Jasper County

Natural Resources Conservation Plan

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Natural Resources Conservation Plan

A concerted community effort to protect the natural resource base in Jasper County for generations to come…

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ACKNOWLEDGEMENTS

The Jasper County Natural Resources Conservation Plan project has been a collaborative effort from various state, federal, county, municipal, business, and citizen partners. This document was developed through a series of public meetings and written by a smaller group of county stakeholders. The Jasper Soil and Water Conservation District (JSWCD) made this plan possible with their positive support, input into the project, and grand facilities. The JSWCD Commissioners include Gordon Wells (chairman), Robert Cope, Zenie Ingram, C.M. Danzler, Tommy Stanley, and support staff Delia Caskey.

The three primary agencies leading the project include the U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS), S.C. Sea Grant Consortium (SCSGC), and S.C. Department of Natural Resources (SCDNR).

Chris Graves, District Conservationist for USDA-NRCS, was involved in initiating this effort, along with the JSWCD, and has provided support and enthusiasm throughout the project. April Turner, of SCSGC, organized and facilitated the meetings and provided support for managing various sections of the document throughout this process. Lindsay Fairchilds of SCDNR contributed with plan development, including research, writing, editing, and formatting of plan content. This endeavor would not have been a success without the input and involvement of local landowners and community members. Of particular note, the Focus Group stakeholders (listed on the following page) provided valuable time and efforts toward successful completion of this document.

Other project partners who participated in the meetings include the USDA-Farm Service Agency (FSA), U.S. Fish and Wildlife Service (USFWS) Refuges and Ecological Services divisions, Clemson University Cooperative Extension Service, The Nature Conservancy (TNC), U.S. Army Corps of Engineers (USACE), S.C. Forestry Commission, S.C. Department of Health and Environmental Control (SCDHEC), Office of Ocean and Coastal Resource Management (OCRM), Jasper County, Town of Ridgeland, City of Hardeeville, National Oceanic and Atmospheric Administration's Coastal Services Center (NOAA-CSC), Town of Bluffton, Beaufort County Planning Department, Beaufort County Open Land Trust, AgSouth, AAC Building Service, South Carolina Coastal Conservation League (SCCCL), Lowcountry Council of Governments (LowCOG), Trust for Public Land (TPL), Good Hope Plantation and Corporation, Turkey Hill Plantation, Okeetee Club, Fife Plantation, Kinghorn Insurance Services, Spring Hill Plantation, Nada Williams Realty, Copper Station, The Lowcountry Institute, and Mead-Westvaco.

Many individuals helped write this document and provided invaluable research and expertise. The entire focus group provided editorial comment and input, but certain individuals should be recognized for their written contributions. Chris Graves, Lindsay Fairchilds, and others wrote many sections of the introduction. Drennan Park (SCDNR hydrologist) wrote the majority of the Streams, Rivers, and Watersheds section, with assistance from Russell Berry (SCDHEC) Lindsay Fairchilds, and Chris Graves. Bob Eppinette (Soil Scientist for NRCS) and Chris Graves wrote the Wetlands and Hydric Soils Section. Ed Eudaly (USFWS) wrote the Threatened and Endangered Species section and developed the associated tables. Lindsay Fairchilds, Joe Hamilton (TNC), Bert Shiflet (Okeetee Plantation), and others developed the Critical Ecosystems, Habitats, and Associated Flora and Fauna section, later joined with the Threatened and Endangered Species section. Chris Graves, Joe Hamilton, Bert Shifflet, Lindsay Fairchilds, and others wrote the Traditional Land Management section. Zenie Ingram and Jim Errante (NRCS) developed the Archeological, Historic, and Cultural Resources section, with input from Wafford Malphrus and assistance from Lindsay Fairchilds and Chris Judge (SCDNR). Jacki Martin (SCCCL), Ashley Demonthenes (TNC), and David Jirousek (LowCOG) wrote the Urban Growth Management sections, with assistance from April Turner and Chris Graves. The Natural Resource Economics section was a joint effort, with contributions from Lindsay Fairchilds, Russ Webb (USFWS), Joe Hamilton, Chris Graves, Curt Hobbs (NRCS), and Tommy Walker (Clemson Extension). Chris Graves developed the Environmental Education section, with critical review by Chris Marsh (Spring Island). The entire focus group also provided considerable input to

the Strategies, Policies, and Actions for Implementation sections of the document.

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On behalf of Jasper County's natural resources and the generations to come that will enjoy their immeasurable benefits, we thank all of the individuals involved in this powerful and promising document. For the expertise, time, effort, creative input, and compassion for the message in this document, we acknowledge these special individuals.

Jasper County Natural Resources Conservation Plan Focus Group

- Robert Cope, Jasper Soil and Water Conservation District and Jasper County landowner
- Marc Cribb, S.C. Department of Natural Resources
- Ashley Demosthenes, The Nature Conservancy
- Bob Eppinette, U.S. Department of Agriculture, Natural Resources Conservation Service
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- Chris Graves, U.S. Department of Agriculture, Natural Resources Conservation Service
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- Tommy Walker, Clemson University Cooperative Extension Service
- Lindsay Fairchilds, S.C. Department of Natural Resources
- Milton Woods, Jasper County landowner
- Russell Webb, U.S. Fish and Wildlife Service

A NOTE FROM THE FOCUS GROUP

Urban development is encroaching on almost every county in the South. Jasper County, South Carolina, is no exception; it is a coastal county supported by friendly people, growing job opportunities, a rich history, and vast natural resources. A short distance from Hilton Head Island and the beach, located between the two thriving cities of Savannah and Charleston, and with I-95 running through the center, Jasper County is a prime target for development. The potential development impacts on the County, and specifically on each of our individual lives, are immeasurable and challenging. Recent growth projections, based on approved developments in Jasper County, estimate that 31,000 acres will be developed and bring over 160,000 new residents in the next 10 years (Jones, pers. comm.). To a rural county of around 24,500 residents, these changes are intimidating to say the least.

In response to these dramatic changes in land use and population, Jasper County has teamed up with its two primary municipalities in Ridgeland and Hardeeville to evaluate, consider, protect, and plan for the effects of this development on our County's substantial natural resource base. This effort was born out of concern that these new developments would change the character and quality of life of our County and that irresponsible, large-scale development would occur without planning for natural resource conservation. Furthermore, people and their communities lose their unique identities and friendly nature when their communities are overwhelmed with traffic, rooftops, extreme busyness, and the quality of life is deteriorated forever. We wanted to ensure that Jasper County planners, Council members, and communities were prepared to handle effects of development. The foremost goals of this Plan were to assure preservation and conservation of our County's water quality, wildlife populations, natural areas, and working farms and plantations. We contend that development is not progress if natural resources fall by the wayside or are disregarded in the process. Too many Americans are unaware of the inextricable relationships between natural resources and our livelihood.

A planning team of diverse individual stakeholders, the Focus Group, was convened to determine necessities for responsible growth. The group, composed of professional and community individuals, wants to be a voice for our natural resources and the future of quality of life in Jasper County. The Focus Group determined that a document assessing and prioritizing our natural resource objectives was essential, and we developed this Countywide Natural Resources Conservation Plan. We believe that the recommendations in this Plan are a key to deterring poorly planned growth. We also believe that County and municipal dedication to the concepts set forth in this Plan will result in optimal resource conservation.

If Jasper County and its municipalities use the recommendations in this plan, they will be promoting a higher standard for urban development that strives to balance the needs of humans and nature. It is our hope that the people of Jasper County can use the information within this document to serve as a future reference and educational tool for natural resource educators and planners. Most importantly, the biological data and innovative solutions herein will protect the unique and infinite benefits of our natural systems for generations to come.

SUMMARY

The Jasper County Natural Resources Conservation Plan was borne out of a community concern for the unique and diverse natural amenities and traditional land management practices in Jasper County. The Jasper Soil and Water Conservation District, with support from S.C. Department of Natural Resources, SC Sea Grant Consortium and USDA Natural Resources Conservation Service, led an effort to gather public input and produce a plan designed to address the conservation needs throughout the County. A community group was convened in early 2005 to gather public input and formulate plans to address the significant and growing development pressures in Jasper County. The desired outcome of this document is that county and municipal planners, leaders, landowners, and developers will take heed of these recommendations and work toward making this plan a reality in Jasper County.

This document reflects public concerns, input, and goals for the County's natural resources and the quality of life surrounding them. It showcases specific strategies and recommendations to successfully implement responsible urban development practices and attempt to preserve healthy natural resources. The ideas in this plan were developed by community landowners, leaders, and natural resource professionals who believe in the traditions, culture, natural, and scenic qualities of Jasper County's resource base.

This plan contains a wealth of material on the history and status of natural resources in Jasper County and is broken into various sections that include (1) streams, rivers, and watersheds; (2) wetlands and hydric soils; (3) critical ecosystems, habitats, and associated flora and fauna; (4) traditional land management practices; (5) archeological, historic, and cultural resources; (6) urban growth management; (7) natural resources economics; and (8) environmental education. The document also contains numerous maps that are fundamental for conservation planning and County planning efforts. The larger map developed for this document entitled "Primary Protection Areas" (Figure 11, located on page 62) includes wetland areas plus a 50 foot buffer, longleaf pine soils, prime farmlands, and hydric soils in which planners should seek to protect and look upon with increased scrutiny.

The primary strategies, policies, and actions for implementing sound conservation in Jasper County are broken out in the eight sections listed above. Below is a summary designed to highlight some of the recommendations for these sections.Please refer to individual sections for more cumulative and specific ideas.

Streams, Rivers, and Watersheds

- Implement a combination of regulations and incentives to ensure that development adequately mitigates impacts to water quality and water quantity
- Encourage low impact development techniques to minimize non-point source pollution and impervious surfaces
- Develop minimum buffer requirements along riparian zones
- Coordinate with local, state, and federal agencies in making water quality decisions and developing water quality programs
- Develop and maintain an up-to-date stormwater management plan that addresses flood prevention and water quality

Wetlands and Hydric Soils

- Update current zoning ordinances and land development regulations to reflect the County's goals to ensure for the protection and conservation of its wetlands
- Develop minimum buffer requirements for jurisdictional and isolated wetlands

- Establish a county office to develop, track, and enforce wetland regulations
- Charge an additional mitigation fee for the loss or conversion of wetlands to contribute directly to the protection, restoration, and management of other wetlands in the County by use of a County Conservation Bank
- Ensure that existing floodplains are maintained in a state where their essential natural functions can be performed

Critical Ecosystems, Habitats, and Associated Flora and Fauna

- Develop a County Conservation Bank to house and provide funding for the protection of critical lands in perpetuity
- Reduce threat of fragmentation through the development of urban growth boundaries and various zoning ordinances
- Encourage private landowners to use conservation easements, purchase of development rights, and other conservation related incentives
- Develop a countywide wildlife corridor plan through information gathering and mapping
- Restore, maintain, manage, and enhance critical landscapes by encouraging landownder partnerships with Federal and State private lands management agencies

Traditional Land Management Practices

- Promote forestry and agricultural conservation best management practices for farms, forests, and plantations
- Protect traditional land management practices related to farm and forest management, such as prescribed fire
- Establish rural programs such as voluntary agricultural districts, land conservation districts, and rural residential districts
- Charge an impact fee for development of prime farmlands and redistribute those funds to protect other prime farmlands in the County

Archaeological, Historic, and Cultural Resources

- Develop a specific management plan for archaeological, historic, and cultural resources
- Evaluate, provide, and promote activities, facilities, and educational opportunities to enhance cultural stewardship and tourism opportunities
- Create historic overlay districts around significant properties for more stringent density and buffer requirements

Urban Growth Management

- Develop urban growth boundaries around existing municipalities and their services as a quality growth management tool
- Designate a Natural Resources Review Team in partnership with the JSWCD and its primary partners. The Review Team would evaluate proposed development projects and provide natural resources planning information to Jasper County and its municipalities
- Create a County Conservation Bank to funnel impact fees and potential tax monies to protect rural and critical lands

- Protect land permanently through a variety of protective land conservation mechanisms such as easements, purchase of development rights, transfer of development rights, fee simple land acquisitions, and other tools
- Create an urban greenspace plan to provide urban parks, greenways, and usable natural areas for the public

Natural Resource Economics

- Expand and diversify wildland recreation opportunities in Jasper County to increase tourist attraction, gain larger local interest and participation, and stimulate the economy
- Partner with natural resource agencies and organizations to develop a natural resource-based strategic recreation and tourism plan for the County
- Conduct an updated natural resources economics study for the County

Environmental Education

- Provide funding for a full-time natural resources educator for Jasper County
- Promote the Blue Heron Learning Center as the Jasper County natural resources education information center to serve the County
- Develop a strategic natural resources education plan for Jasper County

LINDSAY FAIRCHILDS

This row of live oaks at Davant Plantation is characteristic of the natural lowcountry charm in Jasper County

Chapter One

Introduction

Background

Historical land-use patterns provide evidence of a reliance on natural resources in Jasper County. Native Americans fished, hunted, and farmed to survive. They used naturally occurring and controlled fires as land management practices in the Southeast to suit wildlife, settlement, and agricultural needs (Silver 1990). English colonization of the Charleston area in 1608 eventually brought settlers to Jasper County. Early settlement accounts indicate that coastal South Carolina was dominated with longleaf pine-wiregrass and longleaf pine-bluegrass communities (Sargent 1884, in White 2004). Large stands of longleaf pine were destroyed to create naval stores for exportation of turpentine (Silver 1990) and this practice continued until rice cultivation became more common in Jasper County. The longleaf pine region was fully settled by 1750 (Frost 1993).

A period of relatively low-intensity land use existed until about 1780 when rice and indigo farming became the dominant agricultural practice in the Lowcountry. Expanding infrastructure and wood markets supported an intense slash and burn conversion of forest land to agriculture during this period (White 2004). Forest regeneration efforts were widespread in the 1930s during the Roosevelt administration and many parts of Jasper County were reforested. Land use remained relatively stable in South Carolina from 1945 through 1980. Since the 1980s, land use patterns have shown a dramatic shift from rural to urban land use along the Coastal Plain (Wear 2002). The metropolitan centers of Myrtle Beach, Charleston, and Hilton Head Island expanded dramatically in the past 30 years. Future growth projections in these areas and others along the coast predict continued growth from overflow retirement communities and new residents.

PHILLIP JONES

This marker documents Jasper County's early community in Purrysburg, established in the early 1700's.

Given the growth predictions for the South Carolina coast and the fact that many coastal areas are rapidly urbanizing, many potential residents may target Jasper County in search of a coastal lifestyle or rural setting. The Jasper County Chamber of Commerce describes Jasper as "the Gateway to the Lowcountry," and it points out that Jasper is "renowned worldwide for its unique history and natural assets…[and has] retained the simple, original flavor of the Lowcountry" (Jasper County Chamber of Commerce website 2005). This region of the country has long enjoyed a quality of life not found in many areas due to the mild climate, low density of development, existing natural resources, and cultural character. These characteristics correspond with less traffic, lower crime, abundance of natural resources, lower taxes, less pollution, and many other elements related to quality life.

Based on estimates of approved development projects, Jasper County is facing a population increase of about 160,000 people, and development of over 30,000 acres of land within the next 10 years (Jones pers. comm.). With such a huge increase in a short amount of time, residents and governments are faced with dramatic change. A recent study by Clemson University's Strom Thurmond Institute shows that the sprawl index (urban area to population growth) for the Beaufort-Colleton-Jasper area is about 3:1 (Allen and Lu 2006). Projections from that study based on the current sprawl factor show increases in urban area (Figure 1). In an oral presentation on this study, Allen points out that the negative effects of these changes may include increases in cost of living; rise in taxes; increased infrastructural pressure; traffic congestion; environmental pollution; loss of farmland, forest land, and natural landscapes; downtown declines; and community segregation. He suggests determining where not to grow by providing incentives for growth areas, disincentives for areas to protect, and making users pay for new growth.

Today, Jasper County's citizens and lawmakers are at a crossroads; their decisions will determine the future of the County's landscape. Jasper County and municipal leaders have a unique opportunity to change the face of development and its impacts on this county by choosing a progressive approach in placing conservation as a top priority, and directing development with minimal environmental impact. Jasper County citizens are concerned for the conservation of natural resource amenities. The overwhelming community consensus emerging from this document suggests that developers, planners, and elected officials should value natural resource protection and education in community development.

CHRIS GRAVES

Billboard on I-95 advertising for new residents to Jasper County.

Purpose

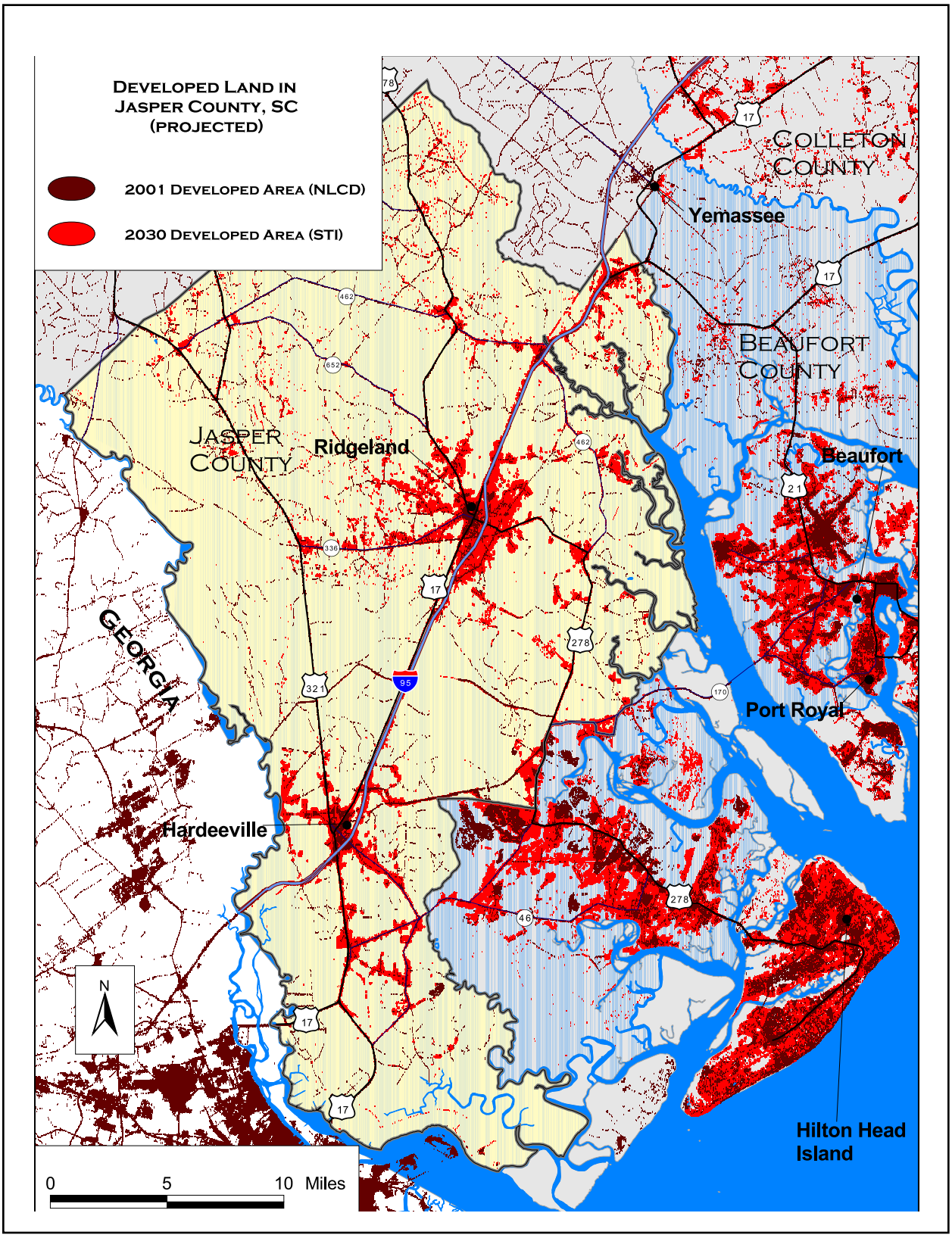
The Jasper County Natural Resources Conservation Plan provides specific data, personal accounts, and recommendations for the County's comprehensive growth plan. This plan is intended to help direct future growth patterns, provide quality growth management tools that are designed to protect the County's natural resources in conjunction with development, and preserve the rich heritage and quality of life in this part of South Carolina. This plan focuses primarily on the future sustainability of the region's natural resources, including soil, water, air, plants, and animals.

