Watershed Based Plan for

Little Pee Dee with Chinners Swamp

TMDL Approved September 2005

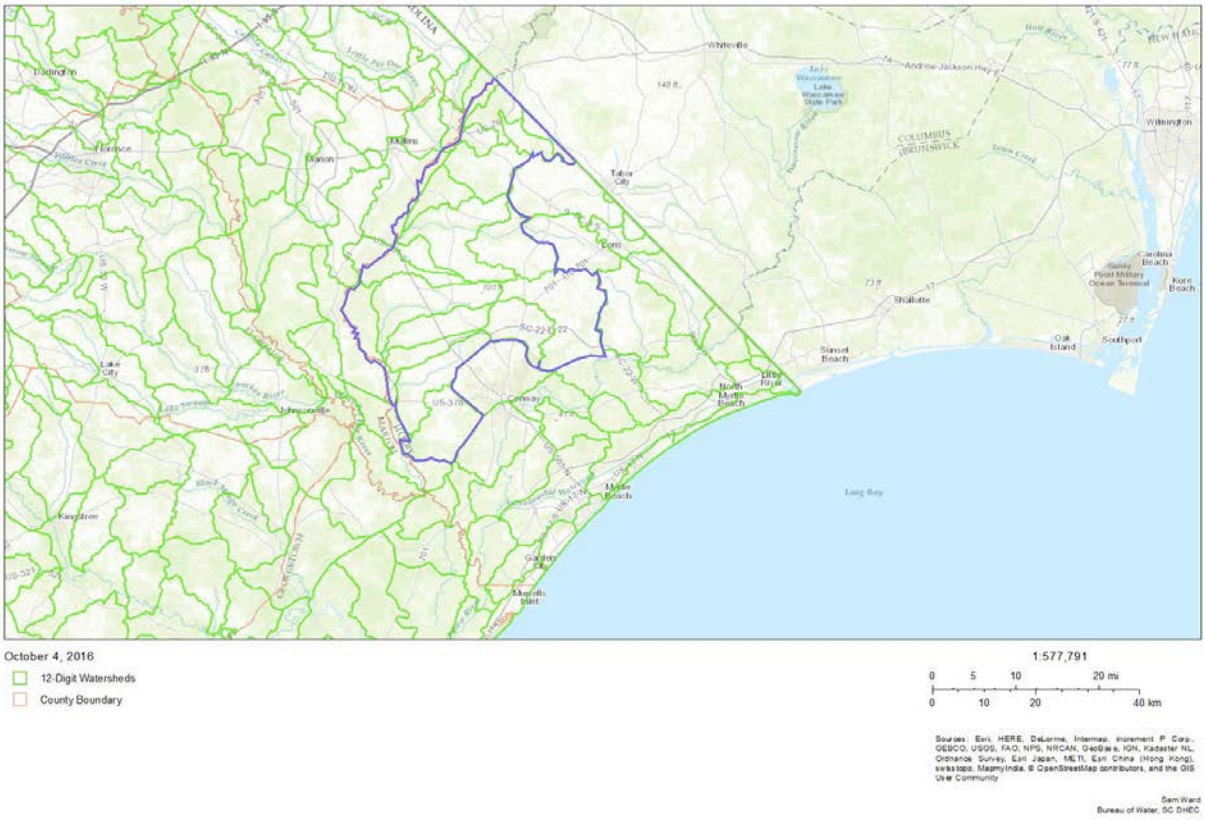
SCDHEC Technical Report Number 029-05

Element A: Identification of Causes and Sources of Impairments

Executive Summary

The watershed included some in part and some as a section are - which come together as the urban/ rural out lays of the 030402031403- Hooks Branch, 030402031401 Headwater Gapway Swamp, 030402031402 Jordan Creek, 030402040801 Cartwheel Branch, 030402040802 Black Creek, 030402031404 Lumber River, 030402040803 Back Swamp, 030402040804 Tredwell Swamp, 030402040808 Cypress Creek, 030402040807 Brown Swamp, 030402040809 Big Cypress Swamp, 030402040806 Palmetto Swamp, 030402040702 Brunson Swamp, 030402040701 Chinners Swamp, 030402040604 Long Branch-Iron Springs Swamp, 030402040603 Playcard Swamp, 030402060802 White Oak Swamp, 030402060801 Maple Swamp-Kingston Lake . These areas of interest are based on determinations from the field of poor soil quality, population density, house confined animal facilities, and social underserved urban and rural land users.

HUC LPD and Chinners



History/Partnerships

The environmental health of the Little Pee Dee River watershed in Marion and Horry Counties is currently threatened by non-point sources of fecal coliform bacteria. As a result of extensive monitoring at ambient water quality monitoring stations (station PD-037), the South Carolina Department of Health and Environmental Control (DHEC) has indicated that portions of the Little Pee Dee River watershed fail to meet water quality standards due to fecal coliform contamination. In addition, DHEC has noted an upward trend of fecal coliform concentrations at a second water

quality monitoring station within the watershed (PD-189). The 2005 TMDL report produced by DHEC (SCDHEC Technical Report Number: 029-05) indicates that causes for fecal coliform contamination at PD-037 may include a combination of nonpoint sources including storm water runoff from the Town of Mullins, failing septic systems, pets and wildlife. Sources for increasing trends in fecal coliform concentrations also include agricultural and livestock inputs. The Horry Soil and Water Conservation District proposes to implement the approved TMDL through a collaborative effort with conservation, public, and private entities dedicated to improving the water quality in the Little Pee Dee River watershed. With station PD-352. A working group of stakeholders will serve as an advisory panel for TMDL watershed outreach, implementation and management activities. Conservation plans & contracts will be developed by certified conservation planners for implementation by private landowners. Monies will be dedicated to implementing corrective measures that reduce the loading of fecal coliform bacteria in NPS sources according to the approved TMDL and the watershed advisory panel. Our project area will be on the Horry County line since a 319 grant was implemented and used within Marion County about 6 year ago. We will also expand the 319 area of a 2013 -319 called HAD, which was Horry, Aynor, and Dog bluff Areas.

Over the last several years with the increased pressure on the watersheds from urbanization and several natural rainfall events, the watersheds have had increased erosion problems. These erosion problems have caused stream banks to be unstable which has decreased the water quality because of increased sedimentation and turbidity.

