3.10 Farmlands

3.10.1 Why is farmland an important consideration?

North Carolina and South Carolina both have a long history of farming and agricultural significance, especially within the project study area. Drawn by its abundant resources, this region was first settled by Native Americans then later by English settlers who traveled inland from the Carolina Coast.[74] Early residents of Marlboro and Richmond Counties were successful cotton farmers. In the mid 1800's, Richmond County grew as the economy diversified from agriculture to manufacturing with the establishment of cotton mills. Local legend holds that the farmland in Marlboro County was so fertile, that it was once sold by the pound instead of the acre.[75] Those settling in Scotland County were mainly of Welsh and Scottish descent, and established largely a farming community, with a few small stores scattered throughout.[76]

South Carolina farms produce crops valued at over $1.4 billion annually.[77] Dillon and Marlboro Counties produce crops valued at almost $92 million, representing six percent of South Carolina's overall crop value.[78] The main crops grown in the two counties are soybeans, all cotton, wheat for grain, and corn for grain (refer to Table 3.33, page 3-153). Hog and poultry farming are also important elements of South Carolina's agricultural industry in Dillon and Marlboro Counties. Dillon County ranks first among counties in South Carolina for hog livestock inventory, and seventh in broilers and other meat-type chickens inventory while Marlboro County ranks eighth for hog livestock inventory and 11th for broilers and other meat-type chickens.[79]

Farming in North Carolina produces crops valued at over $6.9 billon annually.[80] Richmond and Scotland Counties produce crops valued around $112 million, representing two percent of North Carolina's overall crop value.[81] The main crops grown in the two counties are all cotton, forage, and wheat for grain (refer to Table 3.33, page 3-153). Hog and poultry farming are also important parts of North Carolina's agricultural industry in Richmond and Scotland Counties. Richmond County ranks 28th among counties in North Carolina for hog livestock inventory, while Scotland County ranks 25th. For broilers and other meat-type chickens, Richmond County ranks ninth among counties in the state for inventory, and Scotland County ranks 15th.

[74] Marlboro County History Website, http://sciway3.net/proctor/marlboro/marlboro_history.html (October 19,2006).
[75] *Ibid.*
[76] Scotland County Website, History Webpage, http://www.scotlandcounty.org/History.htm (April 4, 2007).
[77] USDA, 2002 Census of Agriculture.
[78] *Ibid.*
[79] *Ibid.*
[80] *Ibid.*
[81] *Ibid.*

Table 3.33
Top Crops Grown in Dillon, Marlboro, Richmond, and Scotland Counties in 2002, in acres

Crops	Dillon County	Marlboro County	Richmond County	Scotland County
Soybeans	36,710	20,347	--	10,961
All cotton*	23,554	28,805	4,784	14,898
All wheat for grain**	20,945	6,624	815	2,525
Corn for grain***	8,153	2,991	--	1,281
Forage****	--	2,315	4,398	3,403

* All cotton includes both upland and pima cotton.
** All wheat for grain includes Durum, winter, and spring wheat other than Durum.
*** Corn for grain means for grain and silage in the US as livestock feed.
**** Forage includes all hay, haylage, grass silage, and greenchop.

Source: USDA, 2002 Census of Agriculture

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 programs have on farmlands. Prior to farmlands 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, 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 importance". The designations are based on NRCS soil types and are protected by federal legislation.

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 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)).

Definition

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

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

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

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

The project study area is comprised of 399,792 acres of land within Dillon, Marlboro, Richmond, and Scotland Counties. Of these acres, 125,393 acres are prime farmland soils and 137,148 acres are farmland soils of statewide importance. Together they account for 66 percent of the land within the project study area.[82] No unique farmland soil types exist in the project study area. Table 3.34 (refer to page 3-155), lists the number of soil types and amount of acreages of prime and statewide important farmland soils in the project study area, by county.

3.10.5 What types of soils are in the project study area?

NRCS has determined the types of soils found within the project study area. Lists of prime and statewide important farmland soils are found in Tables 3.35 and 3.36 (refer to pages 3-156 and 3-157). Dillon County has 11 prime farmlands soils, while Marlboro County has 14, Richmond County has 13, and Scotland County has 16 (refer to Table 3.35, page 3-156). In terms of farmland soils of statewide importance, Dillon County has 15, Marlboro County has 23, Richmond County has 11, and Scotland County has 10 (refer to Table 3.36, page 3-157).

3.10.6 What are the typical farm sizes in Dillon, Marlboro, Richmond, and Scotland Counties?

The Census of Agriculture data was used to characterize the project study area, while aerial photography of the project study area was used to assess the agricultural land uses. Approximately

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

Table 3.34
Summary of Prime and Statewide Importance Farmland Soils in the Project Study Area

	Prime Farmland	Statewide Important Farmland
DILLON COUNTY		
Number of Soil Types	11	15
Acreage	29,818	37,625
MARLBORO COUNTY		
Number of Soil Types	14	23
Acreage	86,476	98,856
RICHMOND COUNTY		
Number of Soil Types	13	11
Acreage	9,087	390
SCOTLAND COUNTY		
Number of Soil Types	16	10
Acreage	12	277

Source: GIS data from NRCS, 2006

25 percent of South Carolina's total land area is in farms. As shown in Table 3.37, (refer to page 3-158), 43.3 percent of Dillon County's land area is in farms, well above the average for South Carolina, while 29.8 percent of Marlboro County's land is in farms, just above the state average. In North Carolina, approximately 29 percent of its total land area is in farms. As shown in Table 3.37, (refer to page 3-158), 16.2 percent of Richmond County's land area is in farms, while 28.5 percent of Scotland County's land is farms, both of which are below the state average.