This plan is designed to address the current threats to our natural, cultural, and historical resources with regard to escalating urban and population growth projections for Jasper County. The information herein will hopefully serve as a future reference to the citizens of Jasper County, an education tool for natural resource educators and planners, and most importantly, an inventory of biological data and innovative solutions of how to protect the many fragile ecosystems and species.

PHILLIP JONES

The fishing tradition in Jasper County has a long history. Here, local fishermen use cane poles in the Savannah River

Figure 1. Growth projections for the Beaufort-Colleton-Jasper area



Compiled by Craig Campbell from EPA, National Land Cover 2001 Data and Clemson Unniversity Strom Thurmond Institute

Plan Development

On January 20, 2005, the Jasper Soil and Water Conservation District (JSWCD), in conjunction with USDA-Natural Resources Conservation Service (NRCS), S.C. Department of Natural Resources (SCDNR), and S.C. Sea Grant Consortium (SCSGC), began this countywide conservation planning effort. The planning process followed a Conservation Needs Assessment format, available through the NRCS. The goal was for the JSWCD, the organization charged by law with overseeing conservation in the County, to organize all levels of government, non-profit organizations, businesses, and private citizens with an interest in natural resources and to work together on conservation planning for Jasper County. It is based on the principle that community stakeholders are best suited to deal with local resource problems. The planning effort can be broken into five basic parts that include: (1) Assess the natural resources and conservation needs in the County; (2) Set community conservation goals; (3) Develop an action plan, or in this case, a countywide conservation plan; (4) Integrate the plan into the new comprehensive growth plan; and (5) Measure success.

The JSWCD led the effort to gather public input from a broad range of agencies, organizations, businesses, and individuals who have an interest in natural resource conditions and conservation needs. Over 400 invitations were mailed to a host of county stakeholders, including Jasper County landowners (both large and small), Jasper County government employees and officials, the cities of Ridgeland and Hardeeville employees and officials, over 20 public conservation agencies and private conservation organizations, and associated businesses and companies. The idea was to build a diverse stakeholder group interested in current urban development and concerned about natural resources conservation in the County. The JSWCD held three public meetings at the Blue Heron Learning Center to educate and inform stakeholders about conservation planning efforts and gather input on other relevant conservation issues.

PHILLIP JONES

The breeding habitat for these cattle egrets is large wetlands, like those found in this picture taken at the Savannah NWR.

A smaller, representative group of diverse stakeholders called the Focus Group was responsible for writing and developing the plan. The Focus Group met, and various sections and mapping projects were assigned to individuals or agencies. The plan was developed, went through various draft stages, and was thoroughly reviewed by the Focus Group. The information gathered could then serve as a platform for decision-making for local priorities, policies, and conservation strategies to be used as a reference for developing the overall County comprehensive growth plan.

Jasper County, Hardeeville, and Ridgeland have a rare opportunity to make some bold decisions on how they develop the bulk of this County. With over 30,000 acres currently slated for development and a projected population boom for which most Jasper County residents are unprepared, now is the time to address natural resources conservation. It is recommended that Jasper County integrate the conservation strategies set forth in this document into the County comprehensive growth plan before large-scale development projects break ground.

Community Vision

Proper planning and resource education have been shown to mitigate the potential impact of burgeoning development and its associated concerns. Real measures need to be taken to protect as many aspects of our quality of life as possible. Because natural resources are

dramatically affected by changes in the landscape, assertion of community natural resource concerns is imperative. The burden must be shared among all parties including developers, government, and new and existing property owners. This plan is the first step to identifying, documenting, and qualifying natural resource elements that enhance quality of life for Jasper County residents and visitors. Considerations given to quality of life planning that are associated with poorly planned development include traffic, stress, conflict, taxes, crime, and degradation of natural resources.

Jasper County has the potential to be a success story for responsible development locally, regionally, and even nationally. It is recommended that county and community leaders create a responsible framework for planned development that respects natural assets. It is the JSWCD's goal to continue its partnership with the County, municipalities, and local communities by providing needed natural resources conservation planning and management assistance. It is important to strive to do what is best for the quality of life for the people of Jasper County, working in partnership and cognizant of natural resource conditions. The community vision is to set a high standard for how Jasper County and its communities should grow responsibly, thereby setting and implementing quality growth standards that strive to maintain a rich heritage and natural resource base.

As a result of the community effort in developing this plan, a number of goals emerged. These goals include:

- Keep the citizens informed of the status and conditions of the natural resources of the County.
- Protect the soil and water resource base to ensure sustained productivity on county lands and waters.
- Ensure orderly development of urbanizing areas, and aid in the identification and retention of important farmlands, critical habitats, and beneficial wetlands.
- Protect or improve water quality through implementing a mandatory buffer program, stormwater management strategies, and erosion and sediment control measures on rural and urbanizing lands.
- Protect and improve wildlife habitat by protecting and promoting proper forest and wildlife management practices.
- Enhance the quality of life for all citizens of the County.

TED BORG

Protection of water quality on the Savannah River is an important consideration of Jasper County landowners in the face of growing development.

U.S. FISH & WILDLIFE

The Savannah NWR provides habitat for many migratory, wading, and song birds.

Chapter Two

JASPER COUNTY DESCRIPTION

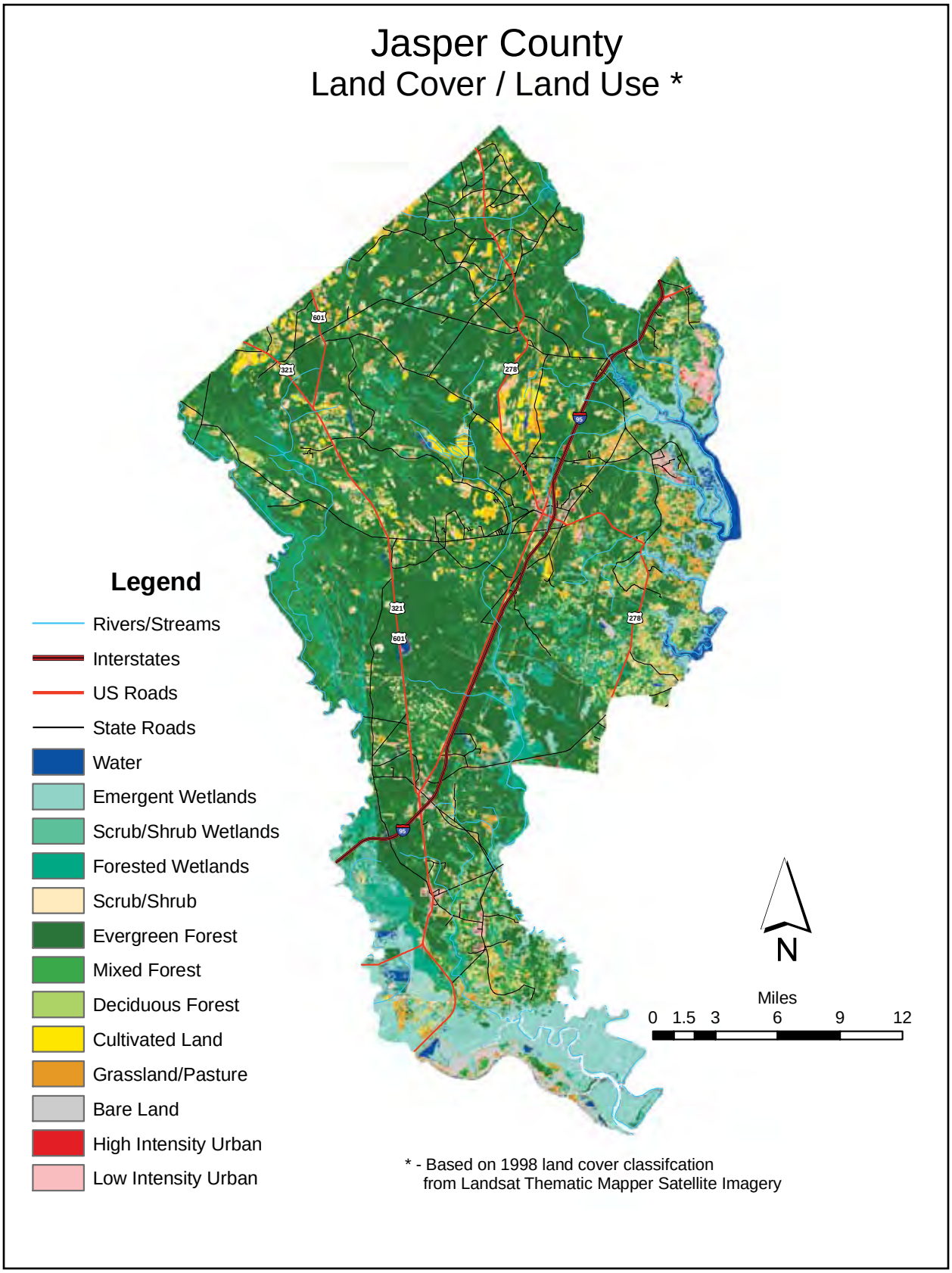
Location and Land Use

Jasper County was formed in 1912 from parts of Beaufort and Hampton counties and named after Revolutionary War hero Sergeant William Jasper (Jasper County Chamber of Commerce website 2005). Jasper County extends from the Savannah River to the Pocotaligo and Broad Rivers and from the Atlantic Ocean to the toe of South Carolina's sandhill region. The land use and corresponding habitats are extremely diverse (Figure 2). Jasper County is bound on the west by the Savannah River and on the north and east by Hampton and Beaufort Counties respectfully. The physiographic provinces present in Jasper County include the flatlands coastal plain, alluvial floodplains river terraces, coastal marsh, and islands. Land composition is primarily evergreen forest, with agricultural grassland and saturated bottomland forest throughout, marsh along the coast, and concentrated urban centers in Hardeeville and Ridgeland. Most of the area consists of nearly level lowlands and low ridges with slopes of less than two percent. Elevations range from sea level to slightly above 100 feet (JSWCD Long Range Plan 1995). The County encompasses 662 square miles, or 423,680 acres (Jasper County Chamber of Commerce website 2005).

PHILLIP JONES

Barrier islands protect the coast and mainland, providing valuable coast marsh and island habitat for S.C. wildlife.

Figure 2. Land use in Jasper County



Climate

Table 1. 50-year average climate data for Jasper County, South Carolina.

Temperature (°F)	
Average maximum summer	86.4
Average minimum summer	64.2
Average maximum winter	67.4
Average minimum winter	43.5
Precipitation (inches)	
Total	51.0
Dryest months	October, November, December
Wettest months	June, July, August
Frost (with 32°F base)	
Average date first frost	November 13
Average date last frost	March 23
Average growing season	234 days
Snowfall (inches)	
Total	0.4

(Data taken from Southeast Regional Climate Center, http://www.dnr.state.sc. Period of record: 7/11/1948 to 5/31/1999. At weather station Ridgeland 5 NI.

Protected Lands

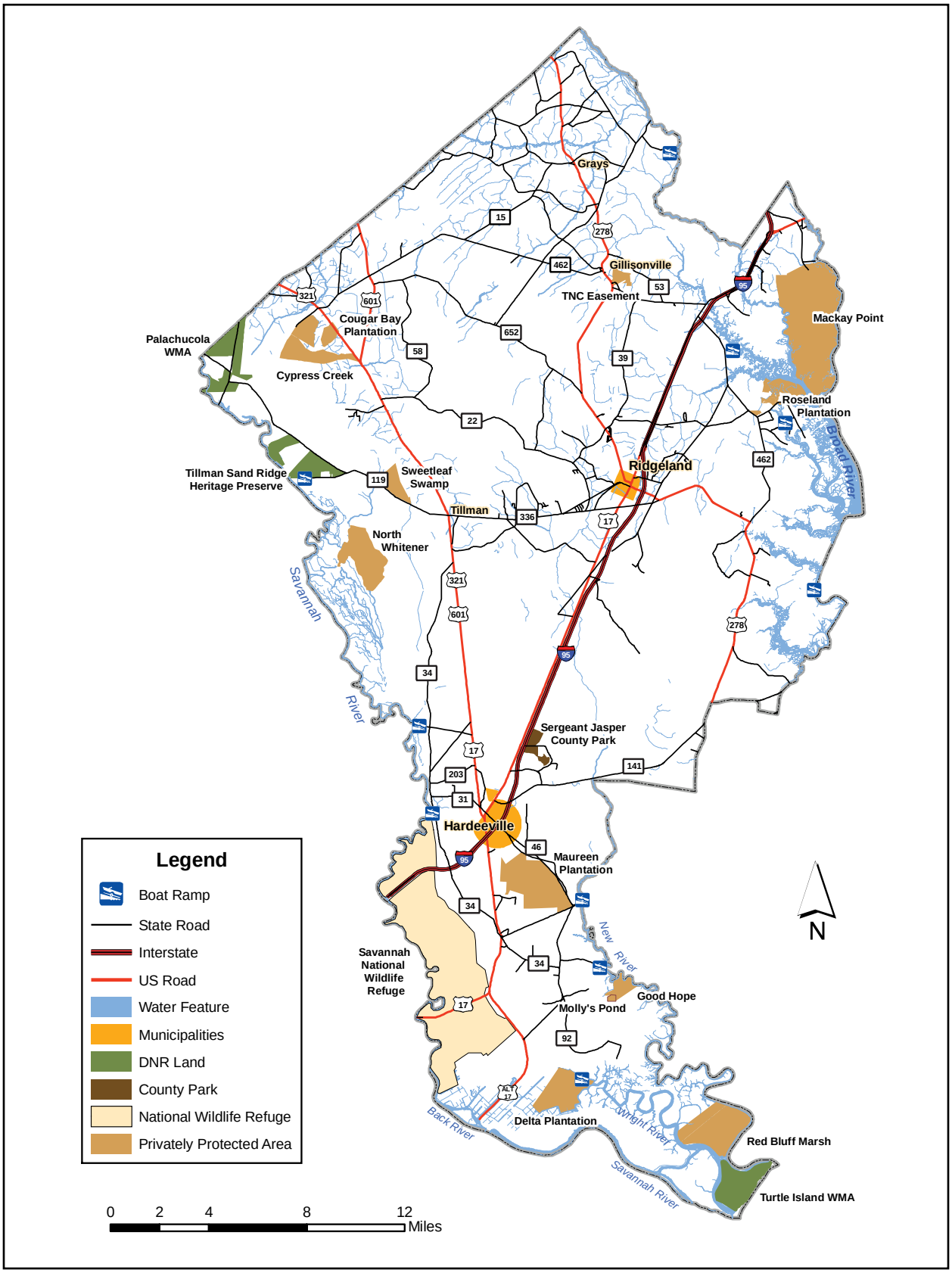
Of Jasper County's 423,680 acres, roughly 8% (36,712 acres) have been protected through the efforts of multiple conservation partners (federal, state, county, and private, Figure 3). Protected federal lands include the South Carolina portion of the Savannah National Wildlife Refuge. This refuge, established in 1927, is comprised of 29,000 acres, of which 15,000 acres are in South Carolina. The refuge provides habitat for a variety of wildlife species including waterfowl and other migratory birds, resident species such as white-tailed deer, wild turkey, and alligators, along with threatened and endangered species, including manatees and shortnose sturgeon. The refuge is also an important nesting area for wood ducks, bald eagles, swallow-tailed kites, and other significant bird species.

State protected lands include Tillman Sand Ridge Heritage Preserve (1,422 acres), Turtle Island Wildlife Management Area (1,700 acres), Niederhof Seed Orchard (1,696 acres), and a portion of Palachucola Wildlife Management Area (1,471 acres). Tillman Sand Ridge was acquired by SCDNR to protect South Carolina's most endangered reptile, the gopher tortoise. In addition to providing habitat for the gopher tortoise, the

PHILLIP JONES

The over 900 acre Tillman Sand Ridge Heritage Preserve was acquired to protect south Carolina's most endangered reptile: the gopher tortoise.

Figure 3. Map of Jasper County protected lands



PHILLIP JONES

preserve also protects more than one half mile of frontage on the Savannah River. Because the preserve covers habitats from sand ridges to the Savannah River, a wide variety of birds frequent the area, including prothonotary warblers, painted buntings, pileated and hairy woodpeckers, vireos, and blue grosbeaks. Turtle Island Wildlife Management Area, owned by the SCDNR, consists primarily of salt marsh and is a vital recreational resource, frequented by waterfowl hunters, birders, and visitors. The island is an especially important stopover area for shorebirds. Niederhof Seed Orchard, owned by the S.C. Forestry Commission, is an important tree seedling nursery accessible to residents of Jasper County and others. Lastly, Palachucola Wildlife Management Area, located adjacent to the Webb Wildlife Center in Hampton County, is a significant recreational resource for Jasper County, providing a variety of hunting and other wildlife observation opportunities. Palachucola is comprised of significant bottomland hardwoods associated with the Savannah River and of longleaf pine communities.

U.S. FISH & WILDLIFE SERVICE

Several Jasper County private landowners have donated conservation easements on their properties to various agencies and non-profit organizations. These easements protect 14,905 acres, providing a significant contribution to the total protected lands in Jasper County (Hamilton, pers. comm.). County protected lands include Sergeant Jasper County Park (380 acres), established in 1994.

PHILLIP JONES

The carnivorous Trumpet Pitcher plant, mostly found in wetlands, lures insects with a sweet smelling nectar.

The Great Blue Heron and American Alligator are common wildlife that characterize Jasper County.

Protected lands, like those of the Savannah NWR shown here, provide wildlife habitat, outdoor recreation activities, soil and water quality protection, and many other benefits.

TED BORG

Sunset on Jasper County's beautiful waterways provides a priceless perspective on natural resources.

Chapter Three

RESOURCES, CONSERVATION, AND MANAGEMENT

Streams, Rivers, and Watersheds

Description

Jasper County has a diverse assemblage of water sources, which include but are not limited to bottomland hardwood wetlands, isolated wetland depressions, cypress swamps, an array of other wetlands and marshes, farm ponds, streams, large creeks, small-and medium-sized rivers (freshwater and saltwater), and tidal marshes of all salinity classes. The County contains complex floodplain systems primarily as a result of the vast amount of wetlands and only slight elevation changes over miles of territory. Therefore, it is sometimes difficult to determine which direction water flows in Jasper County.