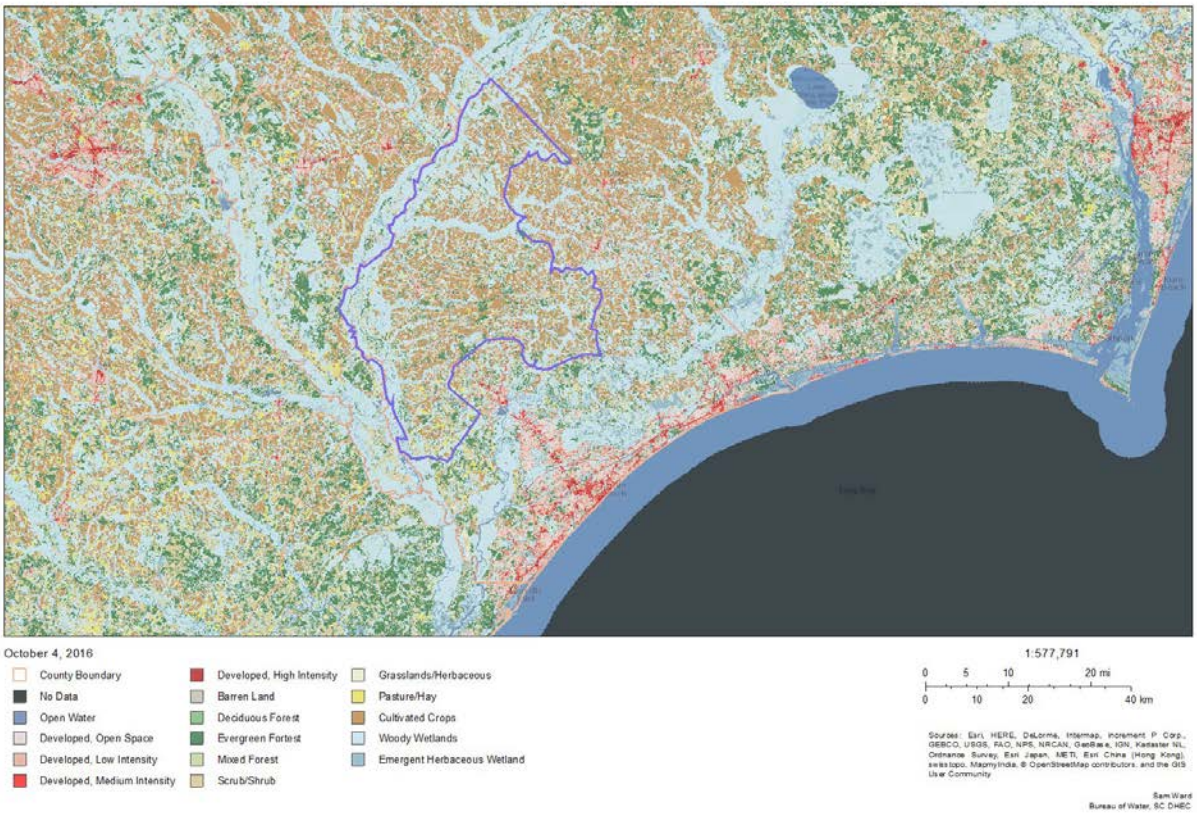
Watershed Description

The watershed includes channelized water bodies, swamps, with smaller un-channelized swamps. Zoning of the Watershed shows about 90% of the watershed is agriculture and forestland with 10 % of watershed being an urban and suburban developed area which includes the town of Aynor. There are 438 miles of roads in the watershed.

The soils range from sandy loam soils to heavy sandy clay soils. These soils have a moderate to slow infiltration rate. The areas normal rainfall is 52 inches per year with the highest rainfall being in February, March, July, and August. Vegetation occurring within the watershed is typical Southern Coastal Plain plants.

No National Register Historic Sites were found within the Watershed during the survey of the site.

Land Use LPD and Chinners



Watershed Conditions

A South Carolina Department of Health and Environmental Control (SCDHEC) monitoring station found in the downstream watershed is **PD-352**. This station is listed on the 2010 SCDHEC 303(d) list. The 303(d) list is the list of impaired water bodies. All states are required by the Environmental Protection Agency (EPA) to develop a list of water bodies that do not meet water quality standards. The purpose of the list is to identify impaired waters so that the source of impairment can be described and corrective actions can be implemented to improve water quality. This site is listed as impaired for Fecal Coliform for Recreational Use for swimming and Dissolved Oxygen for supporting Aquatic Life for macro invertebrates. South Carolina's current water quality standard (WQS) for primary contact recreational use in freshwaters is Escherichia coli (E. Coli): Not to exceed a geometric mean of 126/100 ml based on at least four samples collected from a given sampling site over a 30 day period, nor shall a single sample maximum exceed 349/100 ml. Pollutants, such as E. Coli bacteria, adhere to sediment particles and are transported throughout the system during rainfall events. E. Coli organisms imply that other harmful bacteria, protozoa, or viruses are likely present; and are linked with increased risk of human health illness (Rosenfield, McGee, Robertson, Noble and Jones, 2006). Nonpoint sources

of E. Coli bacteria may include failing septic systems, damaged or leaky sewer lines, livestock operations, pet waste, and resident waterfowl populations.

We will review both Point and Nonpoint Sources of contamination for consideration of implementing Best Management Practices.

There are two major points of Point Source Pollution, Storm Water Permits and Confined Animal Feeding Operations (CAFO). Storm Water Permits are regulated and monitored by SCDHEC. The SCDHEC currently maintains a statewide list of AFOs categorized by the type of facility (cattle, swine, poultry) and size which is defined by the specific number of animal units (large, medium, small). Many AFO's currently exist within the watershed. Therefore point sources are currently being regulated and will not be addressed in this watershed plan.

Nonpoint Source (NPS) water pollution generally comes from diffuse numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria containing waste from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest water body or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries and wetlands.

Nonpoint source pollution may also impact groundwater when it is allowed to seep or percolate into aquifers. The adverse effects of NPS pollution include physical destruction of aquatic habitat, fish die-offs, interference with or elimination of recreational uses of a water body, closure of shellfish beds, reduced water supply, and taste and odor problems in drinking water. Potential human health problems arise because of bacteria and toxic chemicals in NPS runoff, and increased potential for flooding because water bodies become choked with sediment.

Typically nine categories of NPS pollution impact South Carolina's waters which are: agriculture, forestry, urban areas, marinas and recreational boating, mining, streambank erosion, wetlands disturbance, land disposal/groundwater impacts, and wildlife. However in our watershed we will discuss agriculture, forestry, urban areas, streambank erosion, and wildlife.

Soils Information

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits

defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

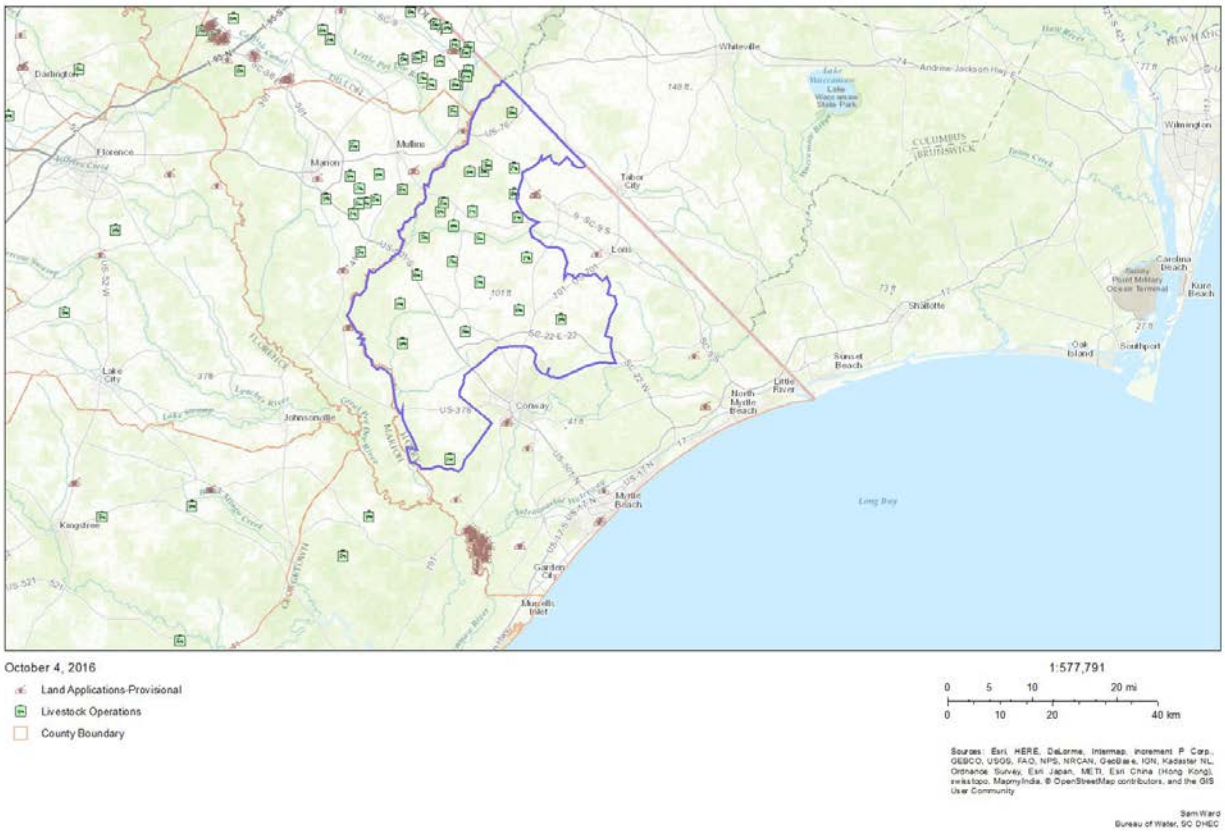
The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions. See appendix D: Soil Description.