The USDA classifies all farms into size groups according to the total land area of the farm. The land area of a farm is an operating unit concept and includes land owned and operated as well as land rented from others. Land that was rented to or assigned to a tenant was considered part of the tenant's farm and not part of the owner's. In the four-county region, farm size ranges from as small as one acre to 1,000 acres or more. In 2002, the majority of farms in the four-county region ranged between 50 to 179 acres in size.

The trends in the size and number of farms within the four-county area from 1992 to 2002 show the number of farms in Dillon and Richmond Counties have decreased by 14 and 13 percent respectively, while the number of farms in Marlboro and Scotland Counties have increased by five and 10 percent respectively.

Table 3.35
Prime Farmland Soil Types in Project Study Area, by County

Soil Type	Location (by county)			
	Dillon	Marlboro	Richmond	Scotland
Brogdon	X			
Chewacla			X	
Clarendon	X			
Clayham		X		
Creedmoor			X	
Davidson			X	
Dothan	X			
Duplin	X			X
Emporia		X		
Enunola		X		
Faceville	X	X	X	
Goldsboro		X		X
Gritney				X
Hornsville		X		
Johns*	X			X
Kalmia				X
Lumbee*				X
Lynchburg*	X	X		X
Mantachie*				X
Marlboro		X		
Maxton				X
Mayoden			X	
McQueen			X	
Noboco		X		X
Norfolk		X	X	X
Orangeburg	X	X	X	
Pantego				X
Paxville**				X
Peawick			X	
Pelion			X	X
Persanti	X	X		
Rains*				X
Riverview**		X	X	
Summerton	X			
Thursa				X
Tubeville			X	
Uwharrie			X	
Varina	X			
Wickham		X		

*only considered prime farmland if it is drained
**only considered prime farmland if protected from flooding or not frequently flooded during the growing season.
Source: USDA, NRCS Soil Surveys for Dillon, Marlboro, Richmond, and Scotland Counties

Table 3.36
Types of Farmland Soils of Statewide Importance in Project Study Area, by County

Soil Type	Location (by county)			
	Dillon	Marlboro	Richmond	Scotland
Ailey		X	X	X
Autryville		X		X
Badin			X	
Bonneau		X		
Byars	X	X		
Candor		X		
Cantey	X			
Chewacla		X		
Clayham		X		
Coxville	X	X		X
Davidson			X	
Dunbar	X			X
Emporia		X		
Enon-Wynott			X	
Fuquay	X			
Gritney				X
Hornsboro			X	
Hornsville		X		
Kenansville	X			X
Lucy	X	X		
Lumbee	X			
Masada			X	
Mayoden			X	
McColl	X	X		
Nankin		X		
Noboco		X		
Norfolk		X		
Ocilla		X		X
Ogeechee		X		
Pacolet			X	
Pantego	X			
Pasvile	X			
Paxville		X	X	
Pelion		X	X	
Pocalla	X			
Ponzer	X			
Rains	X	X		
Smithboro	X	X		
Uchee		X		X
Uwharrie-Badin			X	
Vaucluse				X
Wagram		X		X

Source: USDA, NRCS Soil Surveys for Dillon, Marlboro, Richmond, and Scotland Counties

Table 3.37
Agriculture Land Use in Four-county Area in 2002

	Dillon County	Marlboro County	Richmond County	Scotland County	4-County Area Total
Number of Farms	197	222	257	145	821
Land in Farms (acres)	112,262	114,963	49,293	58,313	334,831
(% of total area)	(43.3%)	(29.8%)	(16.2%)	(28.5%)	(31%)
Approximate Land Area (acres)	259,099	307,011	303,347	204,252	1,073,619
Average Size of Farm (acres)	570	518	192	367	412
Median Size of Farms (acres)	200	231	105	112	648
Average Value of Land and Buildings (farms), dollars	$768,990	$658,729	$471,183	$825,124	$681,006

Source: USDA, 2002 Census of Agriculture.

The amount of land in farms has increased in Dillon and Scotland Counties between 1997 and 2002. In fact, the four-county area experienced an increase in land acres in farm use, despite the reductions in Marlboro and Richmond Counties (refer to Chart 3.2, page 3-159). Dillon County's land area in farms has increased by almost 17,200 acres (18 percent) between 1997 and 2002, while Scotland County's land area in farms increased by approximately 4,800 acres (nine percent). The amount of land area in farms decreased in both Marlboro and Richmond Counties by approximately four and nine percent, respectively.

3.10.7 How would the No-build Alternative directly impact farmlands?

The No-build Alternative would have no effect on farming operations since existing conditions would remain unchanged.

3.10.8 How would the Build Alternatives directly impact farmlands?

A Farmland Impact Conversion Evaluation was completed for the three Build Alternatives. By totaling the relative value and the corridor assessment value, it was determined that the total threshold, 160 points overall, set by NRCS, was not exceeded by the Build Alternatives in any of the four