The boundaries of Jasper County are defined by two rivers: the Savannah and the Broad. These are important recreational, aesthetic, biological, and water supply resources for the County and are known for their abundant fishing and hunting opportunities, expansive floodplain forests, and wildlife viewing opportunities. The Savannah River estuary provides habitat for at least 92 species of fish (Jennings and Weyers 2002). Many of these fish, such as striped bass, shad, and sturgeon provide considerable commercial and recreational fisheries. The lower Savannah also has abundant managed and free-flowing tidal freshwater and brackish marshes, which are important breeding and rearing areas for waterfowl, shrimp, blue crabs, and a wide variety of commercial and recreational fishes. Both the Savannah and Coosawhatchie rivers support excellent populations of freshwater mussels, which perform substantial water filtration tasks for these rivers.

PHILLIP JONES

Adequate buffers and responsible development will mitigate the effects of non-point source pollution in the Savannah River.

Currently, Jasper County uses about 4 million gallons of water per day (Figure 4, Badr and others 2004). Water use in Jasper County is linked to many variables, but is likely to increase with population growth and associated demands on infrastructure. The main threats to Jasper County's rivers and waters are associated with water quantity—making sure there is sufficient water for usage at the right time and place; and water quality—assuring that the available water is suitable for protecting our aquatic animals and plants and providing for human uses.

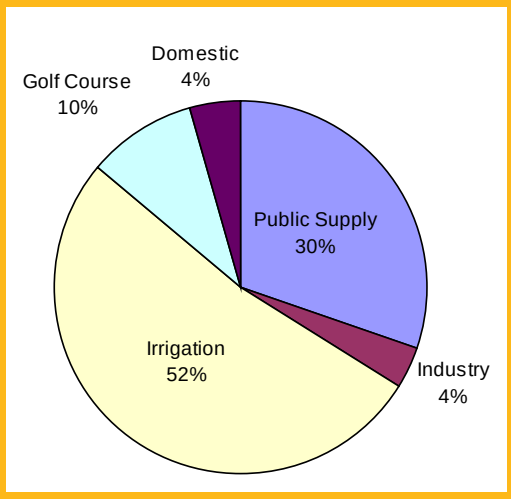


Figure 4. Estimated water use in Jasper County for the year 2000 (Badr and others 2004).

Surface-Water Quantity

The primary rivers that border or run through Jasper County include the Pocotaligo, Coosawhatchie, Tullifinny, Broad, New, Wright, Mud, Little Back, Back, and Savannah (Figure 5). These rivers support a wide diversity of wildlife and fishes, and attract a growing recreation and commercial fishing industry. Surface waters also can be divided into two subbasins: the Lower Savannah River subbasin in the southern part of the County and the Combahee-Coosawhatchie River subbasin in the southwestern section. Most of the County's population lies within the drainage area of the Coosawhatchie River, whereas the Savannah River drainage area is dominated by wetlands and is sparsely developed. Tributaries in the lower Savannah are generally small, associated with swamplands, and follow ill-defined, meandering channels. The Savannah River provides a source of public drinking water for the Beaufort-Jasper Water and Sewer Authority and a source of industrial supply at Savannah, Ga. Brackish water intrudes the river northward to Port Wentworth, Ga. (about seven miles northwest of Savannah, Ga., Park pers. comm.).

The Savannah River flow has been regulated since 1951 by controlled releases from the J. Strom Thurmond Dam (Clark Hill Lake). Annual streamflow is among the highest in the South Atlantic states, averaging about 9,286 cfs (cubic feet per second) at Augusta, Ga. and increasing to 11,810 cfs near Clyo, Ga. (about where S.C. 336 crosses the Savannah River, Park pers. comm.). The U.S. Army Corps of Engineers' (USACE) operation guidelines for Thurmond Dam require minimum flows of 3,500 csf at Augusta, Ga. during stage-two drought conditions, and low flows below the dam consequently are greater than those that occurred when the river was in its natural state. Flows are most variable near the controlled releases of upstream dams, and they become more uniform toward Jasper County because of inflow from tributary streams and the storage capacity of adjoining wetlands.

The Coosawhatchie River and Great Swamp drain the eastern two-thirds of the County and discharge into the Broad River and the New River, respectively. Tidally influenced saltwater streams and marshland predominate in the lower quarter of the subbasin. Average annual flow in the Coosawhatchie River is low (179 cfs), but stream flow varies widely; extremely low flows are common in summer. Periods of zero-flow have been recorded on the Coosawhatchie River numerous times since 1951. The highest recorded flood flow for the Coosawhatchie was 8,160 cfs and was recorded in 1969. Although the period of record for the Great Swamp is short, collected data indicate that it is characteristic of a Lower Coastal Plain stream. Average-annual flow is only 31 cfs, and owing to the Great Swamp's low topography and relief, several periods of zero-flow are recorded (Park, pers. comm.).

Figure 5. Primary streams, rivers, and watersheds in Jasper County

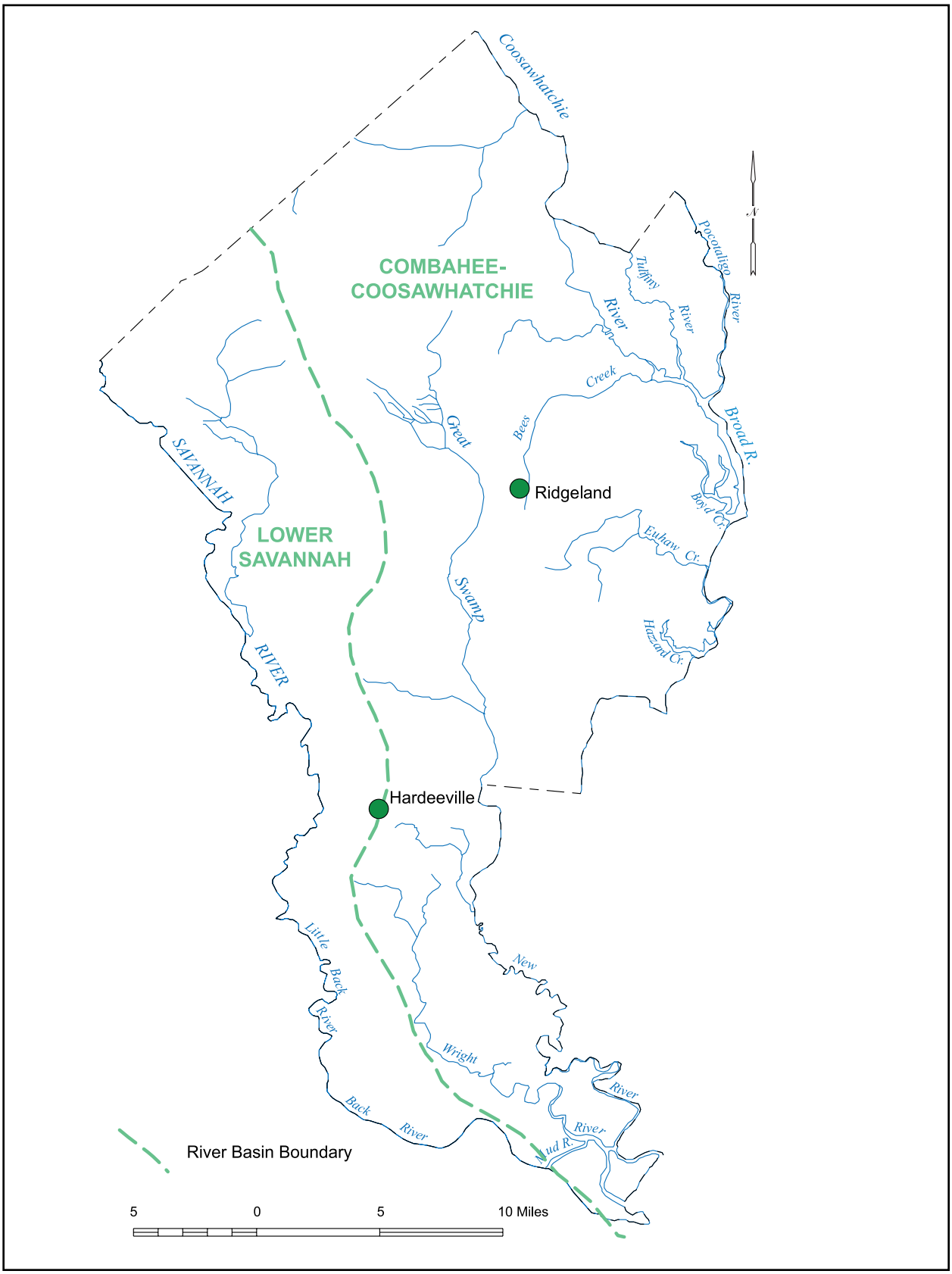


Table 2. Location and nature of surface-water impairment in the lower Savannah and Coosawhatchie River subbasins, Jasper County, South Carolina (SCDHEC 303(d) list 2004).

Location	Use Impaired	Cause
Savannah River at B and C Landing	Fish	Mercury
Savannah River at U.S. 17	Aquatic Life	Zinc
Savannah River at U.S. 17	Recreation	Fecal coliform bacteria
Savannah River at Beck's Ferry	Fish	Mercury
Cypress Creek at S-27-119	Aquatic Life	Dissolved oxygen
Cypress Branch at U.S. 321	Aquatic Life	Macroinvertebrate
Savannah River at Millstone Creek	Fish	Mercury

Surface-Water Quality

Lower Savannah River Subbasin: The entire lower Savannah River subbasin north of U.S. Highway 17 is designated as Freshwater (Class FW). This water-use classification is assigned to waters that are suitable for the survival and propagation of aquatic life, primary- and secondary-contact recreation, drinking-water supply, fishing, and industrial and agricultural uses (SCDHEC Technical Report 003-97 1997). The reach coastward of U.S. Highway 17 is designated as Tidal Saltwater (Class SB). Class SB represents tidal saltwater suitable for primary- and secondary-contact recreation, crabbing, and fishing. These waters are not protected for harvesting clams, mussels, or oysters for market purposes or human consumption (SCDHEC Technical Report 003-97 1997).

Water quality is generally good in the Jasper County section of the lower Savannah subbasin, but quality is locally impaired for some uses (Table 2). The presence of mercury in fish is the most common impairment. Fish-consumption advisories were issued in 2005 for Jasper County in the reaches: (a) south to S.C. Highway 119 for bowfin (mudfish), largemouth bass, and spotted sucker; (b) between S.C. Highway 119 and U.S. Highway 17 for bowfin, largemouth bass, black crappie, bluegill, channel catfish, redbreast sunfish, and white catfish; and (c) downstream of U.S. Highway 17 for channel catfish, largemouth bass, and white catfish (Table 2, SCDHEC Technical Report 003-97 1997).

Coosawhatchie River Subbasin: Part of the New River is designated as Class SA water. Class SA waters are tidal salt waters suitable for primary- and secondary-contact recreation, crabbing, and fishing. These waters are not protected for harvesting clams, mussels, or oysters for market purposes or human consumption. The waters are suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora (SCDHEC Technical Report 003-97 1997). A part of Bees Creek is classified Class SB. Class SB waters are the same as Class SA waters, except that they have lower dissolved oxygen requirements (SCDHEC Technical Report 003-97 1997). The amount of dissolved oxygen in a system is complex and requirements for aquatic organisms are dependent upon the species, water temperature, pollutants, and physical state of the system. A large number of water bodies in the Combahee-Coosawhatchie subbasin are designated Shellfish Harvesting Waters (Class SFH). These tidal salt waters are protected for shellfish harvesting and have the most stringent bacterial standards. SFH water bodies include part of the Coosawhatchie and Pocotaligo Rivers. Upstream reaches of the Coosawhatchie are designated as Freshwaters (Class FW, SCDHEC Technical Report 003-97 1997). Water quality impairments in the Jasper County section of the Coosawhatchie River subbasin include excessive concentrations of mercury, zinc, and fecal coliform (refer to Table 2). SCDHEC issued fish-consumption advisories for New River to Cook Landing in 2005 for bowfin and largemouth bass (SCDHEC Technical Report 003-97 1997).

Ground-water Quantity

Aquifers are underground sources of water that are divided by layers of soil, bedrock, or other materials. Jasper County is underlain by six major Coastal Plain aquifer systems between about -4,000 ft mean sea level (msl) and land surface. These are, in ascending order, the Cape Fear, Middendorf, Black Creek, Tertiary Sand, Floridan, and shallow aquifer systems (Figure 6).

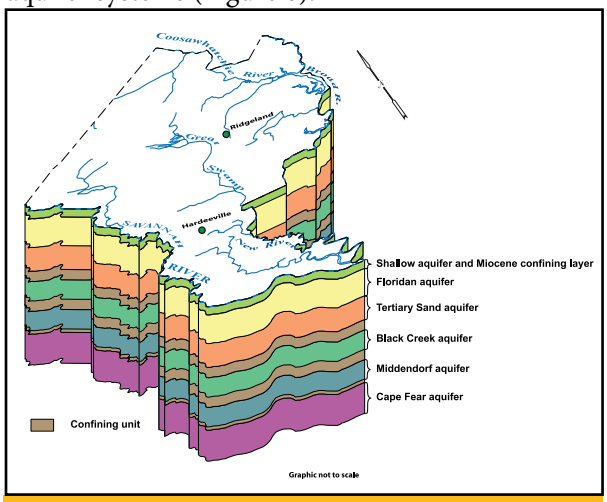


Figure 6. Aquifers underlying Jasper County.

The deepest aquifers, Cape Fear, Middendorf, and Black Creek systems are formed by Cretaceous sediments that range between about 90 and 65 million years in age. Surface elevations of the three aquifers are -2,300, -1,800, and -900 ft msl, respectively, at the northernmost end of the county. Those surfaces dip southward, where their elevations are about, -3.100, -2,800, and -1,600 ft msl, respectively, near the mouth of the Savannah River (Aucott and others 1987). Because of the expense in drilling deep wells and the abundance and good quality of water in shallower aquifers, none of the Cretaceous aquifers are tapped for individual wells. Individual well yields of 500 gpm (gallons per minute) or more are possible from any of the units because of aquifer thickness and the large amount of drawdown available (Park pers. comm.). A 3,800 ft deep well on southern Hilton Head Island is screened in the Cape Fear and Middendorf aquifers and is capable of producing about 1,400 gpm (2.0 mgd [million gallons per day]) of reverse-osmosis treated water. Water in the Cretaceous systems of eastern Beaufort County is highly mineralized owing to the water's long residence time and to the occurrence of brackish water offshore. Similar water quality is likely present in southern Jasper County (Park pers. comm.).

The Tertiary sand, Floridan, and shallow aquifer systems of Jasper County were formed from the Tertiary Period (26 to 66 million years ago) to the present (Hughes and others 1989). The Floridan aquifer is the principal ground-water source in Jasper County and the surrounding Lowcountry counties; it is also the most productive aquifer system in South Carolina. The top of the system and its principal permeable zone occurs at about -50 ft msl at Grays, -110 msl at Ridgeland, and –200 msl near Savannah, Ga. (Hayes 1979). It thickens from a few tens of feet in the northeast corner of the county to about 180 ft along the lower reach of the Savannah River. The Floridan aquifer has the ability to transmit large quantities of water, and well yields of 500 to 1,500 gpm (or more than 2.0 mgd) are possible in most of the county.

A middle permeable zone (Gawne and Park 1992) occurs at depths of about 400 to 600 ft in the southwestern half of the County. This aquifer can produce more than 500 gpm (0.7 mgd) locally, but the aquifer diminishes to a negligible thickness toward the Coosawhatchee River and across Port Royal Sound.

Ground-water Quality

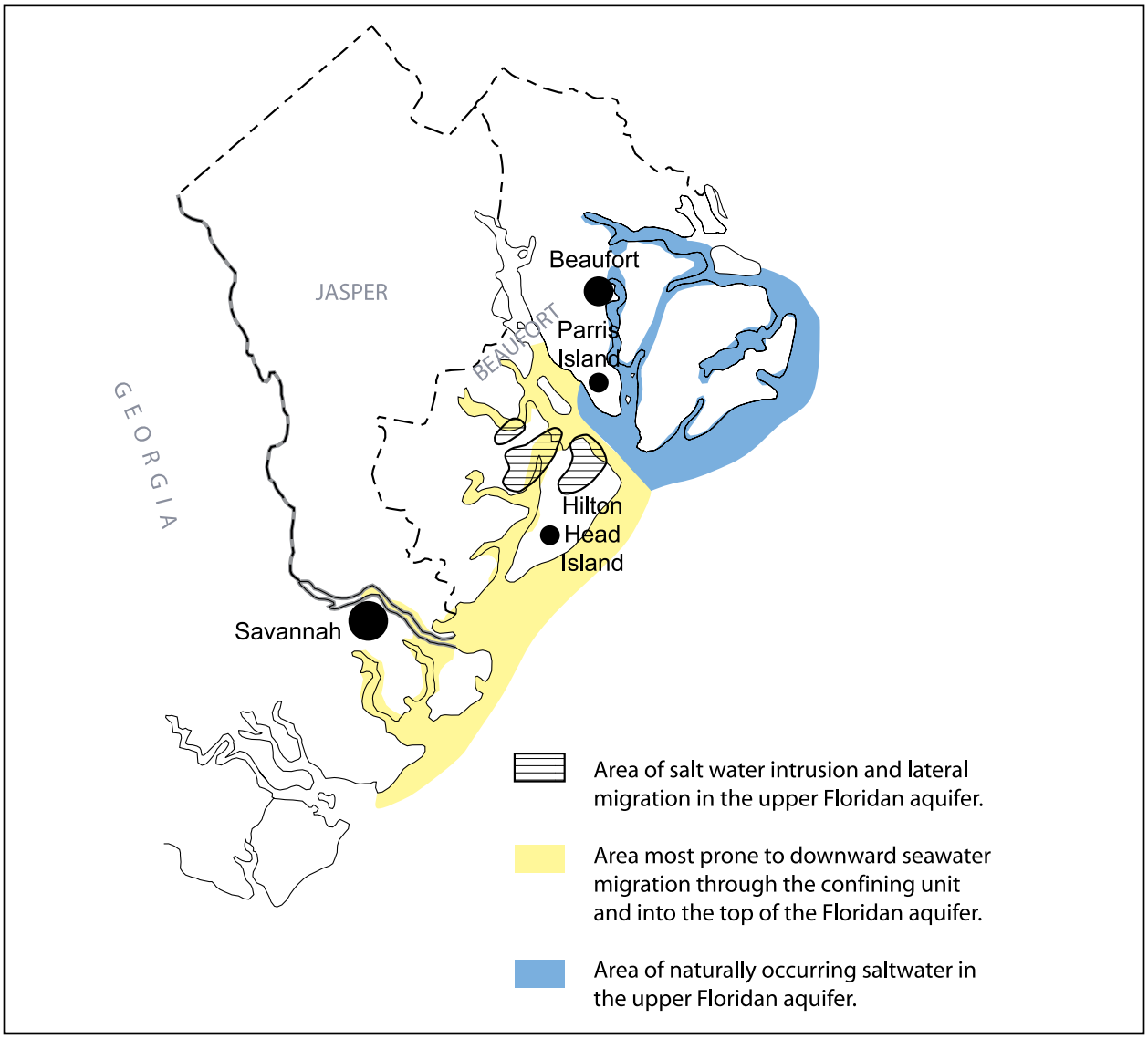
There is saltwater intrusion where brackish water occurs in the aquifer near Port Royal Sound. Water elsewhere in the middle Floridan aquifer is freshwater and characterized by moderate hardness (levels of calcium and magnesium) and acceptable concentrations of dissolved solids.