NPS Pollution Sources

Agriculture

Animal Operations



There are 21 Confined Animal Operations within the project area. Six are Poultry and the remaining sites are swine facilities.

Row Crop Production

During our visual assessment of the watershed we have seen 65 large farmers and 94 small farmers who farm row crops within the watershed. Crops vary from highly intensive tillage crops such as tobacco to low tillage crops such as soybeans. Over use of pesticides and nutrients, soil erosion, and water quality from runoff with a lack of buffers in place, are potential nonpoint source pollution that could be found on theses farms. Currently the Horry Soil and Water Conservation District has a soil health demonstration in progress to show how cover crops can improve soil health and reduce runoff. Cover crops improve soil and water quality. Cover Crops reduce nutrient and pesticide runoff by 50% or more, decrease soil erosion by 90%, reduce sediment loading by 75%, reduce pathogen loading by 60% based on a fact sheet from James J. Hoorman, Cover Crops & Water Quality, Extension Educator Ohio State University Extension, Lima, Ohio. The average soil loss for and average crop rotation would be 5.3 tons of soil loss per year. See Appendix A: RUSLE2 Worksheet Erosion Calculation Record.

Livestock Operations

There are a large number of Livestock farms in the watershed area. There are 7 Large class cattle operations (150+), 40 medium class cattle operations (30 to 150 cattle) known to operate in the area. There are 45 hobby farmers with less than 6 cows/calves seen in the visual assessment. We saw 162 horse farms while touring the area which were actually hobby farms. Also we saw 51 small animal (goats/ sheep/ camels /donkeys /lamas) with-in the watershed. Livestock's waste can be a cause of non-point bacteria pollution. Animals with direct access to surface waters may defecate into the water. Animals will defecate in pastures not using Best Management Practices (BMP) and this will allow for runoff of bacteria into the surface waters after rain events. Three sites have been approached by USDA-NRCS for cost-share and are currently working to implement BMPs to protect waters from receiving animal waste and other contaminants.

Forestry

Logging does occur within the watershed, however most sites are replanted or allowed to naturally regenerate if not turned into developed land. Erosion during logging has not typically been a problem in the watershed. Sedimentation may occur during conversion of land to development, but Horry County does have county ordinances to assist in sediment and erosion control during construction. The average soil loss for and average crop rotation would be 1.3 tons of soil loss per year. See Appendix B RUSLE2 Worksheet Erosion Calculation Record.

Rural Living Uses

Pets

Pets can be a major contributor of E. Coli to streams. A study conducted by Weiskel *et al.* (1996) found that pets produce 450 million E. Coli per animal per day.

On average nationally, there are 0.58 dogs and 0.66 cats per household (American Veterinary Medical Association 2004). Using the U.S. Census data (U.S. Census Bureau 2000), dog and cat populations can be estimated for the counties. A study in a Washington, D.C. suburb found that dogs produce approximately 0.42 pounds of fecal waste per day (Thorpe 2003). A comparable number for waste produced by cats was not available; therefore, only the estimated tons per day of dog waste produce will be used. Based on the 2014 US Census, Horry County has 196,116 homes which equals to be 113,747 dogs and 129, 436.56 cats which totals 23.88 tons per day of dog waste. E. Coli from dog and cat waste can be transported by runoff from urban and suburban areas and can be a potential source of loading. These calculations were provided for informational purposes to demonstrate that pet populations are higher in urbanized areas and that they can be a significant source of E. Coli.

The large number of households in the watershed suggests that E. Coli contributions from pets are significant and must be considered as a bacteria pollutant source within the watershed.

Spaying or neutering your pet is an important decision for pet owners, and it will assist in decreasing overpopulation and reduce E. Coli in the watershed.

Failing Septic Systems

In our estimation, there is one septic system in every 15 acres of urban use in the watershed. Using that estimate, there are approximately 10034 septic systems in the proposed project area since some of the area has sewer. This area has high clay content within the soil profile, making septic system failure common. Also, because of our work in the neighboring watersheds, we have already identified several homes in this area with septic failures. Using a 10% failure rate, there may be 1003 systems needing repair or replacement. Failing septic systems indirectly add E. Coli to surface runoff during storm events. Depending on proximity to ditches and streams, a failing system may have direct access to a stream.

Streambank Erosion

Stream Bank Erosion is being caused by bottom degradation in the Watershed. Surveys show as much as two foot channel degradation over the last twenty years. Although bacteria is the primary pollutant of concern in this watershed, streambanks can be a source of sediment and nutrient pollution.

Wildlife

Waterfowl that establish year-round residence in residential or commercial storm water ponds can contribute to E. Coli bacteria loads. Migratory waterfowl (e.g. Canada geese, mallard ducks) may be encouraged to establish year-round residency by humans feeding them. A ready food source and protection from predators may be factors. Residential storm water ponds often are manicured to the edge with turf and little, if any, landscaping. Waterfowl prefer this type of setting because there is no cover for predators. By providing a non-natural food source, humans inadvertently sustain higher population densities of waterfowl than would naturally be supported, increasing the potential for E. Coli pollution. Management measures for this fecal source consist of outreach and education, interpretive signage, regulatory ordinance, or establishment of landscaping cover that might harbor possible predators or the threat thereof.

E. Coli bacteria are produced by warm blooded animals such as deer, feral hogs, wild turkey, raccoons, other small mammals, and avian species. The SC Department of Natural Resources (SCDNR) conducted a study in 2000 to estimate whitetail deer density based on suitable habitat (SCDNR 2000). This study assumed that deer habitat includes forests, croplands, and pastures. The deer density is estimated at more than 45 deer per square-mile.

There are currently no available data for other wildlife and avian species known to inhabit these watersheds which could potentially contribute to the E. Coli load. Given the representative statistics for deer population and the large amount of rural area (forest, cropland, and pasture) within these watersheds, wildlife may contribute a significant portion of the overall E. Coli load.