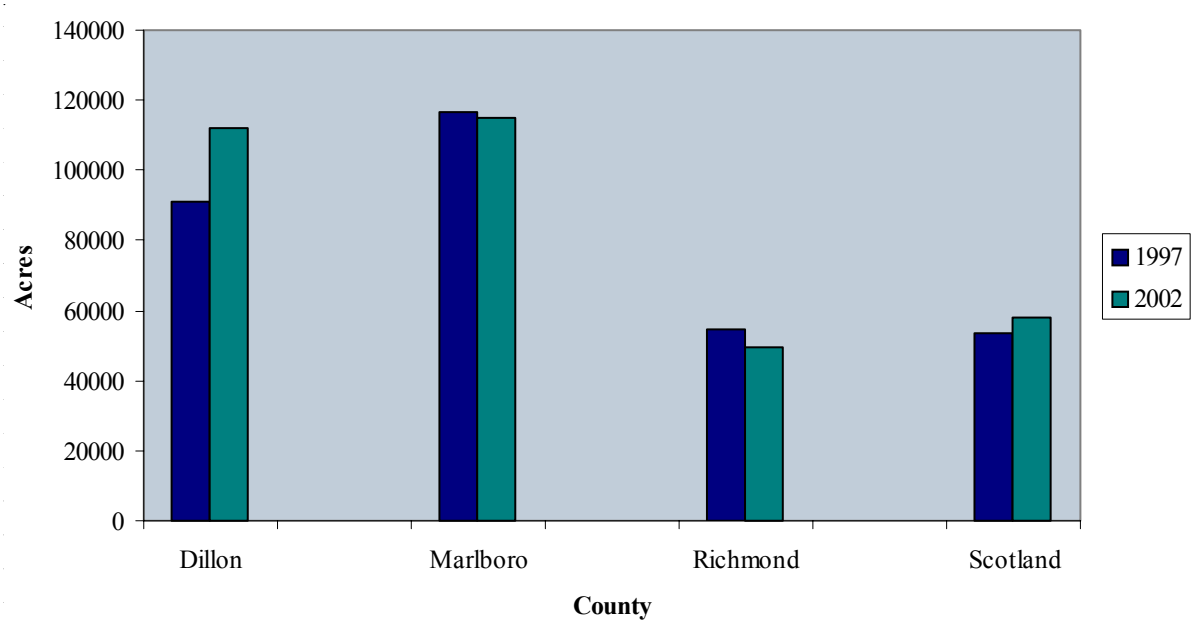

Chart 3.2 Total Acres of Farmland in Project Study Area

counties (refer to Table 3.38). The highest total value was 158 points for Alternative 1 in Dillon County. The lowest value was 83.5 points for Alternatives 2 and 3 in Scotland County (refer to Table 3.38). Since the 160 threshold was not exceeded for any of the Build Alternatives, mitigation actions that could reduce adverse impacts associated with the Build Alternatives would not be required.

Table 3.38
NRCS Farmland Conversion Evaluation Point Total by Alternative

	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Dillon County	158	154	157
Marlboro County	150	147	150
Richmond County	96	96	95
Scotland County	0	83.5	83.5

Construction of the Build Alternatives would result in the direct conversion of farmland to a transportation facility. Alternative 3 would incur 1,582 acres of impact to prime and statewide important farmland soils, the highest of all Build Alternatives (refer to Table 3.39). Alternative 2 would have the least amount, 1,506 acres, of prime and statewide important farmland soils directly impacted, (refer to Table 3.39).

Table 3.39
Direct Impacts to Prime Total and Statewide Important Total Soils by Acres

	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Dillon County	**116**	**265**	**446**
Prime	98	98	247
Statewide Important	18	167	199
Marlboro County	**1,423**	**1,217**	**1,112**
Prime	726	705	711
Statewide Important	697	512	401
Richmond County	**0.24**	**3**	**3**
Prime	0.24	3	3
Statewide Important	0	0	0
Scotland County	**17**	**21**	**21**
Prime	0	0	0
Statewide Important	17	21	21
Alternative Total	**1,556**	**1,506**	**1,582**

The Build Alternatives may also result in other impacts, such as divided farm parcels. Accessibility to fields or pastureland may be affected if farm buildings or land are separated from the rest of the farming operations by the new interstate facility. If access was affected, the farm operator may experience increased time requirements and expenses in order to conduct normal farming operations. The increased expenses could result from the need of the farm operations to move/transfer equipment, feed, and livestock between the divided parts of the farm.

Impacts to parcels that would potentially be divided by the Build Alternatives were identified by the following methodology. Given that farm size in the project study area ranges from 1 acre to 1,000 acres or more, it was determined that no parcel would be too small to farm. For every parcel that a Build Alternative traversed, three areas were calculated: the area within the 400-foot corridor and the two remaining areas on either side of the corridor. The area within the 400-foot corridor was calculated as direct impacts and was assumed that the parcels divided could be kept or acquired by a neighboring farm. Even though the farmland may be split, it may not be removed from active production. Maintaining access to farms that would be split or severed by I-73 is an issue that will be further investigated for the Preferred Alternative in the Final EIS.

Alternative 1 would incur the greatest potential impact to farmland via divided parcels (75.2 acres) while Alternative 2 would incur the least amount of impacts via divided parcels (61.2 acres) (Table 3.40, refer to page 3-161). In Scotland County, parcels along Alternative 3 may be impacted, but no parcels are being divided.

Table 3.40
Divided Farmland Parcels in the Project Study Area by Acres

	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Dillon County	0.2 ac. / 1 parcel	0.2 ac./ 1 parcel	9 ac./ 2 parcels
Marlboro County	73 ac./ 20 parcels	59 ac./ 11 parcels	53 ac./ 10 parcels
Richmond County	2 ac./ 1 parcel	2 ac./ 1 parcel	2 ac./ 1 parcel
Scotland County	--	--	--
Total	75.2 ac./ 22 parcels	61.2 ac./ 13 parcels	64 ac./ 13 parcels
Total Acres in Corridor	2,324	2,081	2,136

Overall, farming operations could be directly impacted as a result of the construction of the proposed project. Thirty-four percent of the land in the project study area is currently being farmed, and 0.005 percent of this land or less would be rendered unfarmable, depending on Build Alternative. No farm acreage, besides that acquired for ROW, should be rendered unfarmable and access issues to divided parcels will be addressed during the right-of-way acquisition process. The conversion of farmland to ROW due to construction should not cause a significant disruption of agricultural activities in the project study area.