Estimates and test wells by the SCDHEC and the U.S. Geological Survey (USGS) also show seawater moving downward through the confining unit that overlies the Floridan aquifer in southern Beaufort County (Park pers. comm.). The arrival times for water traveling from Port Royal Sound to wells at Savannah are estimated to be many centuries, but seawater moving through the

confining unit might begin entering the Floridan near Savannah within a few decades. Preliminary calculations show chloride concentrations of 500 mg/L entering the top of the Floridan aquifer in 3 years to 200 years, depending on locality (Park, pers. comm.). Computer-model simulations estimate that near Savannah, about 50 percent of the flow in the Floridan aquifer is derived from lateral flow and 50 percent is derived from vertical recharge. Where the water from vertical recharge exceeds 500 mg/L, the average chloride level will exceed 250 mg/L, exceeding U.S. Environmental Protection Agency (EPA) secondary water quality standards (Garza and Krause 1992, Figure 7).

The Lowcountry Capacity Use Area was established in 1980 to control saltwater intrusion. Permits are required for ground-water users wishing to pump more than 100,000 gallons per day in Beaufort, Jasper, and Colleton Counties. Withdrawals from the upper Floridan aquifer are now limited to 9.9 mgd at Hilton Head Island to retard the rate of saltwater intrusion. Golf course irrigation permits are no longer granted for the upper Floridan aquifer in Beaufort County, but permits are considered for middle Floridan golf course wells.

Figure 7. Saltwater intrusion near Jasper County



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Resource managers are concerned about the potentioal effects of saltwater intrusion, non-point source pollution, and flooding on water quality

Issues and Concerns

1. Saltwater Intrusion—Ground-water pumping in Beaufort and Jasper Counties and in Chatham County, Ga. has lowered water levels below sea level in the middle and upper Floridan aquifers. The potential for saltwater intrusion into the upper part of the Floridan aquifer has been a concern since the 1940s. The South Carolina Water Resources Commission and USGS mapped a saltwater plume beneath Port Royal Sound in the 1980s. Computer simulations predicted intrusion beneath Hilton Head Island during the early 2000s (Smith 1994). Research by SCDHEC and the USGS has confirmed the movement of one-to two-mile wide plumes southwestward from the Colleton River, Pinckney Island, and northern Hilton Head Island, well in advance of the saltwater found beneath Port Royal Sound. The plumes consist of modern seawater that entered the aquifer since the 1950s and 1960s, and they are advancing at rates of 130 to 250 feet/year (Park pers. comm.).
2. Non-point Source Pollution—Polluted runoff, otherwise known as non-point source pollution (NPSP), is recognized as the leading cause of water pollution in the nation and in South Carolina (Badr and others 2004). Excessive pollutants, including bacteria, pesticides, nutrients, chemicals, oils, and fertilizers, are washed into waterways during periods of high rains. These effects are exacerbated with increases in impervious surfaces (pavements, roads, buildings) and decreases in width and area of vegetation surrounding waterways (natural buffers). Sources of NPSP are extensive, difficult to distinguish, and often unregulated. It is important that the link between NPSP and the existence of proper buffers are recognized to mitigate the effects of this pollution.
3. Flooding—From 1965 to 2003, Jasper County has had one to two presidential disaster declarations that were related to flooding. Because of the County's location and elevation, Jasper County is particularly susceptible to hurricanes and flash flooding.

Goals and Objectives

It is vital to preserve the integrity of our waterway systems by protecting wetlands and preserving buffers around water sources. Wetlands and vegetative buffers will filter sediments and remove pollutants, recharge the ground-water supply, support downstream commercial and sport fisheries, reduce flooding and flood damage to crops and human settlements, protect and maintain wildlife and fisheries resources throughout the county, and support the high demand for outdoor recreation activities. Therefore, it is imperative for Jasper County to oversee land management and urban development practices in both uplands and around water sources to ensure protection of the water resources that everyone enjoys. Specific goals include:

1. Maintain and improve the water quality of streams, rivers, and watersheds to ensure the protection and propagation of fish, shellfish, wildlife and recreation in and on the water.
2. Preserve the quality and quantity of ground-water resources.
3. Plan county growth and development designed to minimize impacts to water quality and quantity.

Strategies, Policies, and Actions for Implementation

In recognition that the County must develop a management plan to protect its water resources

for the community at large, a number of strategies are suggested to protect water quality and quantity. These include:

County Growth And Development Planning—

- Develop and maintain a regional up-to-date stormwater management plan that addresses flood prevention and water quality.
- Implement a combination of regulations and incentives to ensure that new development adequately mitigates its impacts on water quality, such as impact fees and tax breaks for minimizing impervious area and encourage environmental planning, among other things.
- Work with SCDNR and Beaufort County to designate the New River as a state Scenic River.
- Minimize NPSP runoff in the County through natural resource based planning, proper site design, and best management practices.
- Provide for the inclusion of low impact development (LID) techniques into the County's land development regulations and zoning ordinances. (For more information on LID techniques, see the following websites: The Low Impact Development Center at http://www.lowimpactdevelopment.org/ or EPA at http://www.epa.gov/owow/nps/lid/).
- Provide incentives for developers to incorporate creative stormwater management techniques into their developments including, but not limited to, green building technology, pervious surfaces, rain gardens, rain barrels/cisterns, and bio-retention areas. Other specific examples include:
  1. Grassed waterways or swales are innovative practices that developers and landowners can use to convey stormwater runoff from terraces, diversions, or other water concentrations without causing soil erosion or flooding. Vegetation in the waterway protects the soil from erosion caused by concentrated flows while carrying water downslope. The stable outlet is designed to slow and spread the flow of water before it enters a vegetated filter. The vegetated filter is designed to trap sediment and increase infiltration so that other pollutants, such as pesticides and nutrients, can be removed from surface runoff. Depending upon the selection of vegetation and management practices, grassed waterways can offer diversity and cover for wildlife. Utilize the "Grassed Waterway" practice standard and "Filter Strip" jobsheet provided by NRCS when grassed waterways are needed (contact Ridgeland NRCS field office at 843-726-8148 or http://www.nrcs.usda.gov/technical/).
  2. Filter strips are areas of herbaceous vegetation situated between cropland, grazing land, forest land, or disturbed land and environmentally sensitive areas. Sensitive areas include streams, lakes, wetlands, and other water bodies and areas susceptible to damage by water-borne pollutants, including sediment, particulate organics, sediment-adsorbed contaminants, and dissolved contaminants. Utilize the "Filter Strip" jobsheet provided by NRCS when filter strips are needed (contact Ridgeland NRCS field office at 843-726-8148 or http://www.nrcs.usda.gov/technical/).
  3. Newly disturbed areas should be planted to stabilize the soil, reduce damage from sediment and runoff to downstream areas, and improve wildlife habitat and aesthetics. Planting vegetation, such as trees, shrubs, vines, grasses, or legumes on exposed/bare soil should be done immediately after soil disturbance. Utilize the "Critical Area Planting Specification Sheet for Native Vegetation" provided by NRCS when replanting newly disturbed sites (contact Ridgeland NRCS field office at 843-726-8148 or http://www.nrcs.usda.gov/technical/).
  4. Promote strategies for minimizing the use of impervious surfaces by amending land development regulations and zoning ordnances. Some research has shown that as little as 10 percent watershed impervious cover has been linked with stream degradation, becoming more severe as impervious surface cover increases (Schueler 1994).

- Provide incentives for developers to preserve natural vegetation at residential/commercial development sites. Examples include:
  1. Tree Ordinance: An arborist oversees protection, planting, and maintenance of trees on public properties and street trees in the public right-of-way. Permits are required to plant or remove any trees in the right-of-way; and he/she oversees tree protection and planting of trees on private commercial properties and new residential subdivisions. Permits are required to remove trees in set-backs on commercial property.
  2. Native Plant Ordinance: Native vegetation plays a vital role in the dynamic system of the lowcountry. Its presence helps to prevent erosion, provides food and shelter for wildlife, and acts to shade the forest floor and reflect urban heat. In addition, native vegetation requires less water and maintenance than non-indigenous plants. In most cases, salvaging existing plant material is more economical and achieves a more natural appearance in a shorter amount of time. Utilize the "Conservation Cover-Native Species Jobsheet" and/or Critical Area Planting Specification Sheet for Native Vegetation provided by NRCS when replanting of native species is required (contact Ridgeland NRCS field office at 843-726-8148 or http://www.nrcs.usda.gov/technical/) .

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The tidally influenced rivers of Jasper County support a wide diversity of wildlife and fish, and attract a growing recreation and commercial fishing industry.

- Develop minimum buffer requirements along waterways. A minimum of 100 feet is suggested, with a 50 foot "no touch" buffer extending from OCRM (office of Ocean and Coastal Resource Management) "critical line," and the next 50 feet be a "selective clearing" buffer to create river views. The two main types of riparian buffers are listed below.
  1. A riparian forest buffer is an area of trees and shrubs located along or around permanent or intermittent streams, lakes, ponds, wetlands, or seeps. Many of these areas feature year-round or seasonal moisture, which allows woody species to establish quickly. A new riparian forest buffer can rapidly benefit a variety of settings, such as cropland, rangeland, forest land, and urban areas. Utilize the "Riparian Forest Buffer" Conservation Practice Standard provided by NRCS for more details (contact Ridgeland NRCS field office at 843-726-8148 or http://www.nrcs.usda.gov/technical/).
  2. A riparian herbaceous buffer is an area that consists of grasses, grass-like plants, and forbs. Herbaceous cover will be planted along waterways or on the fringe of water bodies where the natural plant community is dominated by herbaceous vegetation. Utilize the "Riparian Herbaceous Cover" Conservation Practice Standard provided by NRCS for more details (contact Ridgeland NRCS field office at 843-726-8148 or http://www.nrcs.usda.gov/technical/).
  3. Limit the number of golf courses allowed in Jasper County and regulate water use on these courses; encourage golf courses to use lagoon water and treated effluent.

- Encourage household conservation of water (example: lawn sprinklers permitted only every other day of the week and rotate use among communities).

Encourage Partnerships—

- Coordinate with local, state, and federal agencies when making decisions that may affect water quality, and work together to develop and implement a variety of water quality programs in the County.
- Consider watershed boundaries as well as political boundaries when making major land-use decisions.
- Work with drinking water providers to ensure that drinking water quality is maintained.
- Maintain Class SA water designations in the New River so that the tidal salt waters remain suitable for primary- and secondary-contact recreation, crabbing, and fishing.
- Improve and restore water quality to protect clam, mussel, and oyster harvesting for market purposes or human consumption.
- Utilize the JSWCD to educate the people of Jasper County about water conservation and local water-use regulations via brochures, internet, flyers, public workshops, and schools.

Flood Prevention—

Because there is such a large area of Jasper County that lies within the floodplain, it is essential to protect these areas by protecting wetlands and creating floodplain development limitations. Specific recommendations include:

- Prohibit development within the wetland and hydric soils areas as noted on the Primary Protection Areas (Figure 11, located on page 62) to maintain the integrity of the floodplain systems of Jasper County. We do not recommend any development within the 100-year floodplain since it will negatively impact our wetlands, wildlife and water resources, and the economy during storm events.
- Adopt and enforce a flood damage protection ordinance, a set of development rules in flood prone areas designed to prevent and reduce flood damage to properties and facilities.
- Require new communities be elevated above the base flood elevation (BFE).

Educate—

- Educate the public on practicing water conservation at home by producing flyers and publishing newspaper articles.

Wetlands and Hydric Soils

Description

The USACE defines wetlands as those areas that are inundated or saturated by surface or ground water 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 (USACE Wetland Delineation Manual 1987). Wetlands generally include swamps, marshes, bogs and similar areas. Wetlands are regulated by federal and state agencies, and the USACE has enforcement authority under Section 404 of the Clean Water Act. All wetlands contiguous to navigable waters are considered jurisdictional by the USACE. The OCRM section of SCDHEC also regulates isolated wetlands if other state or federal permits are needed on site. Any impacts to wetland areas require a permit. The USDA-NRCS can authorize wetland activities on agricultural lands if they meet the criteria in the "Swampbuster" program of the 1985 Food Security Act. These impacts are only authorized for individuals participating in farm programs and receiving USDA payments.

Hydric soils are an integral part of wetland determinations. Hydric soil is defined as soil that formed under conditions of saturation, flooding, or ponding, long enough during the growing season to develop anaerobic conditions in the upper part. The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are also included in the description of hydric soils. In addition, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some hydric series soils have non-hydric

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Wetlands improve water quality, mitigate flooding, support endangered species, provide erosion protection, and serve as breeding, feeding and wintering grounds for wildlife

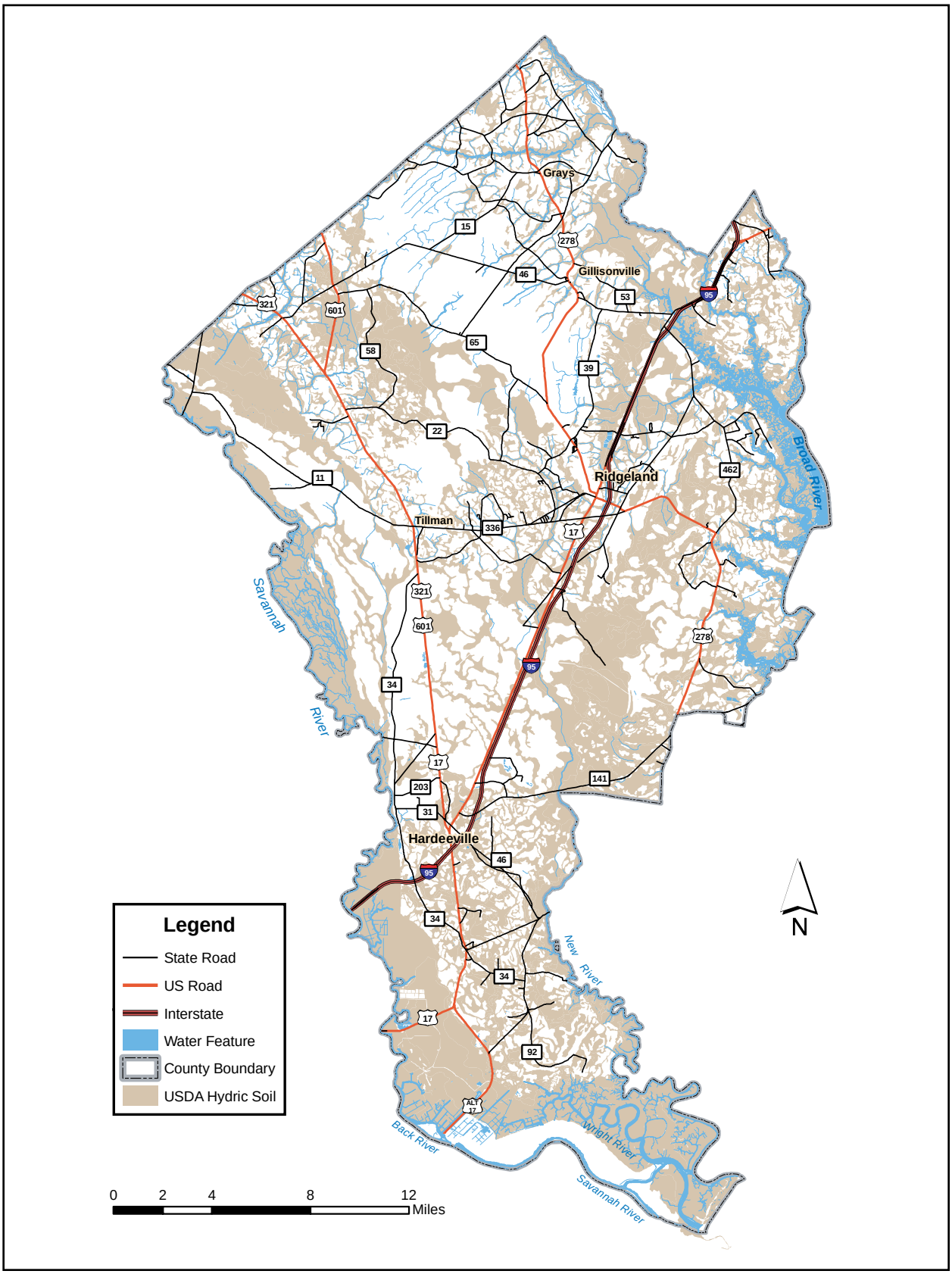
phases depending on water table, flooding, and ponding characteristics.

Jasper County has extensive acreage of hydric soils (Figure 8). About 55 percent of the soils in Jasper County are hydric (Soil Survey, Beaufort and Jasper counties 1980). Generally, areas with hydric soils are considered wetlands (Eppinette pers. comm.). Wetlands are important because they improve water quality by filtering sediments and removing contaminants; recharging the ground water supply; serving as spawning sites and nursery areas for fish and other aquatic life; supporting downstream aquatic systems including commercial and sport fisheries by producing food and organic material that is flushed out of the wetlands and into streams during high flows; reducing flooding and flood damage to crops and human settlements by storing floodwaters and releasing it slowly; serving as breeding, feeding, and wintering habitats for hundreds of wildlife species; supporting many endangered plants and animals; protecting shorelines from erosion due to waves and currents; and providing recreational opportunities such as hunting, fishing, boating, and wildlife observation. Individuals considering purchasing property or current property owners in Jasper County should go to the JSWCD office to pick up natural resources planning information pertaining to wetlands.

Issues and Concerns

1. Loss of wetlands due to poorly planned development in Jasper County.
2. The effort to educate and inform developers, realtors, county and city planning officials, government leaders, individuals moving into the county and the citizens of Jasper County about wetlands is not always successful. Many people buy property and impact wetlands without knowing it.
3. The USACE may not be able to catch all minor wetland violations. Over time, minor wetland violations can have a significant, cumulative impact to the loss of wetlands. Minor wetland violations can also impact stormwater runoff by the loss of retention and the increased release of stormwater through newly dug ditches. County planning officials or building code enforcement officers should be aware of situations such as this.

Figure 8. Hydric Soils in Jasper County



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The Spider Lilly grow in six leaf clusters and bloom in the spring.

4. Hydrology changes affecting wetland recharge could have both short-term and long-term negative impacts on water resources.
5. A loss of wetland habitats that support a diverse assemblage of wildlife and fisheries species will negatively impact wildlife and the economy of Jasper County and the State of South Carolina through the losses of marine and riverine fisheries resources.

Goals and Objectives

1. Conserve the essential flood reduction, ground water recharge, pollution filtering, and recreation functions of wetlands.
2. Ensure that floodplains are maintained in a state where their essential natural functions can be performed.
3. Provide brochures and other educational materials about wetlands.
4. Provide current and future property owners with generalized wetland maps showing the potential for hydric soils on their property.
5. Conduct educational workshops for developers, realtors, county and city planning officials, and government leaders on identifying and permitting activities in wetlands.
6. Define and prioritize various wetland types (marshes, bottomland hardwoods, longleaf pine savannahs, hardwood flats and depressions, wetland seeps, mixed pine hardwood, pine plantations, and converted wetlands.