Loading Rates of Fecal Coliform

Source	Fecal Coliform Loading Rate	Fecal Coliform Loading Rate	Units	BIT Reference	Amount	CFU/ year without BMP
Swine	11X 10E 9	1.1E10	counts/ animals/day	ASAE, 1998	29700	3.3E14
Poultry	1.4 X 10E9	1.4E9	counts/ animals/day	ASAE, 1998	540000	7.5E14
Cattle	1.0 x 10E+11	1E+11	counts/ animals/day	ASAE, 1998	12,000	1.2E15

Horse	1.0 x 10E+11	1E+11	counts/ animals/day	ASAE, 1998	300	3E13
Septic System	1.0 X 10E+4 per ml/, 70 gal per person,	1.00E+10	counts/per day	Horsley and Witten, 1996		7.9E12
Dogs	4.5 X 10E	4.5E10	Counts/animals/day	Weiskel et. Al , 1996	12946	5.82E14
Cats	4.5X10E	4.5E10	Counts/animals/day	Weiskel et. Al , 1996	14732	6.62E14
Totals						3.5E15

Failing Septic System Calculations

This sheet contains information related to the contribution of failing septic systems to streams.

The direct contribution of fecal coliform from septics to a stream can be represented as a point source in the model. Required input for point sources in NPSM are loading rate (#/hr) and flow (cfs).

The following assumptions are made for septic contributions.

Estimated # septics:	10034	
Estimated # people served by septics:	3	
Avg # people served per septic:	2.39	people/septic
Assume a failure rate for septics in the watershed:	10	%
3785.41 ml/ 1 gallon		
Therefore the number of failing septics in the watershed is:		
Assume the average FC concentration reaching the stream (from septic overcharge) is **(Horsely & Whitten, 1996)**:	1.00E+04	count/100 ml
Assume a typical septic overcharge flow rate of: **(Horsely & Whitten, 1996)**	70	gal/day/person

Final Calculation

Watershed	Total area (acres)	# failing septic	Tot. # people served	Septic flow (gal/day)	FC rate (count/day)	
Total Need	300518	1003	3009	210630	7.9E12	

Element B: Expected Load Reduction

Source	Fecal Coliform Loading Rate	Fecal Coliform Loading Rate	Units	BIT Reference	Amount	CFU/ year without BMP	Amount of BMP's	CFU/ year BMP
Swine	11X 10E 9	1.1E10	counts/ animals /day	ASAE, 1998	29700	3.3E14	1000	1E12
Poultry	1.4 X 10E9	1.4E9	counts/ animals /day	ASAE, 1998	540000	7.5E14	5000	7E12
Cattle	1.0 x 10E+11	1E+11	counts/ animals /day	ASAE, 1998	12,000	1.2E15	30	3E12
Horse	1.0 x 10E+11	1E+11	counts/ animals /day	ASAE, 1998	300	3E13	10	1E12
Septic System	1.0 X 10E+4, 70 gal per person, 2232 people	1.24E+10	counts/ per day	Horsley and Witten, 1996		7.9E12	100	1.6E7
Dogs	4.5 X 10E	4.5E10	Counts/ animals /day	Weiskel et. Al , 1996	12946	5.82E14	1600	7.2E12
Cats	4.5X10E	4.5E10	Counts/ animals /day	Weiskel et. Al , 1996	14732	6.62E14	3600	1.62E14
Totals						3.5E15		1.8E14

Element C: Proposed Management Measures

Agriculture

Improper Application of Confined Animal Waste

Animal waste management consists of a system of methods for properly storing and applying animal wastes to farmland. Mobile feeding units allow producers to easily move feeding areas around fields, reducing waste concentrations and increasing breakdown of waste into non-pathogenic materials. Waste is more quickly absorbed by growing plants when it is not heavily concentrated. Advances in technology also make it possible to inject liquid waste under high pressure below the surface of the soil through the use of specialized equipment such as "honey wagons" to haul the liquid waste, and associated injectors to move the liquid beneath the soil's surface. Placement of liquid waste beneath the soil's surface significantly reduces surface water contamination through surface run-off. More recently, Advanced Aeration Systems has improved the delivery of liquid waste below the soil surface, by loosening the top 8-inches of the soil profile, allowing it to more efficiently absorb liquid waste. In a 2004 study by the Arkansas Department of Environmental Quality, the USDA-ARS, and the University of Arkansas, a 68% reduction in Total Nitrogen Loading (lb/Ac.) in storm water runoff was documented in fields spread with hog waste following Advanced Aeration System placement versus traditional surface spreading of hog waste (Knauf, T.A. 2005). Due to the complexities associated with determining correct sub-surface waste placement using injection technology, a 1-day waste management/equipment field day will be held to educate producers on equipment best suited to their particular conditions. In addition, agricultural experts will exercise final decision authority as to the correct waste placement equipment needed for each producer's particular farming situation.

Individual measures and practice estimates for this project include:

- Waste storage/coverage *(2 stacking shed)*
- Waste Management *(5-9 "honey wagons" or equipment for injection of manure into soil instead of spreading)*
- Closeout of Lagoons/ Storage Faculties *(3 farms)*
- Spreader calibration *(15 farms)*
- Manure testing *(15 farms)*
- Manure composting *(10 composters)*
- Nutrient Management/Precision Agriculture *(2000 acres)*
- Runoff Management *(500 acres)*

Livestock

Estimated specific conservation practices to control direct and indirect deposition from livestock of fecal coliform will include:

- Runoff management on 5000 acres
- Pasture planting for 300 acres
- Stream bank fencing 18000 feet
- Alternative water sources and grazing systems (using 30 wells, 65 tanks, 25,000 feet of pipeline, and 40,000 feet of fencing to total about 300 acres of pasture from animals)

Row Crops

Working together to improve farmer knowledge of using cover crop mixes to produce healthy soils.

Cover crops have the potential to provide multiple benefits in a cropping system. They prevent erosion, improve soil's physical and biological properties, supply nutrients, suppress weeds, improve the availability of soil water, and break pest cycles along with various other benefits. The species of cover crop selected along with its management determine the benefits and returns. Using Cover Crops can reduce the soil loss to 6.1 and help to improve soil health as well as improve water quality by reducing runoff. See Appendix C RUSLE2 Worksheet Erosion Calculation Record.