Within the project study area there are numerous hog and poultry concentrated animal feeding operations (CAFOs). During the alternative development process, CAFOs were avoided when possible. However, one CAFO, the Charles and Monnie Perdue Poultry Farm located on State Route 40 east of Clio, would be displaced by Alternative 3. This farm could not be avoided due to the presence of wetlands on both sides of the property, which were avoided during the alternative development process to minimize potential impacts.

3.10.9 What would be the potential indirect and cumulative impacts on farmland?

Impacts from induced development and cumulative impacts were calculated with the use of GIS. Spatial data layers containing acreages of projected growth by Build Alternative (which were determined in the land use study, refer to Land Use, Section 3.1, page 3-1) were overlaid on the soils data (obtained from the NRCS) within the project study area. The acreages of projected growth that fell within prime farmland or farmland of statewide importance were identified and calculated.

3.10.9.1 How would development that is expected to occur with the No-build Alternative impact farmlands?

Development that would be expected under the No-build Alternative would impact approximately 55 acres of farmlands, including prime farmland and farmland of statewide importance. These impacts would include: in Dillon County, 23 acres of prime farmland and 16 acres of farmland of statewide importance; in Marlboro County, no acres of prime farmland or farmland of statewide importance would be impacted; in Richmond County, 16 acres of prime farmland and no acres of farmland of statewide importance would be impacted; and in Scotland County, no acres of prime farmland or farmland of statewide importance would be impacted (refer to Table 3.41). The No-build Alternative was used as a baseline to compare development that was projected as a result of the construction of I-73.

Table 3.41
Impacts from Induced Development on Prime and Farmland of Statewide Importance Soils in the Project Study Area by Alternative in Acres

		No-build	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Total Impacts from Induced Development to Farmland		**55**	**799**	**885**	**716**
Dillon County	Prime	23	9	57	49
	Statewide Important	16	12	32	41
Marlboro County	Prime	0	585	614	449
	Statewide Important	0	193	163	158
Richmond County	Prime	16	<1	19	19
	Statewide Important	0	0	0	0
Scotland County	Prime	0	0	0	0
	Statewide Important	0	0	0	0

3.10.9.2 What would be the potential impacts from induced development on farmland by the Build Alternatives?

In addition to the direct conversion of farmland to right-of-way, impacts from development induced by the construction of the project would be anticipated in the project study area. Listed in Table 3.42 are acres of impacts from induced development to farmland, based on the land use model. Alternative 2 would have the highest acres of potential impacts from induced development with 885 acres, while Alternative 3 would have the least acres of potential impacts with 716 acres.

Table 3.42
Cumulative Impacts to Prime and Farmland of Statewide Importance Soils in the Project Study Area by Alternative in Acres

		No-build	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Total Impacts to Farmland		**55**	**2,362.24**	**2,446**	**2,353**
Dillon County	Prime	23	130	178	319
	Statewide Important	16	46	215	256
Marlboro County	Prime	0	1261	1319	1160
	Statewide Important	0	890	675	559
Richmond County	Prime	16	18.24	38	38
	Statewide Important	0	0	0	0
Scotland County	Prime	0	0	0	0
	Statewide Important	0	17	21	21

3.10.9.3 What would be the potential cumulative impacts on farmland from the Build Alternatives?

Cumulative effects on farmland are caused by the aggregate of past, present and reasonably foreseeable future actions. Cumulative impacts would include development in the project study area that would be expected under the No-build Alternative, development that may result from the project, as well as other development in the project study area that may affect farmlands.The No-build would have 55 acres of impacts to prime and statewide important farmland soils, while Alternatives 1 through 3 would range between 2,353 and 2,446 acres of impacts. This would range from 0.0002 percent (with the No-build Alternative) to 0.009 percent (all Build Alternatives) of the total prime and statewide important farmland soils found in the project study area being impacted (refer to Table 3.42).

Sixty-six percent of the land within the project study area has either prime or statewide important soils, and 0.003 percent or less of these soils would be impacted as a result of cumulative development from the Build Alternatives. In addition to projected growth and land use changes, other transportation projects have been constructed, are under construction, or are in the planning stages. These projects would contribute to the cumulative impacts on farmlands.

In 2000, construction of 28.5 miles of S.C. Route 22 from U.S. Route 501 in Conway to U.S. Route 17 in North Myrtle Beach was completed. Also in 2000, approximately 17 miles of I-74 in North Carolina was completed southwest of Hamlet, North Carolina, impacting 50 acres of prime, unique, or statewide important farmland soils. The S.C. Route 22 and U.S. Route 17 projects were both on new location and traversed predominately rural areas, which directly impacted farmlands as well as bisected parcels, which created access problems for some farm owners. The widening of S.C. Route 38 from I-95 to Marion is currently under construction. This project widened an existing route from two to four lanes, which is anticipated to impact approximately 22 of acres prime, unique, or statewide important farmland soils adjacent to the roadway.

Three projects are reasonably foreseeable future actions, but are dependent upon funding that is currently unavailable. The S.C. Route 9/S.C. Route 38 project would widen the existing roadway from two to five lanes in Marlboro County, South Carolina, which would impact farmlands adjacent to the existing facility. The southern portion of I-73 is 44 miles of new location roadway extending from I-95 to Myrtle Beach region through Dillon, Marion, and Horry Counties. The Southern Evacuation Lifeline is approximately 20 miles extending from interchange at U.S. Route 501 and S.C. Route 22 to the vicinity of U.S. Route 17. When these projects are constructed, they would impact farmlands directly by taking farmland out of production and indirectly by bisecting farm parcels. Access issues for farm owners would be addressed in the final planning stages to reduce these types of impacts as much as possible.