Strategies, Policies, and Actions for Implementation

Resource Protection—

- Maintain natural free-flowing river and swamp, marsh, and tidal systems.
- Develop more restrictive wetland regulations by further protecting those areas considered to be vital wetland systems of Jasper County.

County Growth And Development Planning—

- Update current zoning ordinances and land development regulations to reflect the County's goals to ensure for the protection and conservation of its wetlands.
- A wetlands preservation ordinance would provide that if wetlands are present on the site, applicants (anyone altering the property) must submit evidence that they have contacted the Planning Commission, SCDHEC, and the USACE to determine the applicability of state and federal wetland regulations. Furthermore, any approval of the Planning Commission must be contingent upon full compliance with any requirements of any regulatory agency.
- Adopt a 50-ft wetland buffer ordinance addressing jurisdictional and isolated wetlands.
- Adopt more stringent building requirements for land disturbance in the 100-year flood zone.
- Prohibit untreated stormwater from discharging into jurisdictional wetlands and natural water bodies.
- Utilize, protect, and maintain Resource Conservation and Development (RC&D) flood prevention ditches and access easements provided through NRCS and maintained by Jasper County Public Works.
- Establish a county office to enforce codes and rules on wetland impacts (similar to the Town of Hilton Head).
- Stipulate that monies derived from wetland mitigation be allocated to Jasper County for the protection of other wetlands in the County.
- Charge an additional mitigation fee for the

loss or conversion of wetlands to contribute directly to the protection, restoration, and management of other wetlands in the County by use of a County Conservation Bank.

Encourage Partnerships—

- Coordinate with local, state, and federal agencies and non-profit organizations to provide for the opportunity to implement stewardship programs.
- Cooperate with the USDA-NRCS and JSWCD to promote the Wetlands Reserve Program as a viable conservation option for qualified landowners.
- Seek grant funding for wetland restoration and protection projects.
- Furnish developers, realtors, and city and county officials with a soil database to identify hydric soils.
- Work with state and federal governments to secure grants to provide brochures, maps, and other educational information about wetlands.

Critical Ecosystems, Habitats, and Associated Flora and Fauna

Description

Many critical habitats in Jasper County are currently maintained because of limited development. This trend is evidenced by the less than one percent change in Jasper County's forested and non-forested land between 1968 and 1993 (Marsinko and Zawacki 1999). Historically, longleaf pine dominated the uplands of Jasper County. Bottomland hardwoods including oaks, baldcypress, and water tupelo were common in the low/wet areas. The abundant low-lying areas, coupled with productive uplands, make the habitat within Jasper County expansive and invaluable. Critical habitats in Jasper County include longleaf pine forests, bottomland hardwoods, maritime forests, wet and mesic savannahs, and various ecotypes of coastal wetland depressions. In addition to providing numerous important ecological functions, these areas provide important habitat for many wildlife species.

Contiguous pine forest habitat, maintained with prescribed fire, is essential for numerous

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This Purple Gallinule uses the breeding habitat of Jasper County's swamps and marches, and likely winters south to Argentina.

threatened, endangered, and rare bird, mammal, and amphibian species, along with most game species. Longleaf pine habitat, a pyrophitic community (dependent on fire), has declined significantly since european settlement; its communities are among the most species-rich outside the tropics. Jasper County is no exception to this trend; much of the longleaf pine has been converted to loblolly pine plantation, agriculture, and commercial or residential use. Wetland interspersion in these high quality longleaf pine habitats creates an important niche ecosystem that provides habitat for many threatened, endangered, and other at-risk species. These scattered or isolated wetlands include pond cypress savannas, longleaf pine savannas, and bay-type depressions.

In addition to wetlands closely associated with the pine forest habitat, Jasper County also supports other significant wetland resources including estuaries, large rivers, streams, swamps, and tidal marshes. These wetland areas support a large number of endangered or at-risk species. Bottomland hardwoods, historically converted to agriculture for their fertility, support a wide array of flora and fauna. They are particularly important for migratory birds and water quality. Wetlands, riparian corridors, and associated maritime forests along the Savannah River and blackwater rivers and streams are critical for rare herptofauna and aquatic invertebrates. These aquatic ecosystems also provide feeding, spawning, and nursery grounds for a variety of resident and migratory

fish. Carolina Bays, hydrologically isolated depression wetlands, support habitat for over 35 rare plant species (Partners for Fish and Wildlife website 2001). Dense vegetation associated with these habitats provides refuge for many imperiled amphibians and plants. Major wetland areas are found along the major rivers, creeks, and swamps. Wetlands are also interspersed across the entire County's landscape. Aquatic species face some of the greatest threats to survival because almost any development or modification in a watershed will eventually impact downstream water quality or quantity to some degree. In addition, dams and channelization have impacted many streams.

Intertidal beaches, hammocks, and islands are also rare and fragile ecosystems, and these should be protected for migratory bird habitat. Jasper County contains only a small percentage of beach, island, and hammock habitats, most is located on the state-owned Turtle Island. Hammocks can also be found on the Savannah National Wildlife Refuge. Therefore, this habitat will not be discussed below under conservation strategies. However, any future port development on Barnwell Island needs to evaluate and mitigate impacts to these species, including impacts of light pollution on sea turtle nesting and other wildlife.

Most endangered or threatened species are listed as such because their habitats are imperiled. These species are closely associated with specific ecological communities and have attained their listing mostly because of the conversion of their habitats to other uses. The ICUN (the World Conservation Union) establishes the criteria for determining a species risk level for extinction. An 'endangered' species is defined as when the best available evidence indicates that the species is facing a high risk of extinction in the wild (The

STEVE BENNETT

Longleaf pine-wiregrass habitats are a declining and biologically diverse ecosystem that support more than 300 rare, threatened, or endangered species.

ICUN website 2001). There are several threatened or endangered species within Jasper County, including the bald eagle (mature pines near water), wood stork (wetlands), red-cockaded woodpecker (longleaf pine), fox squirrel (mature pines), gopher tortoise (longleaf pine), pine barrens tree frog (pine lowlands), flatwoods salamander (Carolina bays, depression wetlands), Piping Plover (coastal shorelines), Canby's dropwort (Carolina bays), and pondberry (Carolina bays, ephemeral bays), among others. Jasper County's geographic location in the southern and coastal portion of the State also supports rare niche species, such as the gopher tortoise. Appendix B presents an extended list of all species occurring or likely to occur in Jasper County that are federally listed as threatened, endangered, and a number of species considered to be "at-risk" because of declining populations or habitat threats.

Many species of landbirds that are dependent on diverse terrestrial habitats are also declining and face threats to long-term survival. These groups of birds are generally migratory in nature, and therefore, fulfill a stage of their lifecycle on the South Atlantic coast. Some birds migrate from the tropics of North America to nest in Jasper County, while others stop-over to utilize Jasper County's insect forage for sustenance to continue migration to the Northern U.S. and Canada. The groups of birds that raise their young in North America during the spring and summer and migrate to warmer climates such as Mexico and Central and South America during the winter are classified as neotropical migrants. Many of our familiar birds such as orioles, swallows, tanagers, buntings, thrushes, swifts, flycatchers, vireos, warblers, and ruby-throated hummingbirds are neotropical migrants. These neotropical migrants are advantageous to human communities because they eat insects and pests in the air, foliage, or ground.

One of the most comprehensive writings on the status and management of the landbirds is the North American Landbird Conservation Plan (Rich and others 2004). Within this plan, most of the bird species classified as "stewardship" or "Watch List" from the Southeast, are imperiled because of losses in bottomland hardwood habitat. While protection and restoration of remnant bottomland forests of the Southeast is probably too late for ivory-billed woodpecker and Bachman's sparrow, such efforts are critical for swallow-tailed kite and cerulean, prothonotary, and Swainson's warblers (Rich and others 2004). Jasper County is fortunate to harbor these species, and the habitat that supports them. The coast of Jasper County also harbors several species that are limited to unique habitats. The band of coastal salt marsh on the edge of the Eastern Biome supports the entire world populations of saltmarsh sharp-tailed and seaside sparrows, as well as the entire wintering population of Nelson's sharp-tailed sparrow (Rich and others 2004). All of these species have been documented utilizing the marshes of Jasper County during a cooperative research project with the University of Florida, the University of Tennessee, and the U.S. Fish and Wildlife Service during 2000/01 (Graves 2001).

Issues and Concerns

Intensive land use changes over the past three centuries have dramatically altered ecosystem and habitat composition, structure, and size. Rare communities continue to be pressured by non-point source pollution, poorly planned and shorter rotation timber harvest, wetland drainage, ditching, filling, prescribed fire exclusion, fragmentation, urbanization and sprawl, and disruption of hydrologic function, which are all caused by humans. The use of management practices to maintain and restore critical habitats is a successful method to protect and perpetuate these species and their corresponding ecosystems. It is important that new landowners' perception of land management is accurate.

The greatest threat to most critical species in Jasper County is habitat loss, typically due to human development. Therefore, conservation strategies must focus on conserving, managing, and restoring critical habitats. For the longleaf pine/savannah ecosystem and its associated critical species, prescribed fire is an essential management tool. The continued ability of land managers to use prescribed fire without unreasonable constraints is essential. For bottomland hardwood and wetland habitats, the threats to aquatic species are expected to increase due to changes in channel morphology, sedimentation, and impacts to

U.S FISH & WILDLIFE

Often called the most beautiful bird in North America, the Painted Bunting population is declining on the Coast as habitat is lost to development.

water quality and quantity afforded by increased development in these ecosystems.

Residential and commercial development can have significant impacts on streams and wetlands because of the increase in impervious surface from roads, parking lots, and roofs. Increased impervious area causes higher peak stream flows and lower low flows. The result is destabilization and erosion of stream banks and streambeds. Stormwater also carries sediments, excess nutrients, and contaminants such as metals, oil, and grease into streams. This non-point source pollution is one of the major threats to water quality in the United States according to the Environmental Protection Agency. Overwhelmingly, studies have shown a decline in receiving water health when as little as 10 percent of a watershed is converted to impervious surface, with stream degradation escalating as impervious surface increases (Schueler 1994). Aquatic species have been extirpated or severely impacted from these changes in impervious cover resulting in stream degradation. As an example, a study that examined aquatic insects as a watershed indicator with over 200 sites found that biologic integrity decreased with urbanization, with a sharp decline at the 10 percent level. They also found that riparian condition (buffer quality and width) help mitigate these effects (Steedman 1988). Conservation strategies must focus on minimizing impacts of watershed land use and development on the aquatic systems to mitigate the increasing pressure on critical aquatic species.

Unplanned, patchy future development can result in forest fragmentation, increasing the decline of many species that require large forested areas, including many neotropical migrant bird populations. In order to maintain these important and declining birds, development in Jasper County should be planned to include provisions to protect large contiguous forested tracts that have a diverse makeup of habitats. Therefore, the conservation strategy must focus on provision for large unbroken tracts of forest that are necessary for the survival of neotropical migrants and other wildlife, as well as natural corridors to connect these tracts. Specific threats to habitat and related species include:

1. Fragmentation
2. Urban/Suburban sprawl
3. New, non-native landowners' perception of rural land management
4. Prescribed fire exclusion
5. Shorter timber harvest rotation trends
6. Non-point source pollution
7. Wetland ditching, draining, and filling

Goals and Objectives

Ecosystem management strategies require cooperation of multiple landowners as the majority of Jasper County's land is privately owned and prime for development. In 2001, 98 percent of the forestland in Jasper County was recorded as non-industrial private forestland (S.C. Statistical Abstract website 2005). Residents, federal, state and local governments, non-governmental organizations, and land trusts will have to work together to ensure successful conservation in Jasper County. Local planners should design development to retain forest connectivity, factoring public tracts into conservation strategies. Urban development should be clustered to curtail the wildland-urban interface and fringe area. Minimizing fragmentation through conservation of public and private lands and reduction of urban sprawl has been shown to protect ecosystems and serve as corridors for the normal movements of wildlife species. Limiting coastal and riparian development with prescribed setbacks along waterways has also been shown to decrease pollution and erosion while protecting critical

habitat. Maintaining stream and river buffer zones will minimize downstream siltation and limit non-point source pollution. Encouraging best timber management practices (BMPs), including prescribed fire and silviculture to develop and maintain critical pine ecosystems, will propagate habitat for many endangered species and promote visual aesthetics. Specific goals include:

1. Take a proactive approach in maintaining the existing quality of the County's natural environment.
2. Identify and sustain key wildlife areas, develop urban greenspace, protect and promote native vegetation and vegetative communities, and preserve important natural areas for the health of the County's ecosystems and rural character.
3. Limit the location of uses that would increase fragmentation of important natural and wildlife habitat areas.

Strategies, Policies, and Actions for Implementation

There are a large number of methods to achieve the resource conservation efforts in Jasper County. Some of the specific suggestions are listed, by category, below:

Develop Partnerships—

- Coordinate with federal, state, and local governments, non-governmental organizations, land trusts, and private landowners to ensure successful conservation management strategies in Jasper County.
- Develop an annual manager's workshop for private plantation managers and other land managers to provide updates on new and/or successful land management practices and tour an area that has been successful in conducting best management practices and conservation.

Develop Information—

- Identify and map existing longleaf pine habitats and suitable soils.
- Identify and map existing large blocks of forestlands and other natural areas.

County Growth And Development Planning—

- Develop a County Conservation Bank to house and provide funding for the protection of critical lands in perpetuity.
- Develop and incorporate a designated natural areas and wildlife corridor plan in the County's comprehensive plan.
- Promote restoration of longleaf pine on suitable sites and seek voluntary conservation easements on land supporting or that could support longleaf pine habitat.
- Seek voluntary conservation easements on large forestlands, critical habitats, or other undeveloped natural areas.
- Purchase development rights on high quality sites if easements are not feasible.
- Review and revise zoning ordinances and land development regulations to be consistent with conservation goals.
- Limit urban development to targeted concentrated areas to reduce fragmentation and sprawl.
- Implement requirements for forested riparian buffers on new land disturbing activities. We recommend a minimum of 50-foot buffers on intermittent streams and a minimum of 100-foot buffers on perennial streams.

It is believed that populations of Red Cockaded Woodpeckers are only about 1% of their original numbers. Resource managers often mark the trees that conatin their nests, called cavities, to protect them.

PHILLIP JONES

Raccoons are nocturnal animals that have a reputation for being mischievous and intelligent.

Support Land Management—

- Educate and encourage silviculture BMPs on private lands.
- Encourage prescribed fire as a necessary land management tool.

Educate—

- Provide educational and technical tools pertaining to species of concern and critical habitats to government employees, planners, and local landowners.
- Establish support for prescribed burning by educating the public on the benefits.
- Empower local landowners to convey concerns to their legislators.

Provide Technical Assistance—

- Discourage hydrologic modification including ditching, draining, and filling.
- Avoid direct discharge of stormwater into streams and wetlands by encouraging the use of grassed swales in place of curb and gutter and providing adequate stormwater retention areas.

Traditional Land Management Practices: Prime Farmlands, Timberlands, and Private Plantations

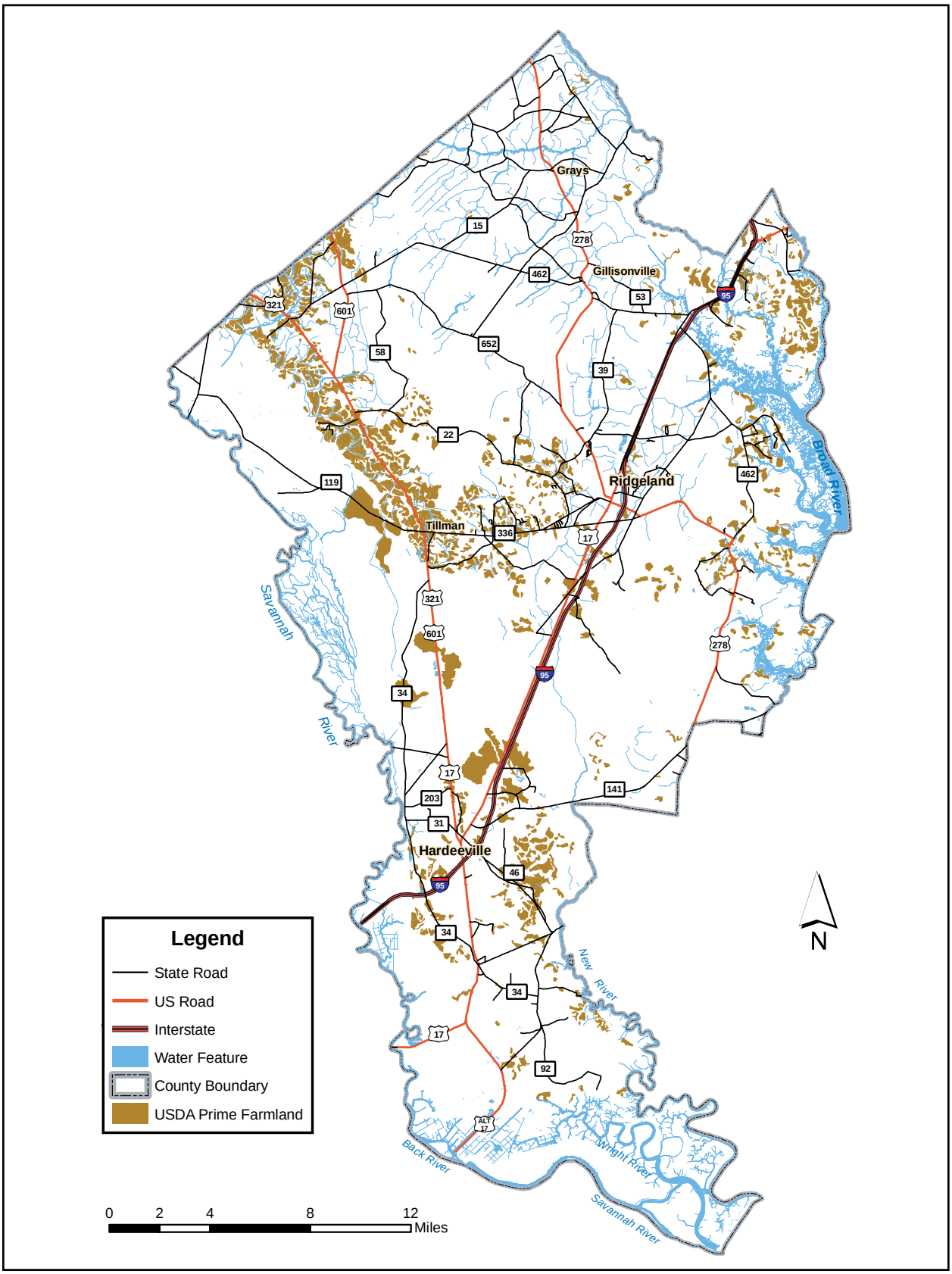
Description

Active land management has become a necessity because man has altered the way natural processes occur across the landscape. For example, fire can no longer burn contiguously across the landscape as it once did because of infrastructure and fire suppression. Active land management attempts to mimic natural processes for various benefits to society and/or the resources. Many of Jasper County's traditional land management practices consist of diverse and complex farming operations, silviculture and other forest management techniques. Specific practices include prescribed burning, hunting to control wildlife population, timber thinning, rotational cropping, and many others that promote wise land-use. These management tools are critical to the health of Jasper County's natural resources and should be preserved to maintain its current biological integrity. This section will review management tools in relation to prime farmlands, private plantations, timber company lands, and other public and private lands.