Rural Housing Uses

Failing Septic Systems

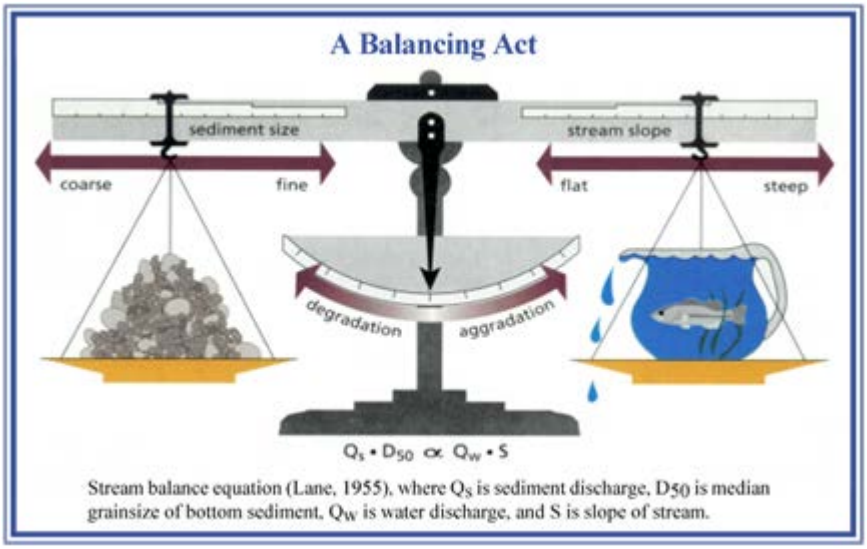
Failing septic systems indirectly add fecal coliform to surface runoff during storm events. Depending on proximity to ditches and streams, a failing system may have direct access to a stream. Best management practices are designed to address nonpoint sources of fecal coliform bacteria. Failing septic systems are often the result of improper or neglected maintenance, or poor soil suitability. Although not always the case, the lack of maintenance or poor site suitability may be related to low income. Solutions include repair or replacement of failed systems or connection to the sanitary sewer system. In both cases, costs can be significant, particularly for those with low income levels. Grant or payment assistance programs can aid in this process.

Streambank

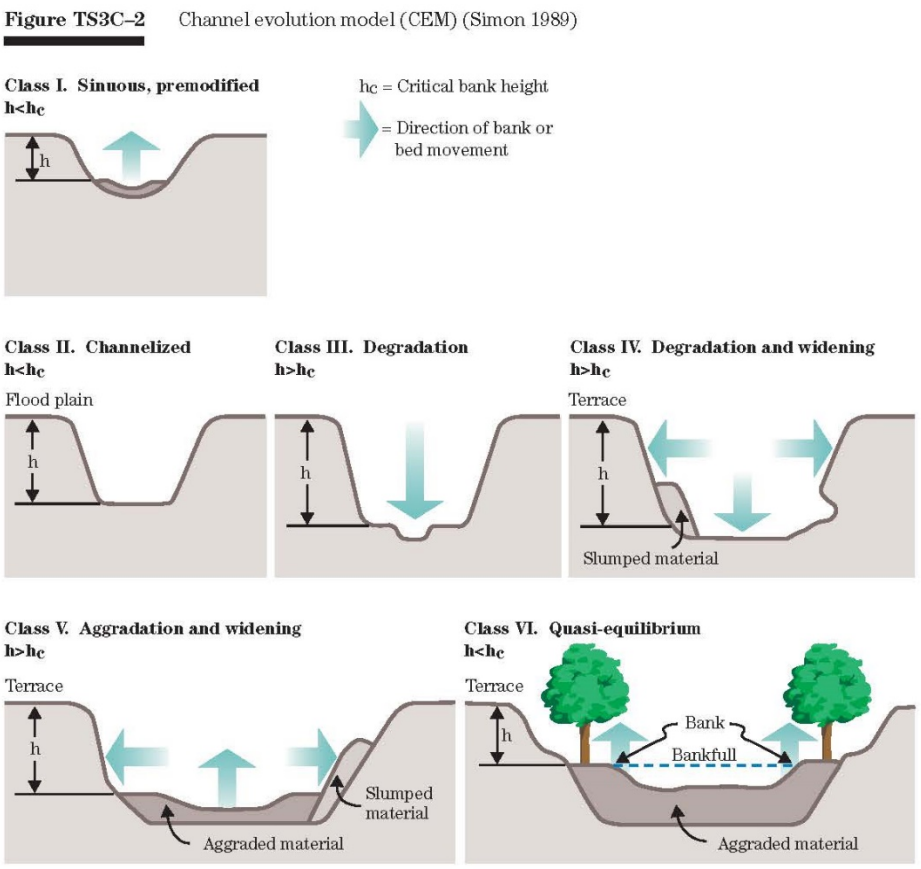
Natural streams change and adjust their shape and pattern in response to the speed, volume and duration of flow over long time periods. The way that natural forces interact to shift and alter stream patterns and characteristics is described as stream dynamics.

Over many years, streams develop their patterns and characteristics of transporting water and sediment from upland areas, through floodplains, and on to larger streams and rivers, and eventually, oceans. For hundreds of years, only minor changes were made to the landscape, and stream systems developed a balance of size and shape capable of carrying the water and sediment generated within each watershed. This balance is known as a state of equilibrium in which stream channels continue to shift and change slowly while maintaining their overall shape and size.

In this watershed, land has been cleared, the timber harvested the land plowed, the wetlands drained, and the creeks straightened. In the process, we also have covered large areas of our cities with concrete, asphalt and rooftops—impermeable surfaces that cannot absorb rainfall as the forests and meadows once did. The development of both farmland and urban land has resulted in a landscape that produces more runoff that moves at a faster rate. "Straightened" creeks then quickly transport the runoff at increased velocities. It is easy to recognize that the natural forces which cause streams to adjust and change their shapes and patterns have themselves been altered. These alterations are causing our stream systems to change dramatically in an attempt to restore equilibrium.



Stream balance equation (Lane, 1955), where Q_S is sediment discharge, D_{50} is median grainsize of bottom sediment, Q_W is water discharge, and S is slope of stream.



The response of a stream to watershed changes has been expressed by hydraulic engineer E.W. Lane as a stream balance equation (Lane, 1955). Lane concluded that a stream's energy, a function of speed and volume of water, must be in balance with the size and volume of sediment carried by the stream. In practical terms, this means that if either the volume of water (increased runoff) or velocity of water (steeper slope usually caused by channelization) increases, then the stream will

need to carry more sediment to balance the increased energy. The usual source for the additional sediment is either from the stream bottom or the stream banks—resulting in severe erosion. Conversely, if sediment load exceeds the available energy to transport it, then the stream aggrades, or fills in, causing loss of capacity and increased flooding. Both conditions are constantly observed in the Watershed. Once the stream equilibrium has been disrupted, the stream bottom typically erodes, deepening the channel. This process is referred to as down cutting. This in turn sets off a series of events that is described by a Channel Evolution Model (CEM) (Simon, 1989). Simply put, the CEM describes that as a channel cuts deeper, more water will remain inside the deeper channel before the stream floods, further increasing velocity and setting off a series of events that will result in failing banks, widening of the top stream width and development of a floodplain within the new channel. After this series of events, the channel will have again established equilibrium, but at a lower elevation and with a newly formed floodplain. It is important to understand that once a channel down cuts at one location, it will down cut upstream and in all tributaries throughout the watershed unless a grade control is encountered (i.e. bedrock or an artificial structure, such as a culvert). Therefore, if a lower reach undergoes down cutting as the result of a channelization project, the effects will be felt throughout the watershed, although it may take many years or decades for the effects of the down cutting to be seen throughout the entire watershed.

Stabilizing streams is a matter of balancing the force of the flowing water against the resistance of the channel sides and bottom. This task may sound simple but can be very complex and costly. Left alone, nature will find this balance; however, it may take decades, and may cause tremendous damage to cropland, roads, homes and other structures built near the stream. Also, large deposits of sediment may result in streams, lakes, and oceans that may degrade aquatic habitat and require expensive maintenance.

In years past, the rule was to remove all sediment so that the stream was not impaired during storm events. However with research it was determined by Horry County Storm Water to implement a maintenance practice to allow sediment to remain in the stream unless it totally blocks the flow of the stream allowing the channel to act as a natural stream to repair itself. However, with the amount of time that has elapsed, total repair without assistance seems impossible. This restoration will allow wetland vegetation to clean the water and remove the coliform.