3.10.10 What Federal/USDA farmland programs are active or found in the project study area and how would they be impacted by the Build Alternatives?

In addition to prime, unique, and statewide or locally important farmlands, the NRCS and USDA have developed other programs for farmlands that provide incentive for landowners to protect, enhance, or conserve their properties. Table 3.43 lists the different types of programs in the four counties (refer to page 3-165).

3.10.10.1 Conservation Reserve Program

The Conservation Reserve Program 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

Table 3.43
Land Enrolled in Federal Conservation Programs by Acres

	Conservation Reserve Program	Farm and Ranchland Protection Program	Wetland Reserve Program
Dillon County	2,902	60	409
Marlboro County	4,126	0	419
Richmond County	2,253	0	0
Scotland County	1,344	0	0

Source: USDA, NRCS South Carolina Office, NRCS North Carolina Office

annual rental payment for carrying out approved conservation practices on the acreage. Under Conservation Reserve Program contracts, farmers are compensated for planting permanent covers of grass and trees on land subject to erosion, where vegetation can improve water quality or wildlife habitat. The USDA's Farm Service Agency administers this voluntary program.

There are over 1,500 Conservation Reserve Program easements in the project study area (refer to Figure 3-38). All of the Build Alternatives would intersect multiple easements, ranging from 10 to 29 easements (refer to Table 3.44). Alternative 2 would intersect the fewest easements (10), which contain approximately 19 acres of land. The Build Alternative with the most impacts to easements is Alternative 3, which intersects 29 sites containing 45 acres of land. The remainder of the land in the impacted parcels would remain in the program and no mitigation would be required for any of the Build Alternatives.

Table 3.44
Impacts to Land in the Conservation Reserve Program

	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Dillon County	2	2	6
Marlboro County	21	8	23
Richmond County	0	0	0
Scotland County	0	0	0
Total Number of Sites	**23**	**10**	**29**
Total Acres	**22**	**19**	**45**

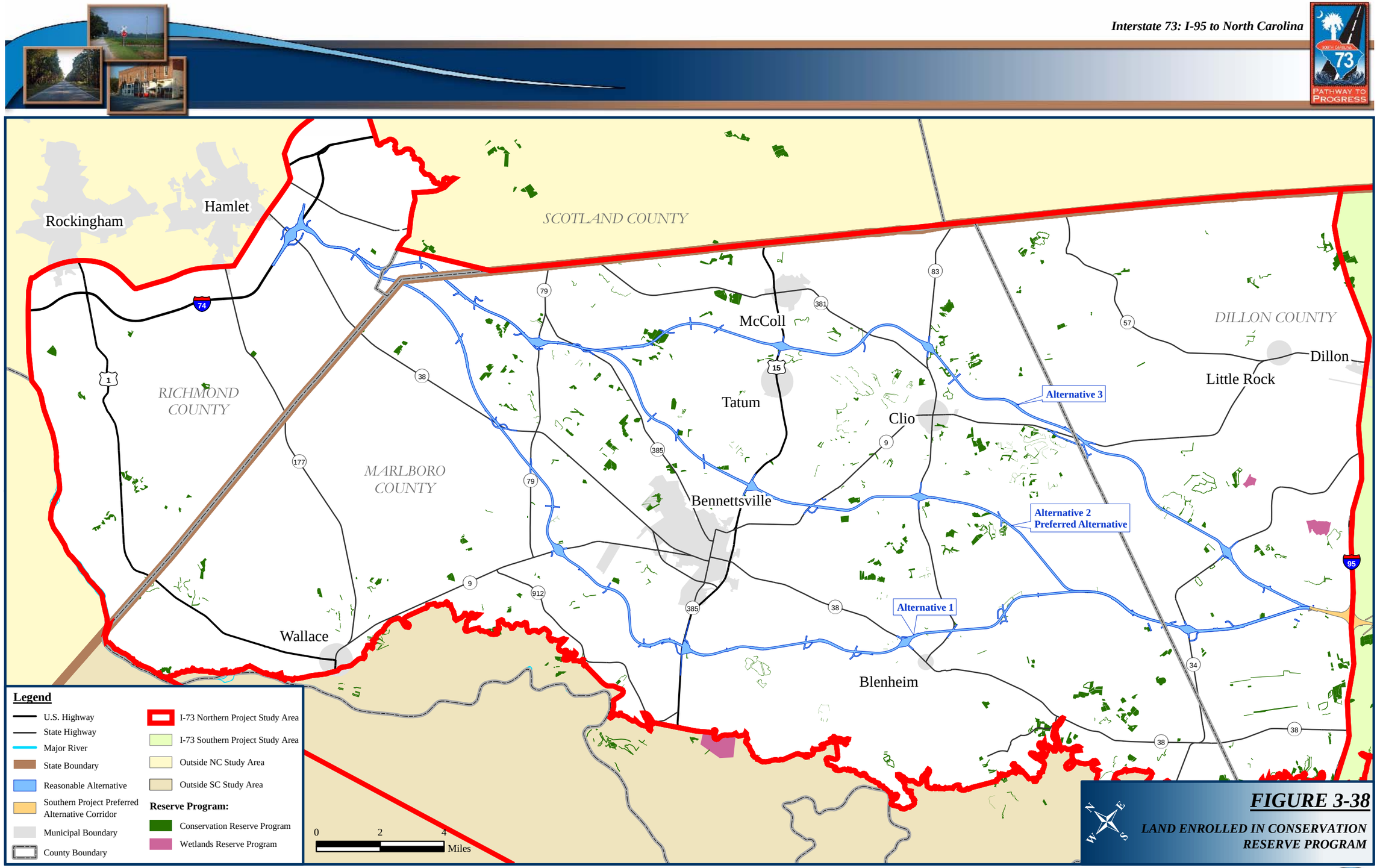

FIGURE 3-38

LAND ENROLLED IN CONSERVATION RESERVE PROGRAM

3.10.10.2 Farm and Ranch Lands Protection Program

The Farm and Ranch Lands Protection Program 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, or local governments and non-governmental organizations with existing farm and ranchland protection programs to purchase conservation easements. The Farm and Ranch Lands Protection Program was reauthorized in the Farm Bill to protect working agricultural land from conversion to non-agricultural uses.[83]

Even though there is enrolled land in the Farm and Ranchland Protection Program within the project study area, no Farm and Ranchland Protection Program easements would be impacted by the Build Alternatives.