JASPER COUNTY HUNTER

Jasper County residents have a long history of game hunting Bobwhite Quail, who primarily inhabit areas of early successional habitat.

Figure 9. Prime farmlands in Jasper County



Prime Farmlands

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing feed, forage, fiber, and oilseed crops, and is also available for these uses. Prime farmland has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, adequate permeability for water and air, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. (USDA Handbook 1993).

Jasper County has over 50,000 acres of prime farmland soils, primarily located in the Tillman and Robertville areas (Figure 9, western Jasper County). Most of the prime farmland soils are used for agricultural or forestry purposes. Prime farmland soils in Jasper County include the Eulonia, Goldsboro, Lynchburg, Nemours, and Norfolk Series. These are the most productive soils in the County.

Issues and Concerns

1. Current or new property owners should be educated on the importance of prime farmland to American society.
2. Over the last 20 years, the agricultural base in Jasper County has declined to the point where it is no longer a viable industry. It is more profitable to either convert land to pine plantations or subdivide prime farmland areas and sell off parcels one at a time (Graves, pers. comm.).

Goals

1. Preserve all of the prime farmlands in Jasper County.
2. Encourage use of conservation measures such as easements.

Timber Lands

Currently, about 70 percent of the land in Jasper County is forested. In Jasper County, 98 percent of the timberland is privately owned (S.C. Statistical Abstract website 2005). The majority of the timberland in Jasper County is pine, primarily loblolly, with hardwoods occurring in wetland areas (Figure 10). Total volume of live species amounts to 769 million cubic feet, of which 319 million are softwood and 250 million are hardwood. The net annual growth for live softwoods in Jasper County averages 22.5 million cubic feet and hardwoods average 5.1 million cubic feet (USDA Forest Service, Forest Inventory & Analysis mapmaker website 2001).

Issues and Concerns

1. Timber companies are selling large tracts of land all across the South, Jasper County included.
2. Timber company lands in Jasper County can and will be developed, causing large-scale fragmentation outside of Jasper County's

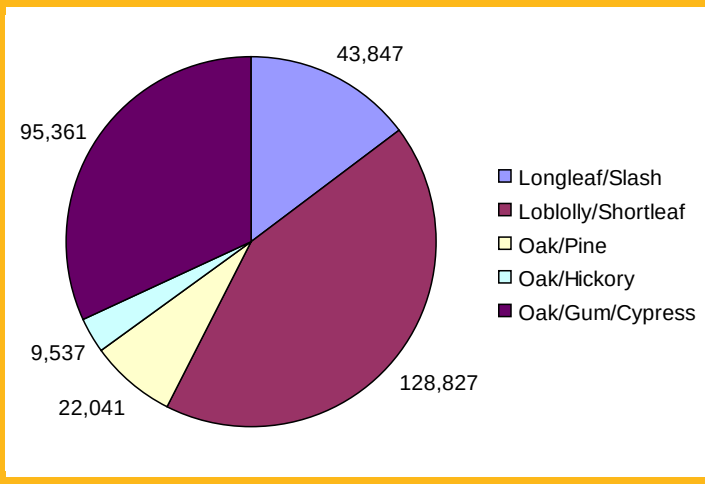


Figure 10. General forest types and their acreages in Jasper County. Modified from USDA Forest Service Forest Inventory Analysis website 2001.

municipalities or "urban boundaries."
3. Large acreages of longleaf pines in Jasper County have been lost and converted to other pine species, mixed pine/hardwood communities, and hardwood stands.
4. Private land ownership is particularly susceptible to individual, often isolated tract development rather than a collective, clustered approach to urban and residential expansion.
5. Urban sprawl will diminish the ability to utilize prescribed fire to manage the landscape due to smoke management issues and health and human safety risks.

Goals

1. Maintain the current forest land base in Jasper County and enhance forestlands through BMPs and longleaf pine restoration efforts.
2. Restore drained forested wetland systems in Jasper County.
3. Minimize forested interfaces with urban development (Wildland Urban Interface, WUI).
4. Maintain forest continuity to sustain wildlife corridors.
5. Encourage use of conservation measures such as easements.

Private Plantations

There are approximately 32 private hunting plantations in Jasper County ranging from 150 acres to 53,000 acres in size (Hamilton, pers. comm.). Plantations in this document are considered undeveloped natural areas (with the exception of a hunt camp providing limited housing and equipment storage facilities) that are privately owned and primarily managed for forestry, wildlife, and outdoor recreation opportunities. Plantations in Jasper County have a multitude of natural resources that range from salt marshes to longleaf pine forests. Private plantations are responsible for much of Jasper County's natural resource prosperity.

Private plantations conduct both timberlands and agricultural lands management. Critical

TED BORG

This alley of live oaks is typical of a plantation road in Jasper County.

habitats and at-risk species have been preserved largely due to historical and on-going plantation management practices. The use of prescribed burning on plantations has perpetuated rare and endangered fire dependent species. Plantations have large reserves of timber and pulpwood. These private entities are among the forerunners in modern forest management. Plantation hunting heritage dates back for hundreds of years, providing many with life long employment. They also host some of the best opportunities for viewing the many critical wildlife species and their habitats.

Private plantations also harbor unique historical and cultural resources. Much of the remnant colonial settlements, rice and indigo fields, Civil War battlefields, and innumerable gravesites are located on private plantations. Additionally, these plantations provide protection for historical resources by minimizing land use changes and engaging in proactive preservation.

Issues and Concerns

1. Trespass will be a problem throughout the County as the population increases.
2. As urban development increases, the likelihood of private plantation isolation will become a problem; land management tools will be limited and wildlife habitat will be degraded.
3. Land value increases prompted by urban development may raise property taxes, pressuring private plantation owners to sell their lands.

Goals

1. Maintain private plantation land base in Jasper County.
2. Encourage use of conservation measures such as easements.

Strategies, Policies, and Actions for Implementation

Over half a million rural acres were converted for development between 1992 and 1997, ranking South Carolina as state with the 9th fastest conversion rate in the nation (London and Hill 2000). Conservation of our rural areas

TED BORG

Swallow-tailed kites are migratory birds that breed in the Southeastern U.S. and are considered rare or endangered.

and responsible development requires proactive management on the part of Jasper County. Strategies for farmland, timberland, and plantation protection include:

Support Land Management—

- Promote programs like the Farm and Ranch Lands Protection Program (administered by USDA) or open land trust programs to protect prime farmlands with conservation easements or purchase of development rights.
- Promote small farmer programs and farm market outlets to provide a means of distributing vegetables and other specialty crops to sustain an agricultural base in Jasper County.
- Upgrade the Jasper County Prescribed Fire Resolution to an Ordinance.
- Utilize the USDA Farm Bill programs to assist landowners with management on private lands and promote wise land use in the County.
- Promote retention of old growth hardwood bottoms.
- Install field borders around all cropland fields to filter sediments and contaminants and increase wildlife habitat.
- Promote the use of cover crops and crop residues.
- Promote conservation tillage practices.
- Recognize a model conservation farm annually.

- Encourage landowners to plant filter strips around water bodies and streams.
- Promote rotational grazing and brush control for maximum growth of desired plant species.
- Promote use of conservation measures such as easements.
- Promote livestock BMPs such as fencing to keep animals out of water bodies and streams, protecting waterways from erosion and water quality problems.
- Promote inter-seeding of small grain for winter grazing operations.
- Encourage landowners to cut hay at correct heights and times to ensure maximum production, quality forage, and sustained wildlife habitat.

County Growth And Development Planning—

- Establish a countywide development tax to fund a conservation bank for prime farmland, critical corridors, and/or threatened ecosystems.
- Establish voluntary agricultural districts, land conservation districts, and rural residential districts (Appendix C).
- Enforce the Farmland Protection Act of 1982 to require any projects involving federal loans to find alternate sites when prime farmland will be impacted.
- Give landowners a tax incentive to not develop prime farmland areas. Presently landowners are taxed at a higher rate on prime farmland soils because of their higher productivity.
- Discourage development on prime farmland soils at the federal, state, and local levels.
- Create zoning overlay districts that will prohibit urban and/or residential development outside of the "urban boundaries."
- Maintain large tracts of managed forested lands as natural areas across the County landscape.
- Acquire conservation easements and/or purchase of development rights on critical lands.
- Charge an impact fee for developments on prime farmlands, and redistribute those funds to protect other prime farmlands in the County.
- Encourage communities to meet criteria for a "Firewise Community" as defined by the Firewise Communities USA program administered by the National Fire Protection Association so as to reduce the risks associated with wildfire in the community.

Educate—

- Provide future property owners with a soil map showing prime farmland soils on their property.
- Educate landowners and promote various NRCS Farm Bill Programs and grant opportunities for landowners to restore longleaf pine ecosystems on historic longleaf pine sites.

PHILLIP JONES

Prescribed burning is a traditional land management practice used to reduce forest fuels, create habitat, control pests and disease, and protect from wildfire.

Archeological, Historic, and Cultural Resources

Description

Jasper County, formed in 1912, is one of South Carolina's youngest counties (Perry 1962). The County is rich in historical, cultural, and archeological resources. A particularly strong mix of old and new exists in Jasper brought on by attempts at settlement, Indian uprisings, wars and destructions, modifications to the landscape, and agricultural, religious, and political changes.

History in Brief

Native Americans—Native Americans occupied the area that is now Jasper County for at least 12,000 years. Recent archeological investigations along the Savannah River suggest that Indians may have roamed this area for a time period significantly earlier than what has been recently believed. The first documented accounts of contact with aboriginal populations in South Carolina originate in the early 16th century from Spanish explorers. Accounts from the Juan Pardo expedition suggest that his party traveled through Jasper and Hampton counties. During these travels a number of small Indian towns of unknown affiliation were encountered (Gantt and others 2005).

During the 17th and 18th centuries, Indian populations along the coastal plain areas of South Carolina mixed with or were displaced by Indian migrations from the interior of the state. These groups were comprised mainly of Siouan tribes. By the late 17th century Yamassee Indian populations, believed to be of non-Siouan decent from Georgia, began moving into South Carolina and settling on lands provided by the English near the mouth of the Savannah River, and eventually moving eastward. Around this same period, a second Indian group began migrating into the Jasper/Hampton County area from Georgia, establishing a town on the east bank of the Savannah River. This Siouan group is referred to as either the Apalachicolas or the Palachucolas. A third group of Indians of Muskhogean decent also living in this region was the Cusabo, who were believed to have originated from southern Georgia. The Yamassee Indians were known to have inhabited around 10 villages in this region, and are widely recognized from the Yamassee war in 1715. Believed to have been angered by displacement and mistreatment from traders, the Yamassee Indians lodged an unsuccessful attack against the English. The majority of Indian populations had disappeared from the coastal areas of South Carolina by the mid-18th century (Gantt and others 2005).

Early Settlements—Jasper's early history needs to be seen in a regional context which includes English settlement beginning in Charleston in 1670 (Harvey 1996), the settlement of Beaufort in 1711, and Savannah, Georgia in 1733 (Rowland and others 1996). Purrysburg, originally known as Great Yemassee Bluff and located in present-day Jasper County, was established in 1733 by Jean Pierre Purry of Neufchatel, Switzerland (Rowland and others 1996). By 1736 there were 100 houses and 450 settlers in the new town at Yemassee Bluff on the banks of the Savannah River (Rowland and others 1996).

Establishment of Jasper County—Soon after the English settled Carolina and during the regime of the Lords Proprietors, the land reaching the Combahee and Savannah Rivers was designated as Granville County for governmental purposes. This area was organized into St. Helena's, Prince

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Many plantation homes and villages were destroyed during the Civil War. The Garnett house was one of the lucky ones to survrive.

Williams', St. Luke's, and St. Peter's parishes by the Church of England, and was used as election districts for the Lowcountry. Hampton and Beaufort Counties were formed from a large part of Granville County in 1878. Jasper County was formed from backcountry settlements of Beaufort and Hampton Counties in 1912 (Perry 1962).

Rice Cultivation—Experimental rice cultivation in Colonial South Carolina began around 1685. This practice grew steadily as a commercial enterprise after 1695, and continued to earn high profits up to the Civil War. When efforts by the English to grow rice failed, West Africans, who had the knowledge and experience of growing rice, were brought to the coastal regions of South Carolina and Georgia. The West Africans irrigated the rice fields according to river tides and constructed water control structures called "rice trunks" to regulate the flow of water in the fields as necessary. Their expertise and the development of rice fields and rice trunks brought great prosperity to planters throughout the region (Errante 1984). The rice trunk technology is still in use for waterfowl and other migratory bird management in many areas along the Savannah River and at the Savannah National Wildlife Refuge.

PHILLIP JONES

Rice trunks like the one pictured here are an important tool in the management of freshwater impoundments. They are used to control waterflow between tidal rivers and impoundment systems.

Early transportation—Indian foot paths, the Charleston to Savannah stage road, the King's Highway, Rochester Ferry Union Causeway, Screven's Ferry, Two Sisters' Ferry, Beck's Ferry, and the Charleston-Savannah Railway (completed in 1860) all proved essential to Jasper's early history (Rowland and others 1996).

American Revolution—Significant military activity took place at Purrysburg, Coosawhatchie, and Black Swamp (later known as Robertville, Perry 1962). Thomas Heyward Jr., loyal to the patriot cause and member of the Revolutionary party, was one of four from South Carolina who signed the Declaration of Independence. Heyward's home at White Hall remains one of the most beautiful sites in America with its double allée of live oaks at the gated entrance and tabby ruins on private property near S.C. Highway 462 in the "Old House" area. The White Hall plantation is truly a jewel of Jasper County. Heyward's gravesite is at Old House, his father Daniel Heyward's plantation site, located at the S.C. 642 and S.C. 336 junction. Old House is believed to be the richest plantation in the Beaufort District on the eve of the Revolution.

George Washington's Trail—In 1791, President George Washington visited Pocotaligo on his tour of the South. During his stay, parishioners of Price William Parish entertained him with a dinner at Van Bribben's Tavern. After dinner, Washington proceeded to Judge Thomas Heyward Jr.'s home at White Hall to lodge. At 5:00 a.m. on May 12, Washington left White Hall for Purrysburg, where he was met by officials of Savannah (George Washington's Journal, SC PRT 1991).

Civil War—Signers of the S.C. Ordinance of Secession to leave the union included Richard James Davant of Gillisonville's Davant Plantation and Langdon Cheves Jr. of Delta Plantation on the Savannah River (Rowland and others 1996). In 1861, General Robert E. Lee of the new

Confederate States Army was headquartered at Coosawhatchie while supervising construction of the fortifications to protect the Savannah and Charleston railroad (Perry 1962). Jasper County became a battleground of the Civil War in the Coosawhatchie area early in the war over the Charleston-Savannah railroad. In November 1864 the last Confederate victory occurred in Jasper with the Battle of Honey Hill (Perry 1962). In January of 1865, limited defensive forces turned to slow the advance of Union General William T. Sherman as he left Savannah with troops bound for Columbia. Skirmishes were unsuccessful in defending homes, plantations, and villages from total destruction by fire (Perry 1962).

Robertville, Henry Martin Robert, and "Robert's Rules of Order"—Robertville, in the northwestern corner of Jasper County, enjoyed state-wide importance prior to the Civil War at which time it was totally destroyed (Perry 1962). Renowned for the beauty of its churches and plantations, Robertville was the birthplace of Henry Martyn Robert. As a small boy, Robert was taken to live in the Midwest and graduated from West Point in 1857. He fought in the Civil War as an army officer and defense engineer for the Northern side. After the War, he wrote a guide for the proper method to conduct an orderly and impartial meeting. This document, Robert's Rules of Order, was first published in 1876 (Robert 1915). In 1901, Robert was promoted to Brigadier General. In 1915, Robert revised his Rules of Order and secured a copyright for the book which continues to be the authoritative treatise on parliamentary procedure (Perry 1962).

Religion and Churches—Religion played an important part in Jasper's history and many beautiful churches still exist throughout the County. Specific church buildings that pre-date the Civil War are the Episcopal Church of the Holy Trinity in Grahamville (1850), Gillisonville Baptist Church (1845), Hardeeville United Methodist Church (1860), and Black Swamp Baptist Church at Robertville (built in 1845 in Gillisonville by Episcopalians and moved piecemeal to Robertville starting in 1871).

Cemeteries—During the early settlement period (early 1700s) in present-day Jasper County, the death rate was high due to malaria, yellow fever, and other maladies. Early communities, like Purrysburg, developed their own cemeteries. Soon, as land grants allowed people to scatter to their own lands, family cemeteries became popular. Thereafter, church-owned cemetery plots became fashionable as a sign of family status and prestige. Today, Jasper County has almost 200 cemeteries, ranging in size from one burial plot to over one thousand. Many burial sites have no markers and are just marked by a depression in the ground. About 80 of these unmarked sites are from burials that took place over 100 years ago (Malphrus pers. comm.).

In 1994, the Local Jasper County Historical Society attempted to survey all cemeteries in the County. By early 1996 and after working with over 150 individuals, the Society had surveyed all the cemeteries they could find. In total, the Society documented 184 cemeteries and developed a book entitled *The Cemeteries of Jasper County* (Malphrus 2001). Although the project was successful in developing a record of burial sites, it also revealed some reason for concern for the preservation of existing sites. The survey found that many burial sites had been damaged or destroyed by irresponsible logging, timbering, or farming operations, and a more recent practice of housing development. Their study also indicated that measures should be taken to better protect the

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Jasper County has 184 documented cemeteries, although it is believed that many burial sites are not marked.

historic burial sites, particularly in remote areas.

Villages and Towns—Purrysburg, Switzerland, Pocotaligo, Coosawhatchie, Robertville, Gillisonville, Grahamville, Arm Oak, Tillman, Grays, Old House, and other Jasper villages harbor important history and historic sites. Two incorporated towns, Ridgeland and Hardeeville, are both bisected by rail and U.S. Highway 17 (the Coastal Highway). Interstate I-95 is adjacent to both towns and was built in the 1970s. The railroad hamlet of Ridgeland became the county seat after the County was formed in 1912.

TED BORG

Timber production, saw mills, row crops, and naval store exports sustained the economy in rural Jasper County through most of the 20th Century.

The 20th Century—Jasper County remained rural throughout the century with timber production, saw mills, row crops, naval store exports, and tourism maintaining the economy. U.S. Highway 17 paved in the 1920s and I-95 built in the 1970s both brought many visitors and tourism dollars into the County. From the mid-century onward, most local citizens had to travel to Hilton Head, Beaufort, and Savannah for employment. Large plantations and timber corporations owned most of the land, providing necessary refuge for Jasper's wildlife. Pristine rivers and streams provided shrimp, fish, and crab for eating; most locals had home gardens for growing vegetables. The 1980s and 1990s brought industry to Jasper including a powerplant for electricity production at Purrysburg. Sun City at Hilton Head, a major retirement community developed on the Jasper-Beaufort County border, has proven to be a catalyst for much continued growth and development interest.