Wildlife

Horry County currently has an ordinance that prohibits feeding of waterfowl. Concentrating waterfowl population contributes to fecal coliform pollution. The County will promote compliance with the ordinance, particularly in residential areas where ponds are prevalent by using media outlets and cable access channel.

Horry County also has an ordinance that prohibits excessive buildup of pet waste or depositing pet waste on public or private property that one does not own. The County will promote compliance with the ordinance using media outlets and cable access channel.

Pets

Cat and dog populations can get out of hand rapidly if left unchecked. Many pet owners cannot afford to have their pets spayed or neutered. A spay and neuter Campaign with cats and dogs can have a direct impact on water quality. Providing funding to assist and/or pay for spaying or neutering can greatly impact the population growth of cats and dogs. Funding directed to population control can dramatically reduce pet waste entering the environment. Pet owners can be reached through use of the news media, door hangers, flyers left at stores and churches, and with one on one contacts. Significant reductions in cat and dog populations and resulting waste reductions can occur with this program which should improve water quality over time.

Technical and Financial Assistance

The Little Pee Dee with Chinners Swamp Watershed Planning Group consists of the Town of Aynor, Horry County, Grand Strand Water and Sewer, Horry Soil and Water Conservation District, S.C. Department of Natural Resources, USDA-Natural Resource Conservation Service, and S.C. Department of Health and Environmental Control.

Horry County Storm Water Department role is to be in charge of maintenance of all the storm water runoff. Storm water collects the funds and administers the funds collected from tax payers. Horry County Storm water has been in charge of developing a plan to restore the flood plain, installing structures, and day to day maintenance. Their long-term goals are to stabilize the bottom of the stream and reduce sediment, reduce four-wheeler traffic within the stream, and restore the floodplain along the Canal.

S.C. Department of Natural Resources is in charge of protecting wildlife habitat for all animals small and large. SCDNR also serves as a technical advisor for the Horry Soil and Water Conservation District. SCDNR will continue to monitor the current location of the species of concern to track changes in population.

Horry Soil and Water Conservation District (HSWCD) promotes and publicizes the 319 Water Quality Project using all available media sources and one on one contacts. The HSWCD office is the main contact point for participants in this project. Applicants apply at the HSWCD office and HSWCD staff determine if the applicants live in the project area, review income information to determine cost share rate, make site visits to verify failing systems and their locations, and make follow-up visits after repairs and installations. All applicants are directed to the South Carolina Department of Health and Environmental Control (SCDHEC) office for their technical expertise and guidance.

USDA-NRCS work with local rural land users to improve their natural resources with different cost-share programs such as EQIP and CSP. These program are set up to allow for voluntary conservation on private land while improving the natural resources for all.

Information and Education

Education and outreach about the watershed, its goals and its activities will be conducted using a variety of methods.

Agricultural outreach is often best accomplished in a personal, one-on-one fashion or through trade associations. Residential outreach may be achieved through HOAs or via media outlets. Informational brochures, flyers, and door hangers will be produced to help recruit potential participants, particularly in communities immediately adjacent to streams that are known to have septic repair and replacement needs. Youth outreach can often be effective in reaching families. We hope to target the local fall and spring festivals with flyers and reach out to students attending various events at the Playcard Environmental Education Center throughout the year.

Because individual contact is most effective in the agricultural community, staff will make door-to-door contacts. Informational materials will also be produced targeting specific audiences. Flyers will be available at locations unique to the specific audience (i.e., feed-and-seed and tack stores for horse operations). We will work to reach audiences through other appropriate avenues (i.e. Pee Dee Cattlemen's Association, equine committees, etc.). Educational workshops, in cooperation with Clemson Extension Service, will be conducted to demonstrate proper ways to handle animal waste. Workshops may focus on: composting manure; confined animal waste management; rotational grazing and pasture grass management; fencing and watering systems; and preventing and curing animal health issues related to poor water quality.

The Spay and Neuter Program will be directed to population control which can dramatically reduce pet waste entering the environment. Pet owners can be reached through use of the news media, door hangers, flyers left at stores and churches, and with one on one contacts. Significant reductions in cat and dog populations and resulting waste reductions can occur with this program which should improve water quality over time.

Implementation Schedule

Phase 1 – Reduction of fecal coliform with a 319 Grant for the Little Pee Dee and Chinners Project. Currently submitting plan.

Phase 2. Part 1 is an effort to pave some dirt roads within the watershed where sandy soils are found as runoff is causing sediment movement. Horry County Public Works is in charge of locating and fixing problems as found. Yearly review by Public Works.

Phase 2. Part 2 Pursuing funding to add sewer pipeline to Project Area. Grand Stand Water and Sewer Board currently working on adding additional lines

Milestones and Outcomes

(1) Upgrade Confined Animal Facilities with Better Handling of Animal Bi-products
(2) Stabilize bank and channel to reduce sediment movement and failure of side slopes and maintenance roads.
(3) Reduce sediment entering the stream from non-point sources by looking at erosion on dirt roads with in the watershed.
(4) Assist landowners with installing buffers to remove sediment, nutrients, and pathogens from entering water system.
(5) Assist hobby farmers with understanding manure and pasture management, with planning, and educational workshops.
(6) Assist failing septic systems with repairs to reduce pathogens in the stream.
(7) Implement a Spay and Neuter Program

Ultimate project success will be determined using DHEC monitoring data collected at two stations within the watershed. Data will be collected for the length of the project, plus 1-2 years.

We will survey participants after 3 month with the hopes that 80% are maintaining their practice.

We have listed our expected number of BMP's and will use amount installed to determine success of the project. We may need to add to these goals or number of BMPs may be adjusted as implementation progresses.

Load Reduction Evaluation

At the end of the project we will use the same Estimated Load calculations to show our reduction based on actual work completed within the watershed. Load reductions will be based on standard values available in technical literature.

Monitoring and Assessment Strategy

We can assess success of the plan based on the:

1. Upgrading Confined Animal Waste Handling Facilities
2. Amount of bank and channel stabilized.
3. Number of Spayed and Neutered Animals
4. Amount of dirt roads paved within the watershed.
5. Amount of buffers installed on agricultural land.
6. Number of failing septic systems repaired to reduce pathogens in the stream.
7. Results from water quality monitoring by SCDHEC. SCDHEC ambient monitoring includes temperature, nutrients, pH, dissolved oxygen, alkalinity, and E. Coli. The results of the monitoring have not only resulted in the listing of the stream system as impaired for dissolved oxygen and E. Coli bacteria, but also indicate high sediment loads driven by rain events. Sediments are known to transport E. Coli bacteria and other pollutants which may stimulate algal and other bacterial growth that may lead to low dissolved oxygen levels.

Implementation success will be determined by several criteria. The simplest criterion is to assess the number of BMPs implemented during the project. A related criterion is to calculate the estimated reduction in pollutant loadings as a result of the number of BMPs implemented.

Finally, water quality monitoring data from various sources may be used to assess the impact on water quality parameters at the DHEC sampling locations to determine if they would support their use classifications.