3.10.10.3 Wetlands Reserve Program

The Wetlands Reserve Program is a 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 enrolled in the Wetland Reserve Program within the project study area, no easements would be impacted by any of the three Build Alternatives.

3.11 Uplands

3.11.1 What are uplands?

Generally, upland communities are dry areas where the water table is one foot or more below the ground during the growing season. 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. The coastal plain of the Carolinas contains many types of natural and altered upland communities.

Upland biotic communities identified within the project study area were classified based on the predominant type of plants found within them, landscape position, soil type, and hydrologic regime

[83] Farm Bill, 2002.

as described in *The Natural Communities of South Carolina*[84] and *Classification of the Natural Communities of North Carolina.*[85]

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 uplands within the project study area are currently used for crop and timber production. Most types of development occur on uplands, especially so 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 cover from predators. Forested areas along the major waterways 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 mobile species. Upland communities also provide resting and foraging habitat for migratory bird species that move through the Carolinas 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, filters through these areas before reaching the water bodies, which helps trap 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 upland communities along streams allows for cooler water temperatures, which some aquatic species require.

3.11.3 How were uplands identified for this project?

Initially, the SCDNR's GAP data and the NWI maps were used to identify the upland community types within the project study area. The 1999 false-color infrared aerial photography and 2004 true-color aerial photography were reviewed within a 2,500-foot wide corridor along each of the three Build Alternatives (referred to as the study corridors). The GAP database was updated based on the current land use conditions depicted on the aerial photography and field visits were conducted to verify changes. The GAP data were modified to correlate the GAP habitat designations with the

[84] Nelson, J.B, South Carolina Wildlife and Marine Resources Department, *The Natural Communities of South Carolina,* (1986).
[85] Michael P. Schafale and Alan S. Weakley, *Classification of the Natural Communities of North Carolina*. (Raleigh, NC: North Carolina Natural Heritage Program Division of Parks and Recreation & NCDENR, 1990).

descriptions found in *The Natural Communities of South Carolina*[86] and *Classification of the Natural Communities of North Carolina*.[87] Changes made to the mapping included updating areas where agricultural fields were converted to pine plantations or housing developments; changing former pine dominated forests that have transitioned to mixed pine/hardwood forests; and revising forested areas that have been clear-cut or are in early successional stages.

3.11.4 What upland natural community types were identified within the project study area?

During the review of GAP data, NWI maps, aerial photography, and results of the field visits, the following natural upland communities were identified in the study corridors:

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

3.11.4.1 Mesic mixed hardwood forest

Mesic mixed hardwood forest

Mesic mixed hardwood forests are found primarily on slopes and ravines in the Piedmont, but also occur within the Coastal Plain on north-facing river bluffs. The canopy and understory is composed of a rich variety of hardwoods, and the herbaceous and shrub species are numerous. It may be difficult or impossible to recognize a single dominant species. Typical overstory species include tulip poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), white oak (*Quercus alba*), black oak (*Quercus velutina*), and beech (*Fagus grandifolia*). The understory has arrow-wood (*Viburnum dentatum*), hornbeam (*Carpinus caroliniana*), American holly (*Ilex opaca)*, horse-sugar (*Symplocos tinctoria*), and flowering dogwood (*Cornus florida*).

Definition

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

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.

[86] Nelson, *The Natural Communities of South Carolina*.
[87] Schafale and Weakley, *Classification of the Natural Communities of North Carolina*.

The herbaceous layer includes partridgeberry (*Mitchella repens*), heartleaf (*Hexastylis arifolia*), and pipsissewa (*Chimaphila maculata*).

3.11.4.2 Oak-hickory forest (Dry or Dry-mesic oak-hickory forest[88])

Oak-hickory forest

Oak-hickory forests occur on slopes between rivers and tributaries, and are dominated by a canopy of oaks, hickories, and a few other species of hardwoods in combination with pines. Those identified within the study corridors are dominated by several different oaks including water oak (*Quercus nigra*), willow oak (*Quercus phellos*), southern red oak (*Quercus falcata*), white oak, and post oak (*Quercus stellata*), as well as mockernut (*Carya tomentosa*) and pignut hickory (*Carya glabra*). Co-dominants are loblolly pine (*Pinus taeda*), sweetgum, red maple, and the occasional tulip poplar. The understory is comprised of sapling canopy species, plus sweetleaf, American holly, dogwood, sweet pepperbush (*Clethra alnifolia*), and black cherry (*Prunus serotina*). Woody vines are common, and include muscadine (*Vitis rotundifolia*), yellow jessamine (*Gelsemium sempervirens*), Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), Japanese honeysuckle (*Lonicera japonica*), and trumpet vine (*Campsis radicans*). The herbaceous layer is sparse, with partridgeberry, ebony spleenwort (*Asplenium platyneuron*), blackberry (*Rubus* spp.), and the occasional pipsissewa, and elephant's foot (*Elephantopus tomentosus*).