Issues and Concerns

The concerns of Jasper County residents are based on conservation of the history and culture that exists in Jasper County. Not only are they founded in preserving historic sites and structures that exist as evidence of heritage, but a sense of community and tradition that exists in the County should also be preserved. Specific issues include:

1. Unplanned development pressures in historical areas threaten to change the context of the landscape and historical sites.
2. Lack of documentation, recognition, and knowledge of county historical and cultural resources threaten destruction of structures and sites.
3. Lack of maintenance threatens to age historic sites and structures.
4. Lack of adequate protection around recognized sites threatens to encroach on historic sites and destroy the sense of history around them.

Goals and Objectives

Certain measures can be taken to mitigate the impacts of time and development on historic and cultural sites and structures. These steps will ensure that these resources will be around for generations of Jasper County residents to appreciate, learn from, and understand in a historical context. Specific goals and objectives include:

1. Preserve and enhance the existing historic buildings and sites, archaeological sites, and cultural resources for the benefit of current and future citizens.
2. Increase public awareness and understanding of the cultural resources in Jasper County and promote community efforts to preserve them.

Strategies, Policies, and Actions for Implementation

TED BORG

The Webb Wildlife Center, in nearby Hampton County, provides many of the same wildlife and public recreation opportunities as Jasper.

Protecting historic and cultural resources is an essential component for maintaining Jasper County's character and past. Steps should be taken to recognize, publicize, and develop long-term protection measures for historic sites and cultural resources. An important component of protecting these resources includes developing meaningful partnerships. Partners for implementing these measures should include Jasper County, pertinent municipalities, non-profit organizations, S.C. Department of Archives and History, S.C. Department of Parks, Recreation, and Tourism, and other preservation organizations. Specific recommendations include:

Develop Information—

- Develop a specific management plan for archaeological, historic, and cultural resources.
- Create a catalog of specific county-recognized sites and structures that should be protected. Catalog should include information and location for each site.

County Growth And Development Planning—

- Require archeological surveys and protective buffers around properties as they change hands of ownership to ensure protection of recognized sites.
- Increase county and municipal interest and support for historic markers on recognized sites and structures to document and provide information.
- Increase county and municipal interest and support for signs to provide information on recognized historical sites and structures.
- Create historic overlay districts around significant properties for more stringent density and buffer requirements.

Resource Protection—

- Create minimum maintenance requirements for county owned sites to ensure protection.

Educate—

- Evaluate, provide, and promote activities, facilities, and educational opportunities to enhance cultural stewardship and tourism opportunities.

A list of specifically recognized sites and structures is provided in Appendix D of this document. Not intended to be exhaustive, this list includes battlesites, structures, churches, gravesites, and other areas, that should be protected through county planning efforts.

PHILLIP JONES

Backyard wildlife habitat can be tailored to attract birds and butterflies with the right selection of plaints and flowers.

Chapter Four

URBAN GROWTH MANAGEMENT

Quality Growth Standards and Objectives

The Jasper County Natural Resources Focus Group believes no discussion of the management of this County's natural resources can be considered complete without consideration of growth-related practices, objectives, and standards for the County. In particular, practices and standards related to future land use, infrastructure extension, and water quality have substantial implications for the County's ability to protect key natural areas and quality of life for County residents. These practices and standards must be coordinated with natural resource conservation goals. With this in mind, the Focus Group offers these recommended "quality growth standards and objectives."

It is the hope of the Focus Group that these recommendations be considered within the context of the joint planning/visioning effort of the County, Ridgeland, and Hardeeville. These recommendations should also be considered during the revision of the natural resources, future land use, transportation, water quality, and community facilities sections of the Jasper County Comprehensive Plan, the revision of Ridgeland and Hardeeville's comprehensive plans, and the development of the Southern Beaufort County Regional Plan.

Detailed below, recommended quality growth objectives are to:

1. Plan land use and infrastructure regionally and at a broad-scale level.
2. Designate and optimize appropriate growth areas.
3. Designate and protect rural land and land in traditional uses.
4. Optimize transportation networks and choices.
5. Evaluate, and strengthen, and enforce water quality standards and regulations.

PHILLIP JONES

The effects of urban and suburban growth on the natural resources of Jasper County will be determined by the utillizaton of growth management tools.

Plan land use and infrastructure regionally at a broad-scale level

Plan future land use regionally. To maximize protection of natural resources while still accommodating and encouraging preferred new development, the unprecedented level of cooperative planning now taking place among the jurisdictions of Jasper County, Hardeeville, Ridgeland, and Beaufort County should set the standard for ongoing regional planning in this area.

Plan future land use at the landscape-level. Cooperating jurisdictions should evaluate the entire landscape within the regional planning area as a whole. They should determine those areas best suited for the accommodation new development based on a set of criteria. They should also determine undeveloped protection areas to preserve land that is valuable ecologically, culturally, and historically. The Focus Group has created a Primary Protection Areas map to serve as a resource for the County, largely based on protecting wetlands, areas within 50 feet of wetlands, prime farmlands, and soils suited for longleaf pine (Figure 11, located on page 62). The County should also outline transitional areas between land that is most intensively developed and that which is least developed to prevent urban sprawl.

Focus infrastructure investment within growth areas. Cooperating jurisdictions should coordinate on locations for new and expanded growth-supporting infrastructure, including transportation networks, schools, and water and sewer lines. This infrastructure investment should be focused within those areas mutually designated as appropriate for additional urban and suburban development.

Adjust "growth rings" on completion of landscape-level planning effort. Establishment of growth/annexation rings is a forward-thinking, proactive approach to growth, services management, and annexation issues. On completion of cooperative landscape-level planning establishing growth and protection areas, the five-mile growth rings established around Hardeeville and Ridgeland should be altered to reflect a mutually agreed-upon finer-grain delineation of growth areas surrounding those municipalities.

Designate and optimize appropriate growth areas

Focus new development in and near existing urbanized areas. As part of a landscape-level planning effort and in conjunction with designation of protected lands, cooperating planners should evaluate and identify existing urbanized areas and additional land near them that are appropriate for additional urban and suburban development. Wherever appropriate, these growth areas should be annexed into the appropriate municipalities, which should carefully master-plan them within the context of existing development patterns.

Provide transitions between urban and rural areas. Transitional areas should be designated between growth and protection areas to effect a softened, "stepped-down" transition between those areas that are most intensively developed and those least intensively developed. Development standards in transitional areas will vary, but should allow moderate housing densities and uses appropriate to the area.

Provide incentives to development within growth areas. To maximize leverage of private and public investments, incentives should be made available to developers within growth areas. These incentives should include expedited permitting, flexible development standards for lot sizes and setbacks, and other market-based incentives that effectively reduce the costs of development.

Promote high quality development. To endeavor responsible growth, Jasper County should encourage development that considers natural resource conservation concepts, traditional lowcountry designs, and "smart growth" benefits.

Develop new growth areas in traditional development patterns. Development standards should be created to maximize appearance and functionality, improve traffic patterns, and provide for a variety of housing types. Standards should consider affordable housing, connectivity among new and existing roadways, bike and pedestrian transportation options, mixed uses for residential, retail, commercial, office and civic development, and various housing types and densities.

Designate and protect rural land and land in traditional uses

Protect and conserve existing rural lands and lands employed in traditional uses. As part of a landscape-level planning effort and in conjunction with designation of growth areas, planners should designate categories of land for varying degrees of protection. These should include land that is valuable ecologically, culturally, and historically; land that provides open space, wildlife habitat, and recreational uses; land that relieves congestion; and land employed in traditional uses such as farming, hunting, and timber production. Counties should abstain from annexing these areas into area municipalities. If land designated for such protection falls within the five-mile "growth rings" it should be removed and jurisdiction returned to the County.

Coordinate public and private land protection efforts. Public agencies and private land protection entities should work together to strategically identify the most critical area for protection and identify ways to work together to maximize fulfillment of land protection objectives.

Protect land permanently through a variety of protective mechanisms. Where most advantageous and feasible, land should be permanently protected via donated easements from private individuals and developers, purchase of development rights, transfer of development rights, fee-simple acquisitions, and other permanent protection mechanisms.

LINDSAY FAIRCHILDS

Supporting responsible development concepts will result in a landscape that allows for residential and commercial development to co-exist with set aside natural areas, such as this one, in Jasper County.

Employ agricultural zoning and conservation development standards in appropriate areas. Where appropriate, some rural land should be zoned to allow non-intensive, low-density development (example: one home to 10, 15, or 20 acres). "Conservation development" standards should be developed for these zoning districts that are consistent with existing land uses. Standards should encourage development on less than 20% of the gross acreage and offer density bonuses for clustering homes and other development.

Establish funding for permanent land protection. Establish an income stream to fund local public and private land protection programs. Funding sources could include real estate transfer fees, local option sales taxes, and others should be investigated.

Create an urban greenspace plan. A greenspace plan within municipal limits will provide for urban parks, greenways, and usable natural areas for the public. These efforts will encourage health and recreation, an appreciation for the environment in a non-rural setting, and a sense of community.

Encourage land developers to build *Firewise Communities* and establish necessary regulations to ensure they meet minimum criteria following guidelines provided by the Lowcountry Wildland Urban Interface Council. Due to the height probability of wildlfires in Jasper County and the ever increasing need for prescribed fire, firewise communities should facilitate better fire education for Jasper County residents and promote public health and safety through firewise construction techniques. Contact the S.C. Forestry Commission for more information.

Optimize transportation networks and choices

Plan major traffic corridors regionally. To maximize regional and local transportation efficiency, cooperating regional governments should undertake joint planning of such shared major corridors as U.S. 278 and S.C. 170.

Maximize roadway connectivity. New roadways should maximize connectivity with existing roadways, both within and outside of new development.

Maximize transportation alternatives to decrease roadway demand. To decrease vehicle miles traveled and demand on roadways, alternate transportation modes should be maximized where appropriate, including bike ways, pedestrian ways, and such appropriate mass transit as localized bus routes.

Build mixed-use developments to decrease roadway demand. To localize some travel, residential development approved within growth and transitional areas should include a mix of appropriate uses, including retail, office, and commercial.

Ensure adequate roadway capacity. Transportation facilities adequate to handle new vehicle trips generated by any new development should be in place or be put in place in conjunction with the new development.

Ensure context-sensitive roadway design. A flexible and sensitive approach to roadway design will best balance transportation, economic, social, and environmental objectives.

Develop user-specific taxes for new infrastructure development. To ensure that new developments do not increase the tax burden on new and existing residents, infrastructural development taxes will ensure adequate transportation, communication, and safety for new populations.

Develop traffic reduction strategies for all developments. Requiring developers to include traffic studies for responsible road development will protect both new and existing neighborhoods from increased traffic. An example of this is self-contained shopping for high-density development areas.

Identify strategic emergency service locations for large development areas. This is important to ensure proper health and safety of new and existing residents.

Create lighting ordinances for all developments. Lighting ordinances should be designed to minimize light pollution in residential, commercial, and industrial developments.

Evaluate, strengthen, and enforce water quality standards and regulations

Evaluate and strengthen water quality standards and regulations. Cooperating planners

PHILLIP JONES

Water quality can be protected through buffers, standards, regulations, and other conservation measures.

should establish and adopt through ordinance water quality standards and mechanisms to be employed at the landscape, neighborhood, and site levels. These standards and mechanisms should be employed to maximize water quality within both intensively and less intensively-developed areas.

Strengthen protection of marshes and coastal waters. Consider establishment of areas that prohibit certain land use near salt marshes and coastal waters; assess the adequacy of existing critical line setbacks and buffer requirements in those areas and establish new requirements where necessary.

Protect non-jurisdictional wetlands. Establish and adopt regulations to protect non-jurisdictional wetlands ("isolated wetlands"). Currently, there are no state or federal protection for these valuable habitats.

Establish watershed-level stormwater management and regulations. Assess the adequacy of regulations and standards governing stormwater quantity and quality and establish new requirements where necessary.

Strengthen non-point management and regulations. Assess the adequacy of regulations and standards governing septic systems, boat wastes at marinas, and other non-point pollutant sources. Establish new requirements where necessary.

Monitor water quality and enforce regulations. Establish a structure to coordinate water quality monitoring activities to ensure water quality standards are met.

Develop a water conservation management plan for the county and within the municipalities to encourage long-term water conservation and wise water use. Examples include a water waste ordinance, rain sensor ordinance, odd-even day outdoor watering, limiting the amount of ground-water used on golf courses or turf, mandating the use of alternative water sources when feasible.

Tools to Achieve Quality Growth

As described earlier in the conservation plan, efforts to protect the valuable landscape of Jasper County have already begun using a variety of tools. Additional tools have recently emerged in response to the needs of landowners, making land protection an even more accessible option for communities. Below is a comprehensive list and description of commonly used land-protection tools that are available for both the small and large land bases.

Urban Growth Boundaries

Urban Growth Boundaries (UGBs) help to keep growth and development to a certain point or boundary. Utilities such as sewer and waterlines cannot be extended past the boundary for a certain amount of time (Daniels 1999). These boundaries are drawn on planning and zoning maps to show where a city anticipates that it will grow. The land outside of the designated UGB will remain rural and low-density in nature. Outside the UGB, restrictive zoning will prohibit urban development and small lot sizes. UGBs do not provide permanent protection of environmentally sensitive areas and open space. Boundaries are set for a stated amount of years (Daniels 1999). Major considerations when developing urban boundaries include growth potential, potential deflection, and fiscal strength (Avin and Bayer 2003).

Jasper County and its municipalities are working together to develop "urban boundaries," which will focus urban growth around the current municipalities (and their services) as a quality growth management tool. We recommend that Jasper County protect its current land-base from large-scale development by restricting urban development outside of these urban boundaries. This will minimize urban sprawl throughout the County landscape. This measure will not prohibit current or future residents from moving into rural Jasper County, but it will restrict urban development activities in a more rural landscape that is best managed through forestry, wildlife, and farming management practices, especially prescribed fire. We view this element as a critical component to true quality growth, and recommend Jasper County and its communities seriously evaluate and maintain set urban boundaries. Specific measures we recommend are listed below.

1. Restrict commercial, industrial, and residential development outside of the municipal urban

boundaries, and set urban boundary lines around current smaller communities to implement this standard throughout Jasper County.

2. Set zoning regulations to designate rural and critical lands in the County.
   a. Critical lands would include prime farmlands, wetlands, critical habitats for threatened and endangered species, species of special concern, and corridors between critical habitats.
   b. Encourage new commercial, industrial, and residential development in current municipalities and/or within approximately 2-3 miles of I-95.

Donated Conservation Easements

Conservation easements are permanent, legally enforceable mechanisms that allow a private landowner to voluntarily donate certain property rights to a qualified land trust while retaining ownership of the property. The bundle of rights donated to the land trust has a monetary value which is determined by an appraisal. The landowner receives both federal and state tax benefits for this donation. To learn more about conservation easements, visit the following website: *http://www.nature.org/aboutus/howwework/conservationmethods/privatelands/conservationeasements.*

PHILLIP JONES

Maintaining natural spaces in Jasper County is an important component of responsible development.

Donated Fee

Landowners who no longer wish to retain title to their land or who wish to will their land to a charitable organization may do so by donating the entire fee simple bundle of rights. Similar to a conservation easement donation, a fee simple donation carries a monetary value determined by an appraisal, which results in federal and state tax benefits to the landowner.

Purchased Fee

With the recent trend of timber companies disposing large tracts of land, the opportunity and need to purchase land for conservation has never been greater. Both public agencies and private non-profit organizations are in the business of purchasing land for conservation, and are actively seeking tracts to add to existing national wildlife refuges, wildlife management areas, and heritage preserves. Private non-profits also have the ability to acquire land to retain as a preserve or to sell to conservation-minded buyers who are willing to protect the land with a conservation easement.

Both the public and private land acquisition strategies result in permanent land protection that has clear and tangible public benefits, including protection of air and water quality as well as recreation and other traditional uses.

Purchased Conservation Easements/ Purchase of Development Rights

Landowners who are unable to use tax deductions and credits but who own significant land may be able to voluntarily sell the right to develop their land without giving up ownership of the land. An organization, such as a qualified land trust or federal, state, county, or local government holds the development rights to ensure that the land is permanently protected (Chadbourne and Chadbourne 2000). This tool is often used when a landowner's land carries

a high market value and the income of the landowner is such that they are unable to materially benefit from tax incentives. In return for giving up the right to develop, the landowners receive cash for the value of the property rights that are sold. Like the donated conservation easement, landowners retain title to the property. Interchangeably referred to as purchased easements or purchase of development rights (PDR), this mechanism is designed to "...preserve important resources, such as river corridors, aquifer recharge areas, open space, but notably farmland, by paying for and retiring the development right of the land and restricting the deed to agreed activities, such as farming" (Chadbourne and Chadbourne 2000).

PHILLIP JONES

Many species of migratory birds spend their breeding season in the marshes and swamps of South Carolina.

There are a variety of funding sources available to purchase easements, including the newly developed South Carolina Conservation Bank. Applications to the Conservation Bank must be in partnership with an eligible entity such as a non-profit conservation organization, a state agency, or local municipality. To learn more about the Bank, please visit their website at: *www.sccbank.sc.gov*. Another funding source for purchased easements is the Wetland Reserve Program (WRP) administered by USDA's NRCS. WRP easements afford landowners the opportunity to receive financial and technical expertise for the restoration, protection, and enhancement of wetlands and associated uplands. To learn more about WRP, please visit their website at: *http://www.nrcs.usda.gov/programs/wrp.*

Counties also can establish a PDR program through a bond referendum, tax increase, or other similar mechanisms. An example of such a program is the Beaufort County Rural and Critical Lands Program. To learn more about Beaufort County's successes with their program, please visit their website at: *http://www.co.beaufort.sc.us/Public_Info_Officer/Rural_Critical_Lands/R&CL_Main.php.*

Transfer of Development Rights

Transfer of Development Rights (TDR) is a market-based program that guides development away from threatened natural resources and towards areas where growth is appropriate and planned. Jasper County would not have to raise taxes or funding to support a TDR program. TDR programs involve an exchange of development rights between developers and private landholders. TDR programs consist of "sending areas," where resources are to be protected, and "receiving areas" where the development rights are transferred to areas where development is planned and encouraged. There is an incentive for developers to buy development rights from landholders in "sending areas." Developers can exceed the base density zoning in "receiving areas" with transferred development rights, resulting in the construction of more units and increased profitability.

Special Designation

Special Designation of a threatened natural

area provides the area with "special recognition and, in some cases, legal protection, technical and financial assistance, and management support to the resource owners, depending on the characteristics of the resource" (Chadbourne and Chadbourne 2000). Natural areas can have state or federal special designation. Examples of special designation are: S.C. Scenic Rivers, National Heritage Corridor Program, National Historic Landmark (NHL) program, Natural Register of Historic Places, and Scenic Highway designation.