Appendix A: Cropland RUSLE2 Worksheet Erosion Calculation for Soil Loss without BMP

RUSLE2 Worksheet Erosion Calculation Record

Info: Enter climate record, soil for dominant HEL soil and appropriate slope information. Then on line 2 of the Management Alternative table, select or create a management scenario representing the current farming system and any applied supporting pratices such as terraces, contouring or contour buffer strips. Compare the soil loss between the two profile runs.

Inputs:

Owner name	*Location*	--
Pee Dee	**USA\South Carolina\Horry County**	

Location	*Soil*	*T value*	*Slope length (horiz)*	*Avg. slope steepness, %*
USA\South Carolina\Horry County	SSURGO\Horry County, South Carolina\EuA Eulonia loamy fine sand, 0 to 2 percent slopes\Eulonia Loamy fine sand 90	5.0	150	2.0

Outputs:

Base management	*Description*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*	*Soil loss erod. portion, t/ac/yr*	*Soil detachment, t/ac/yr*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*
CMZ 67\b.Multi-year Rotation Templates\67 North\D01. TOBACCO\01. FLUE TOBACCO + COVER or GRAIN\B01. 2 YR. FLUE TOBACCO + SM GRAIN grain / DC SOY + fallow	Potential Erosion Continuously tilled	a. rows up-and-down hill	(none)	(none)	5.2	5.2	5.2	5.2

Appendix B: Forest RUSLE2 Worksheet Erosion Calculation for Soil Loss without BMP

RUSLE2 Worksheet Erosion Calculation Record

Info:

Inputs:

Owner name	*Location*	--
PD and Chinners	**USA\South Carolina\Horry County**	

Location	*Soil*	*T value*	*Slope length (horiz)*	*Avg. slope steepness, %*
USA\South Carolina\Horry County	SSURGO\Horry County, South Carolina\EuA Eulonia loamy fine sand, 0 to 2 percent slopes\Eulonia Loamy fine sand 90	5.0	150	2.0

Outputs:

Base management	*Description*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*	*Soil loss erod. portion, t/ac/yr*	*Soil detachment, t/ac/yr*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*
CMZ 67\a.Single Year/Single Crop Templates\Orchards\Established Orchard Full Cover		default	(none)	(none)	1.3	1.3	1.3	1.3

Appendix C: Cropland RUSLE2 Worksheet Erosion Calculation for Soil Loss with BMP

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info: Enter climate record, soil for dominant HEL soil and appropriate slope information. Then on line 2 of the Management Alternative table, select or create a management scenario representing the current farming system and any applied supporting pratices such as terraces, contouring or contour buffer strips. Compare the soil loss between the two profile runs.

Inputs:

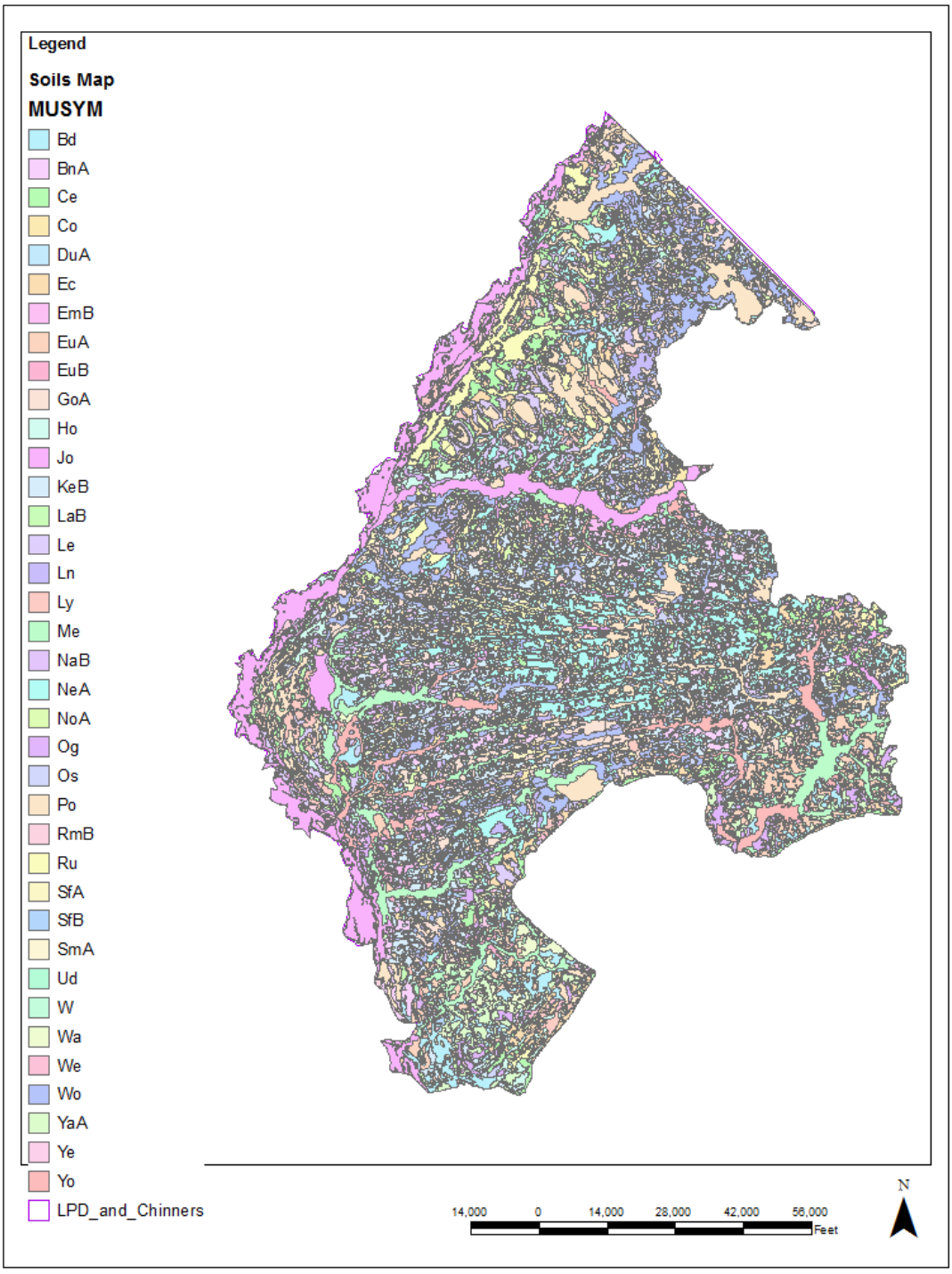
Owner name	*Location*	--
Pee Dee	**USA\South Carolina\Horry County**	

Location	*Soil*	*T value*	*Slope length (horiz)*	*Avg. slope steepness, %*
USA\South Carolina\Horry County	SSURGO\Horry County, South Carolina\EuA Eulonia loamy fine sand, 0 to 2 percent slopes\Eulonia Loamy fine sand 90	5.0	150	2.0

Outputs:

Base management	*Description*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*	*Soil loss erod. portion, t/ac/yr*	*Soil detachment, t/ac/yr*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*
CMZ 67\b.Mullti-year Rotation Templates\67 North\D01. TOBACCO\01. FLUE TOBACCO + COVER or GRAIN\B01. 2 YR. FLUE TOBACCO + SM GRAIN grain / DC SOY + fallow	Added Residue Management	a. rows up-and-down hill	(none)	(none)	4.9	4.9	4.9	4.9