3.11.4.3 Pine flatwoods (Mesic pine flatwoods[89])

Pine flatwoods

Pine flatwoods are found on essentially flat or rolling terrain with 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 typically successional from the abandonment of cropland and quickly succeed to deciduous hardwood-dominated forests. If fire is maintained, they frequently become a pine savannah habitat. Those identified within the study corridors are dominated by loblolly pine, water oak, black gum (*Nyssa sylvatica*), red maple, black cherry, and sweetgum in the canopy or near-canopy layer. The understory consists of

[88] *Ibid.*
[89] *Ibid.*

sweetleaf, sparkleberry (*Vaccinium arboreum*), wax-myrtle (*Myrica cerifera*), and beautyberry (*Callicarpa americana*), with the occasional chokeberry (*Aronia arbutifolia*), highbush blueberry (*Vaccinium corymbosum*), and sassafras (*Sassafras albidum*). Woody vines included catbriers (*Smilax rotundifolia, S. bona-nox,* and *S. glauca*), yellow jessamine, muscadine, poison-ivy, and Japanese honeysuckle. The herbaceous layer is dominated by bracken fern (*Pteridium aquilinum*), silver-leaved grass (*Heterotheca graminifolia*), and ebony spleenwort.

3.11.4.4 Upland pine-wiregrass woodland

Upland pine-wiregrass woodlands occur on rolling sandhills with an open to closed canopy of pines, a shrub layer, and a diverse herbaceous layer. The dominant overstory species for this community is longleaf pine (*Pinus palustris*), with some pond pine (*Pinus serotina*). When an understory is present, it includes blackjack oak, post oak, flowering dogwood, and hickories (*Carya* sp.). Typical shrub species include inkberry (*Ilex glabra*), staggerbush (*Lyonia mariana*), dwarf huckleberry (*Gaylussacia dumosa*), dangleberry (*Gaylussacia frondosa*), and low-bush blueberry (*Vaccinium tenellum*). The dominant herbaceous species is wire grass (*Aristida* spp.). Other herbaceous species include goat's rue (*Tephrosia* spp.), elephant's-foot, and camphorweed (*Chrysopsis* spp.).

Upland pine-wiregrass woodland

3.11.4.5 Xeric sandhill scrub

Xeric sandhill scrub habitats occur on flat or hilly areas within the driest parts of sandhills, formed on deep, well-drained sands. The dominant overstory species is longleaf pine. The understory typically consists of turkey oak (*Quercus laevis*) while the shrub layer includes dangleberry, blueberries (*Vaccinium* spp.), and sandhill-rosemary (*Ceratiola ericoides*). The herbaceous layer includes wireplant (*Stipulicida setacea*), prickly pear (*Opuntia* sp.), sandwort (*Arenaria caroliniana*), Carolina ipecac (*Euphorbia ipecacuanhae*), and sandhill-cress (*Warea cuneifolia*). Grasses belonging to the genera *Aristida, Andropogon, Sporobolus*, and *Triplasis* are generally present.

Xeric sandhill scrub

3.11.4.6 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.[90] Communities identified within the study corridors are dominated by a canopy of longleaf pine, with an understory almost exclusively of the scrub oak species: blackjack oak (*Quercus marilandica*), bluejack oak (*Quercus incana*), post oak (*Quercus stellata*), and turkey oak, with the occasional sparkleberry. The shrub layer is restricted to deerberry (*Vaccinium stamineum*), dwarf 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*).

Pine-scrub oak sandhill

In addition to the natural areas above, the study corridors contain other upland areas, including one type that was a formerly functioning wetland system. These other upland areas are:

- Agricultural fields and timberlands;
- Developed areas; and,
- Drained bottomland hardwoods (formerly functioning wetland system).

Although timberlands and drained bottomland hardwoods have been altered, 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 herbaceous and shrub 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.

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

3.11.4.7 Agricultural fields and timberlands

Agricultural fields and timberlands are not natural communities. However, these upland communities are significant elements within the project study area. Agricultural fields include areas currently planted with crops or fallow fields that have not yet developed into another community type. Also, pastureland and hedgerows/fencerows are included in this category. Timberlands include pine plantations and are managed primarily for pulpwood. Typically, these areas are planted with loblolly pine or slash pine (*Pinus elliottii*). The project study area contains many drained Carolina bays that are currently agricultural fields and managed timberlands.

Tobacco Farm Field

3.11.4.8 Developed areas

Developed areas have been built upon for residential or commercial purposes. These include maintained lawns, residences, parking lots, vacant lots, abandoned home sites, industrial yards, institutional uses, and commercial buildings.

3.11.4.9 Drained bottomland hardwoods

A bottomland hardwood is typically defined as a forested wetland area occurring within floodplains. However, several bottomland hardwoods identified in the study corridors have had their hydrology altered and no longer function as wetlands. Typical tree species include sweetgum, red maple, swamp gum (*Nyssa sylvatica* var. *biflora*), water oak, laurel oak, cottonwoods (*Populus* spp.), willows (*Salix* spp.), river birch, and loblolly pine. The shrub layer consists of gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), sweet-bay (*Magnolia virginiana*), red-bay (*Persea borbonia*), and arrow-wood.

3.11.5 How would upland communities be impacted?

Each Build Alternative would impact forested upland communities as well as agricultural and developed lands. The majority of the upland impacts for each Build Alternative would occur to agricultural and developed lands. Analysis of the GAP data indicates that Alternative 1 would have the highest impacts to developed land followed by Alternative 3, and then Alternative 2 with the

least impact (refer to Table 3.45). Alternative 3 would have the highest impacts to agricultural land followed by Alternative 1, and then Alternative 2 with the least impact. The portion of forested uplands that would potentially be impacted would range from 30 to 42 percent of the total upland impacts for the Build Alternatives (refer to Section 3.1, Land Use, page 3-1 and Section 3.10, Farmlands, page 3-152).

