson's *The Natural Communities of South Carolina.*[76] All of the wetlands and waters of the United States that occur within the Preferred Alternative study corridor are palustrine (freshwater).

[74] *Ibid.*
[75] L.M. Cowardin, V. Carter, F.C. Golet, and E.T. LaRoe, *Classification of Wetlands and Deepwater Habitats of the United States,* prepared for the USDI-FWS. FWS/OBS-79/31, Washington, D.C., (1979).
[76] Nelson, John B., *The Natural Communities of South Carolina: Initial Classification and Description*. (Columbia, SC: S.C. Wildlife & Marine Resources Department Division of Wildlife and Freshwater Fisheries, 1986).