Appendix D: Soil Description



Map Unit Symbol	Acres	Percent
Bd	7238.5	2%
BnA	7869.5	3%
Ce	9653.2	3%
Co	5208	2%
DuA	1824.8	1%
Ec	8190.6	3%
EmB	2425.3	1%
EuA	7676.1	3%
EuB	1032.2	0%
GoA	18488.6	6%
Ho	2886.2	1%
Jo	22081.7	7%
KeB	26085.8	9%
LaB	3015.8	1%
Le	11069.1	4%
Ln	7382.2	2%
Ly	4903.5	2%
Me	12795.9	4%
NaB	2399.1	1%
NeA	27078.2	9%
NoA	4287	1%
Og	5250.6	2%
Os	2992.3	1%
Po	28785.7	10%
RmB	1626.2	1%
Ru	13729.2	5%
SfA	5547	2%
SfB	1918.5	1%
SmA	445.1	0%
Ud	378	0%
W	1746.9	1%
Wa	3284.8	1%
We	743	0%
Wo	24832	8%
YaA	6057.6	2%
Ye	803.6	0%
Yo	8786.5	3%
Total:	300518.3	100%

Map Unit Description

Horry County, South Carolina

[Minor map unit components are excluded from this report]

Map unit: Bd - Bladen fine sandy loam

Component: Bladen (100%)

The Bladen component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

Map unit: BnA - Blanton sand, 0 to 6 percent slopes

Component: Blanton (85%)

The Blanton component makes up 85 percent of the map unit. Slopes are 0 to 6 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 60 inches during January, February, March, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

Map unit: Ce - Centenary fine sand

Component: Centenary (85%)

The Centenary component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 42 inches during January, February, March, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

Map unit: Co - Coxville fine sandy loam

Component: Coxville (100%)

The Coxville component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

Map unit: DuA - Duplin loamy fine sand, 0 to 2 percent slopes

Component: Duplin (100%)

The Duplin component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map Unit Description

Horry County, South Carolina

Map unit: Ec - Echaw sand

Component: Echaw (95%)

The Echaw component makes up 95 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

Map unit: EmB - Emporia loamy fine sand, 2 to 6 percent slopes

Component: Emporia (100%)

The Emporia component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces, coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: EuA - Eulonia loamy fine sand, 0 to 2 percent slopes

Component: Eulonia (90%)

The Eulonia component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: EuB - Eulonia loamy fine sand, 2 to 6 percent slopes

Component: Eulonia (92%)

The Eulonia component makes up 92 percent of the map unit. Slopes are 2 to 6 percent. This component is on coastal plains, marine terraces. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: GoA - Goldsboro loamy fine sand, 0 to 2 percent slopes

Component: Goldsboro (96%)

The Goldsboro component makes up 96 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map Unit Description

Horry County, South Carolina

Map unit: Ho - Hobcaw fine sandy loam

Component: Hobcaw (100%)

The Hobcaw component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains, coastal plains. The parent material consists of loamy fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 6w. This soil meets hydric criteria.

Map unit: Jo - Johnston loam

Component: Johnston (100%)

The Johnston component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flood plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, November, December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 7w. This soil meets hydric criteria.

Map unit: KeB - Kenansville fine sand, 0 to 6 percent slopes

Component: Kenansville (100%)

The Kenansville component makes up 100 percent of the map unit. Slopes are 0 to 6 percent. This component is on marine terraces, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map unit: LaB - Lakeland sand, 0 to 6 percent slopes

Component: Lakeland (100%)

The Lakeland component makes up 100 percent of the map unit. Slopes are 0 to 6 percent. This component is on coastal plains, marine terraces. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 4s. This soil does not meet hydric criteria.

Map unit: Le - Leon fine sand

Component: Leon (100%)

The Leon component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Map Unit Description

Horry County, South Carolina

Map unit: Ln - Lynchburg loamy fine sand

Component: Lynchburg (94%)

The Lynchburg component makes up 94 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: Ly - Lynn Haven sand

Component: Lynn Haven (100%)

The Lynn Haven component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Map unit: Me - Meggett loam

Component: Meggett (100%)

The Meggett component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flood plains. The parent material consists of clayey fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 5 percent. Nonirrigated land capability classification is 6w. This soil meets hydric criteria.

Map unit: NaB - Nankin fine sandy loam, 2 to 6 percent slopes

Component: Nankin (96%)

The Nankin component makes up 96 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces, coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: NeA - Nansemond loamy fine sand, 0 to 2 percent slopes

Component: Nansemond (95%)

The Nansemond component makes up 95 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, stream terraces. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map Unit Description

Horry County, South Carolina

Map unit: NoA - Norfolk loamy fine sand, 0 to 2 percent slopes

Component: Norfolk (96%)

The Norfolk component makes up 96 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, marine terraces. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during January, February, March, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

Map unit: Og - Ogeechee loamy fine sand

Component: Ogeechee (100%)

The Ogeechee component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

Map unit: Os - Osier loamy sand

Component: Osier (100%)

The Osier component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, stream terraces. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

Map unit: Po - Pocomoke fine sandy loam

Component: Pocomoke (100%)

The Pocomoke component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Map unit: RmB - Rimini sand, 0 to 6 percent slopes

Component: Rimini (90%)

The Rimini component makes up 90 percent of the map unit. Slopes are 0 to 6 percent. This component is on coastal plains, Carolina Bays. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Map Unit Description

Horry County, South Carolina

Map unit: Ru - Rutlege loamy sand

Component: Rutlege (100%)

The Rutlege component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains, coastal plains. The parent material consists of sandy fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 7w. This soil meets hydric criteria.

Map unit: SfA - Suffolk loamy fine sand, 0 to 2 percent slopes

Component: Suffolk (100%)

The Suffolk component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, marine terraces. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

Map unit: SfB - Suffolk loamy fine sand, 2 to 6 percent slopes

Component: Suffolk (90%)

The Suffolk component makes up 90 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces, coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: SmA - Summerton fine sandy loam, 0 to 2 percent slopes

Component: Summerton (96%)

The Summerton component makes up 96 percent of the map unit. Slopes are 0 to 2 percent. This component is on marine terraces, coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

Map unit: Ud - Udorthents and Udipsamments, well drained

Component: Udipsamments (50%)

The Udipsamments component makes up 50 percent of the map unit. Slopes are 0 to 15 percent. This component is on coastal plains, fills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Udorthents (50%)

The Udorthents component makes up 50 percent of the map unit. Slopes are 0 to 6 percent. This component is on fills, coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage

Map Unit Description

Horry County, South Carolina

Map unit: Ud - Udorthents and Udipsamments, well drained

Component: Udorthents (50%)

class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Map unit: W - Water

Component: Water (100%)

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Map unit: Wa - Wahee fine sandy loam

Component: Wahee (90%)

The Wahee component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: We - Witherbee sand

Component: Witherbee (90%)

The Witherbee component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Map unit: Wo - Woodington fine sandy loam

Component: Woodington (100%)

The Woodington component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on stream terraces, coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

Map unit: YaA - Yauhannah fine sandy loam, 0 to 2 percent slopes

Component: Yauhannah (90%)

The Yauhannah component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map Unit Description

Horry County, South Carolina

Map unit: Ye - Yemassee loamy fine sand

Component: Yemassee (90%)

The Yemassee component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on coastal plains, flats. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: Yo - Yonges fine sandy loam

Component: Yonges (100%)

The Yonges component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.