Table 3.45
Potential Agricultural and Developed Land Impacts in Acres

	Alternatives		
	1	2 (Preferred)	3
Agricultural Land	937.9	828.5	1,055.5
Developed Land	267.2	217.0	234.9
TOTAL IMPACT	**1,205.1**	**1,045.5**	**1,290.4**

Source: THE LPA GROUP INCORPORATED, 2007

Impacts to forested upland 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 road bed. Table 3.45 provides the potential forested upland community impacts by community type that would result from the construction of each Build Alternative.

As indicated in Table 3.46, the total impacts to forested uplands would range from 552.4 acres for Alternative 3 to 755.0 acres for Alternative 2. Alternatives 1 and 2 have similar forested upland

Table 3.46
Potential Natural Forested Upland Community Impacts in Acres

	Alternatives		
FOREST TYPE	1	2 (Preferred)	3
Oak-Hickory Forest	124.9	77.1	80.9
Pine Flatwoods	36.5	28.8	0
Pine-Scrub Oak	111.8	146.4	144.2
Timberlands	473.4	502.7	327.3
TOTAL FOREST IMPACT	**746.6**	**755.0**	**552.4**

Source: THE LPA GROUP INCORPORATED, 2007

impact totals, with approximately 8.4 acres of impacts difference, while Alternative 3 would have the least amount of impact.

Upland forested community impacts would result in the removal of wildlife habitat as discussed in Section 3.16, (refer to page 3-221). Of the forested uplands that would be impacted, the oak-hickory forest would support the most wildlife diversity due to the presence of mast producing plant species, on which animal species such as turkey, squirrels, and white tailed deer feed. Alternative 1 would have the most impacts to oak-hickory forests while Alternative 2 would have the least.

Pine flatwoods typically have a dense understory and provide cover and browse for white tailed deer. These areas also provide nesting and forage habitat for a variety of perching bird species. Alternative 1 would have the greatest impact to pine flatwoods, followed by Alternative 2, and then Alternative 3, which would have the least impact.

Pine-scrub oak forests are typically the least diverse of the upland habitats from a wildlife standpoint, however Pickering's morning-glory, savannah campylopus (a moss), sandhills gaillardia, soft milk-pea, showy milk wort, twisted-leaf goldenrod, and southern hognose snake, all North Carolina or South Carolina state listed species, occur in this habitat type. None of the federally listed species occur in pine-scrub oak communities. Alternative 2 would have the most impacts to pine-scrub oak forests while Alternative 1 would have the least impacts to this community type.

The largest portion of the upland forest impacts would occur to timberlands, or managed pines, which typically have relatively low wildlife diversity when compared to the other upland types that would be impacted. In addition, these forested areas are frequently disturbed by logging operations during which wildlife is displaced to adjoining upland communities. Timberlands 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. Impacts to timberlands would be essentially the same for Alternatives 2 (502.7 acres) and 1 (473.4 acres), while the lowest impact to would occur on Alternative 3 (327.3 acres).

Indirect and cumulative impacts to upland habitats as it relates to wildlife habitat can be found in Section 3.16.7, page 3-243.

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."[91] Wetlands are transitional areas between uplands and aquatic communities.

The USACE, through Section 404 of the *Clean Water Act of 1977* (CWA), 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*.[92] An area must exhibit evidence of wetland vegetation, wetland soil, and wetland hydrology to be considered a wetland.

3.12.2 Why are wetlands important?

Wetlands are important because of the functions and values they provide. These functions and values are relative 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:

[91] 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].
[92] *Ibid.*

- NWI Maps;
- Soil data layers;
- U.S. Geological Survey (USGS) topographic maps;
- 1999 false-color infrared aerial photography; and,
- 2004 true-color aerial photography.

The NWI wetland layer was used to quantify potential wetland impacts for the preliminary Build Alternatives. 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 relative quality of each wetland type. Areas that had been previously impacted were given a lower value based on the severity of impact.

After the six preliminary Build Alternatives were identified, the wetland boundaries were re-evaluated. For a 2,500-foot wide corridor along each alternative, NWI mapping was overlain onto the aerial photography and a desktop review was performed using the soil maps, NWI maps, and aerial photography. The USGS topographic maps, along with the SCDNR and NCDENR stream data layer, were used to map second and third order streams within the project study area. Questionable areas, those that were indicated as wetland on the NWI map, but did not exhibit typical wetland signatures on the aerial photography, or those that were indicated as upland on the NWI map, but appeared to be wetland, were identified. Field visits were then performed and the questionable areas were groundtruthed. During the field visits it was noted where some former wetland areas were effectively drained by ditches. These locations were revised on the project wetland map. 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.

Additional information collected during the field visits included other impacts to wetland communities such as changes in the vegetation types (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. The values of the wetlands on the mapping were updated when observations from the field visits concluded that the wetland had been altered by practices such as conversion to maintained utility corridors or silviculture. Wetlands and streams identified within the preliminary Build Alternatives are indicated on Figure 3-39 (page 3-179).

A field delineation will be performed within a 600-foot wide corridor along the Preferred Alternative and the results will be included in the FEIS. Wetland boundaries will be determined using the current USACE methodology described in the *1987 Corps of Engineers Wetlands Delineation Manual*, and marked with surveyors flagging labeled "Wetland Boundary". The wetland boundaries will be mapped using sub-meter accuracy Global Positioning System (GPS) equipment and a wetland map for the corridor will be produced. The wetland map and supporting documentation will be submitted to the USACE for review and approval.