National Conservation Buffer Initiative

The National Conservation Buffer Initiative was established to reduce farmland runoff and soil erosion, and to increase wildlife habitat and diversity. In this program, landholders establish conservation buffers (riparian buffer zones, filter strips, grassed waterways, shelter belts/fields windbreaks, contour grass strips, wellhead protection areas, field borders, vegetative barriers, and stream bank plantings) to improve environmental conditions. Buffer practices can qualify for financial assistance from federal and state programs. To learn more about buffers visit *www.nrcs.usda.gov/technical/ECS/aquatic/buffer.pdf.*

Conservation Zoning

Conservation Zoning is a method used to protect environmentally sensitive and critical areas of land. Conservation Zoning includes large lot zoning and overlay zoning, large minimum lot sizes, limitations on land use types that may be permitted, and performance standards to prevent disturbance to natural areas (Daniels 1999). This method can help to protect habitat and sensitive areas, but it does not guarantee permanent preservation (Daniels 1999).

Conservation Subdivisions

Conservation subdivisions are methods of development that concentrate growth in one area, while protecting land in another. Through this technique, there will be the same amount of housing units as a typical subdivision, but the units will be clustered into a smaller area. Environmentally sensitive areas outside of the developed area can be permanently protected with this technique. While development is concentrated in one area, the technique can preserve environmentally sensitive areas such as wetlands, floodplains, scenic areas, and prime farmland, and critical habitat. This technique is effective in protecting environmentally sensitive areas and is low in cost (Georgia Quality Growth Partnership website 2005).

PHILLIP JONES

Driftwood washed up on the shore of the Savannah NWR shelters and feeds birds, plants, and other species.

Natural Resources Review Team

Jasper County and its municipalities can continue their partnership with the JSWCD and its primary agency partners to best manage urban growth and natural amenities of Jasper County by utilizing a "natural resources review team." A team (2 or more) of local natural resource professionals can provide additional

assistance by reviewing large, urban development projects before development is approved by Jasper County or its municipalities. Individuals selected for the review team should be certified natural resource professionals and will be selected by the JSWCD. Additionally, the County and its municipalities should also hire natural resource professionals and natural resource planners to deal with development.

The natural resources review team would evaluate proposed urban development projects (50 acres or more) to provide non-biased natural resources information to Jasper County and its municipalities. This would better inform decision-makers on natural resource findings and recommendations. It would enable the County and its municipalities to be more innovative in their natural resources planning efforts and efforts to maintain Jasper County's natural integrity. The following is an outline summary of the natural resources review team process.

PHILLIP JONES

Protecting critical habitat in Jasper County through conservation measures for development along the coast should help mitigate the effects of disturbance on nesting seabirds.

1. County or municipality contacts the JSWCD office to set up an appointment with the natural resources review team.
2. A minimum of 2 natural resource professionals will be assigned to the site.
3. The natural resources review team will be provided with a site location and boundary map for the properties under consideration for urban development.
4. The natural resources team will have four weeks, after the date of contact, to visit the site and provide Jasper County and/or its municipalities with:
   a. Pertinent maps of the site and locations of "key" natural resources;
   b. An attached inventory and other findings;
   c. A summary of recommendations; and
   d. Other important information for the County or municipalities to make their decisions.

County Conservation Bank

Jasper County should create its own Conservation Bank to house monies derived from various impact fees. The County should propose and lobby for a sales tax referendum to create funds for the Conservation Bank.

Impact Fees

Developers should be charged a natural resources impact fee per acre. These impact fees should be housed in a County Conservation Bank and utilized specifically to protect natural resources in perpetuity on other lands in Jasper County.

PHILLIP JONES

Natural resources such as the beaches of South Carolina attract thousands of tourists every year.

Chapter Five

NATURAL RESOURCE ECONOMICS

Overview

Jasper County's natural resource economy is unique because of its proximity to interstate highways, abundant water resources and natural areas, pristine undeveloped areas for enjoyment, and developing retirement communities. Economic variables that Jasper County must consider are direct resource industries, recreation, hunting, fishing, and ecotourism. Although it is important to clearly express the economic values for cost-benefit analysis and county planning, it is extremely difficult to put a value on natural resources. Non-quantifiable natural resource benefits include quality of life, aesthetics, and "existence values," variables that are subjective based on the observer.

Jasper County's natural resource industries provide significant economic benefits. The natural resource industry (including forestry, logging, fishing, agriculture, and hunting) employed 130 people in 2000 (1.5 percent of total employed in county, S.C. Statistical Abstract website 2005). This number is down from 361 people in 1990. The delivered value of timber for Jasper County in 2001 was almost $18 million (Table 3, S.C. Statistical Abstract website 2005). An additional $10.7 million was the stumpage value paid to all owners in Jasper County in 2001. As expected, these values are affected by changes in land use. Cash receipts in 2004 for agriculture totaled over $11 million. The value of commercial fishing reported for Jasper County was over $660,000 in 2000 (S.C. Statistical Abstract website 2005). These numbers are very sensitive to development along the waterways.

Wildlife recreation is often recognized as the cornerstone of the conservation ethic, and the economic impact of these activities is often overlooked. Wildland recreational opportunities on

US FISH & WILDLIFE

In addition to their beautiful sunsets, wetland ecosystems in Jasper County provide considerable biodiversity and charm to the area.

Timber	
Delivered value	$17,984,030
Stumpage value	$10,755,593
Seafood	
Shrimp	$75,317
Crabs	$585,359
Agriculture	
Crops	$10,956,000
Livestock	$742,000
TOTAL	**$41,098,299**

Table 3. Value of natural resource industries in Jasper County, S.C. (S.C. Statistical Abstract website 2005).

both public and private lands contribute to the Jasper County economy. One substantial economy in Jasper is hunting, which includes deer, turkey, quail, doves, waterfowl, and other game. A 1991 Jasper County survey estimated that 2,400 sportsmen hunted on private land in Jasper County, and that over 80 percent of these sportsmen were from a different county or state (Clemson University 1992). The survey also showed that 90 percent of the private land in the County was owned by landowners who allowed hunting, three-fourths of which were hunted under a fee-hunting arrangement. The survey also showed that the hunting community contributed over $6 million to Jasper County annually. It is important to note that three-fourths of these actual expenditures were paid to community businesses and over 80 percent of these monies were "new monies" brought from outside the County. It is clear that well managed private lands in Jasper County attract non-resident hunters and other outdoor enthusiasts, and that these visitors bring with them an influx of new money into the County. It is also clear that businesses receive the bulk of the benefit from these activities. The current economic impact of this activity is likely greater than it was in 1991.

In terms of public wildlife recreational activities, Jasper County also contains the Savannah National Wildlife Refuge (NWR), a federally protected natural environment for wildlife viewing and recreation. Visitation at Savannah NWR averages approximately 200,000 visitors per year. Almost half of the total refuge visitors (98,000) drive the wildlife drive, called the Laurel Hill Wildlife Drive. Half of those who use the wildlife drive are non-resident. The remaining visits are from managed hunting, fishing, and boating recreation on the refuge. Considering data from the refuges with comparable public use programs, Savannah NWR could perhaps contribute approximately $6 million per year to the local economy (Russ Webb, pers. comm.). And this does not include employment opportunities further supported by an influx in consumers.

Other recreational activities in the County include fishing, boating, wildlife viewing, golfing, and hiking, among other things. The 2001 *National Survey of Fishing, Hunting, and Wildlife Associated Recreation* conducted by the U.S. Fish and Wildlife Service, reported that South Carolina had 1.7 million participants in wildlife associated recreation (angling, hunting, wildlife viewing). According to the survey, these recreational users generated $1.3 billion dollars annually.

Another source of natural resource economics is tourism stimulated by the existing natural resources. The S.C. Department of Parks, Recreation, and Tourism (SCPRT) reported that domestic travelers to South Carolina spent $7.8 billion in 2004; research also indicated that 17 percent of leisure trips from out of state were for outdoor recreation. SCPRT also reported that there is an average of 149 visitors per day in Jasper County. According to SCPRT, these visitors generate $39 million dollars and employ over 6,000 people in Jasper County. Additionally, they provide over $2 million in state tax receipts and $740,000 in local tax receipts. These numbers represent the economic impact of tourism in Jasper County, and they are inextricably tied to the natural resources.

Jasper County provides its citizens and visitors a number of opportunities to enjoy outdoor recreation on its lands and waters. The figures above hopefully provide some indication as to how much wildland recreation activities alone can significantly impact the local economy.

There is no doubt that healthy natural resources can diversify and increase the economic options in a community and sometimes be the primary means of attracting visitors to a particular area. It is important to point out that this document does not consider quality of life, aesthetics, and existence values of resources, which are undoubtedly powerful players in local economies.

CHRIS GRAVES

Logging can provide a viable and sustainable industry in Jasper County if it is conducted with silvicultural Best Management practices (BMP).

Future Challenges

Over the past 100 years, land value on the rural-urban fringe has increased significantly in the South. Pressure to sell prime lands, including farms, forests, and plantations, has rapidly increased. This pressure occurs as the cost of land management goes up when landowners forego potential returns from selling land and investing it in other ways. The shift to urbanization and increased demand for retirement properties is reflected in changing land values. Land in Jasper County has increased from $67-100 per acre in 1959 to $645-1,400 per acre in 2002 (Hite and others 1999).

Commercial, residential, and industrial development is often touted as a source of income for local residents and a stimulus to local economies in the form of an increased tax base. Negative fiscal impacts resulting from loss of natural areas are often under-rated as they are hard to measure and are not apparent in the short term. Ulbrich (2000) lists these considerations:

- Cost of congestion;
- Cost of infrastructure;
- Changes in real estate areas for established areas;
- Deterioration of existing real estate in the urban core; and
- Fiscal impact on local governments.

Given the dramatic growth projections for Jasper County over the next 20 years and the abundant natural resources that are threatened by this growth, Jasper County and its municipalities face great challenges in the near future. It is important to choose wise land management that supports conservation, and conservation that supports responsible development to achieve a fiscal and natural balance. Jasper County and its municipalities are charged with achieving this equilibrium between future land development and conservation of its priceless assets: the natural, historical, and cultural resources.

Goals, Strategies, Policies, and Actions for Addressing the Challenges

Goal:

- To maintain and improve natural resource-based economics in Jasper County.

Strategies, Policies, and Actions:

- Develop quality growth strategies that will minimize negative impacts to natural areas and associated land management activities.
- Protect the health of Jasper County's natural resources by utilizing a variety of regulations on urban development.
- Expand and diversify the wildland recreation opportunities in Jasper County to increase tourist attraction, gain larger local interest and participation, and stimulate the economy.
- Partner with local natural resource agencies and non-profits to develop a natural resource-based strategic recreation and

tourism plan for the County.

- Assist Jasper County and Clemson University Cooperative Extension Service or another University with conducting an updated natural resources economics study within the County.

Recently, researchers presented a fiscal impact report to the Councils of Jasper County, Town of Ridgeland, and City of Hardeeville (Taylor and Molnar 2006). Their report addresses the effects of rapid growth in Jasper County and provides growth management options to mitigate negative fiscal impacts. As discussed throughout this document, growth management options must be proactively pursued, including:

- Comprehensive land-use planning;
- Zoning;
- Phased development;
- Urban growth boundaries; and
- Smart growth.

Planners and county and municipal decision-makers must incorporate community values into future action as development will not wait on local administrators taking action.

CHRIS GRAVES

Jasper County has a rich history of agriculture and supports a considerable acreage of prime farmland that contributes to the local economy.

PHILLIP JONES

The Blue Heron Nature Trail in Jasper supports a butterfly garden, a half mile recycled rubber trail, and educational kiosks.

Chapter Six

ENVIRONMENTAL EDUCATION

The Role of Environmental Education

New residents escaping from metropolitan areas are attracted to Jasper County because of its rural character. Therefore, preserving the rural nature of the County is important for both Jasper County's longtime resident prosperity and future economic health. To ensure preservation of natural resources, the next generation must also develop these same values because they are the future policymakers. A central value associated with preserving a rural landscape is developing an appreciation of nature. This occurs through a combination of personal experiences with nature and instruction about the value of natural systems.

The Jasper Soil and Water Conservation District, with assistance from multiple partner agencies and private donors, constructed the Blue Heron Nature Trail and a 4,200 square foot Learning Center to specifically fulfill the natural resources education needs in the community. It is located in Ridgeland and offers a variety of education workshops to the public, and classroom and outdoor natural resources education for all ages. The conservation community of Jasper County realized the need to educate its children about natural resources, so the Blue Heron Learning Center was designed to fill the void for natural resources education in Jasper County. For details on current educational opportunities at the Blue Heron Learning Center, please contact them at 726-7611 or at *http://www.dnr.sc.gov/conservation/districtsdnr/jasper/index.html.*

PHILLIP JONES

Students visit the Blue Heron Learning Center to learn about nature in a natural setting.

Future Challenges

Many children today are generally far removed from the land and especially a rural lifestyle, in which farming, hunting, fishing, and the outdoors are well understood. They spend most of their time at school, playing sports, riding in automobiles from one place to another, in malls or other stores, and playing video games or watching television in the luxury of their homes. Many children believe that food comes from the grocery store and cannot identify the various natural resources in their backyard or local community, or how those resources benefit them.

LINDSAY FAIRCHILDS

Conservationists tour Davant Plantation and get education on natural resource management.

Jasper County is no different than most other counties in the U.S., in that most of its public and private schools do not offer specific courses on natural resources education. Soil, water, air, plants, and animals are usually only briefly addressed in general science courses. Humans rely on natural resources to survive. Therefore, it would seem as if education of natural resources would be of utmost importance in all of our schools. Unfortunately, this is rarely the case. It is extremely important that children learn about what natural resources are, how they directly impact their lives, and how they are managed or not managed for the benefit of humans.

As the public loses touch with the land, the environment, and conservation, the understanding and respect of those values decreases. The result of a less educated public is that residents will value natural resources less, and the County will lose its support for protection of its natural resource diversity. The challenge that Jasper County faces is providing understanding and respect of natural resources to new and existing residents who lack an upbringing that included natural, wildlife, and rural land management experiences.

Goals, Strategies, Policies, and Actions for Addressing Challenges

It is the vision of the conservation community in Jasper County to promote natural resources education in public, private, and home schools; provide additional classes and outdoor learning experiences for all ages; and to have area teachers embrace the importance of offering natural resources education.

Goal:

- To educate all ages of Jasper County residents and area professionals on natural resources, wise land use and management of natural resources, and critical issues associated with natural resources conservation.

Strategies, Policies, and Actions:

- Provide funding for a full-time natural resources educator stationed at the Blue Heron Learning Center. The educator will provide in-depth natural resources education, day trips, camps for various children groups, and training for teachers.
- Partner with the JSWCD and Jasper County School District to develop natural resources education as part of the curriculum.

- Partner with the JSWCD to work closely with private and home schools to develop natural resources education as part of the curriculum.
- Promote the JSWCD's Blue Heron Learning Center as the Jasper County natural resources education information center to serve the County.
- Promote JSWCD educational activities for special events and/or during public festivals and events through sponsorship.
- Utilize partnerships with other local conservation agencies, organizations, and groups to increase educational opportunities in Jasper County*.
- Sponsor JSWCD's week-long workshop on "Teach the Teacher" about natural resources education and developing curricula*. Teacher workshops will be divided by student grade level.
- JSWCD will offer natural resources education classes, tours, and workshops for school groups*.
- Submit monthly newspaper articles on conservation awareness and significant happenings.
- Publish a quarterly county natural resource newsletter.
- Publish and distribute a Jasper County natural resource annual report.
- Promote proper use of herbicides, pesticides, and fertilizers by providing an annual certified education course with Clemson Extension at the Blue Heron Learning Center.

CHRIS GRAVES

Boardwalks provide educational opportunities for students, while preserving the natural systems.

CHRIS GRAVES

Hunting Island State Park in nearby Beaufort County, is a good example of a place where humans and nature co-exhist.

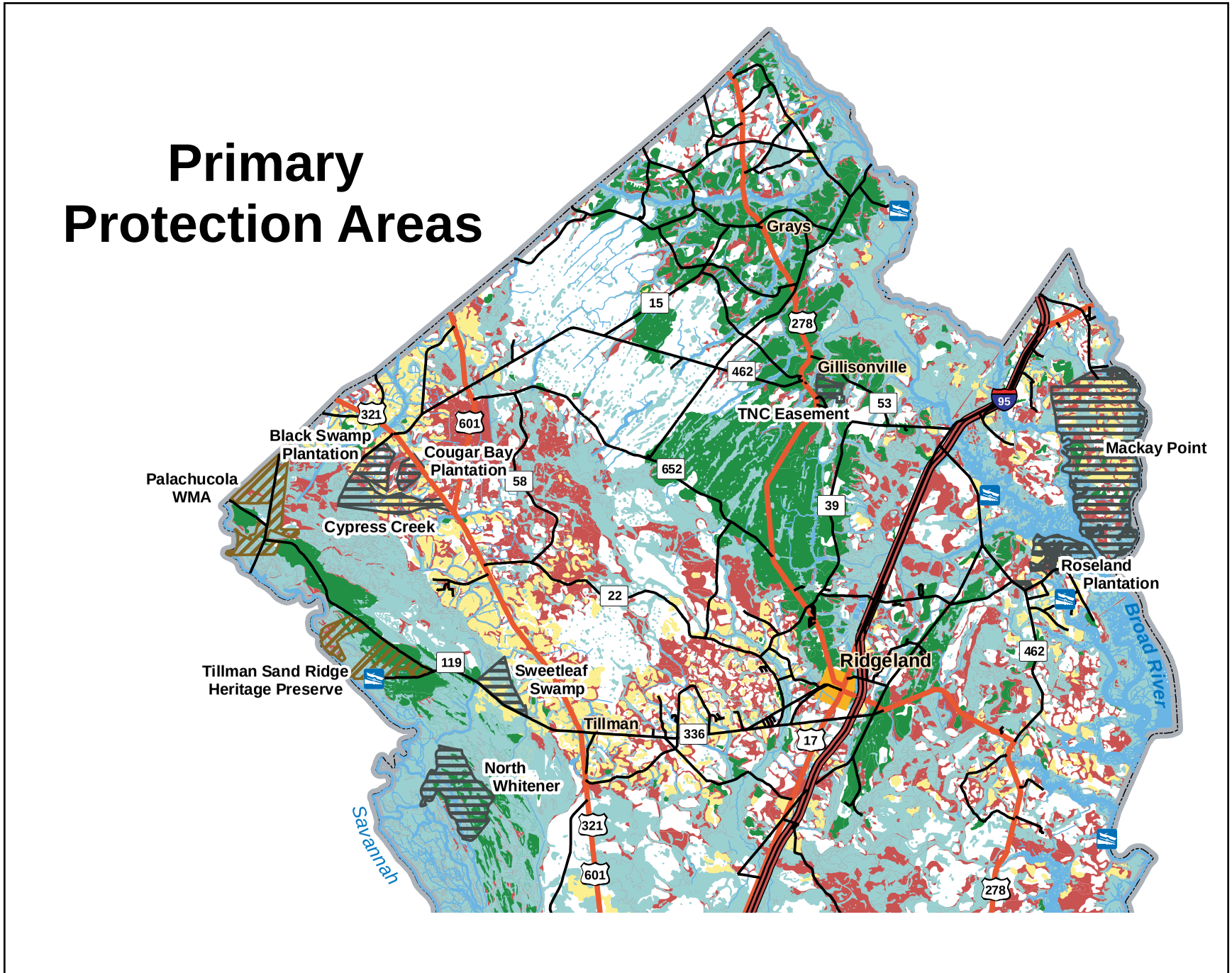
* proposed actions indicated with an asterisks are dependent on receiving funding for a fulltime environmental educator.

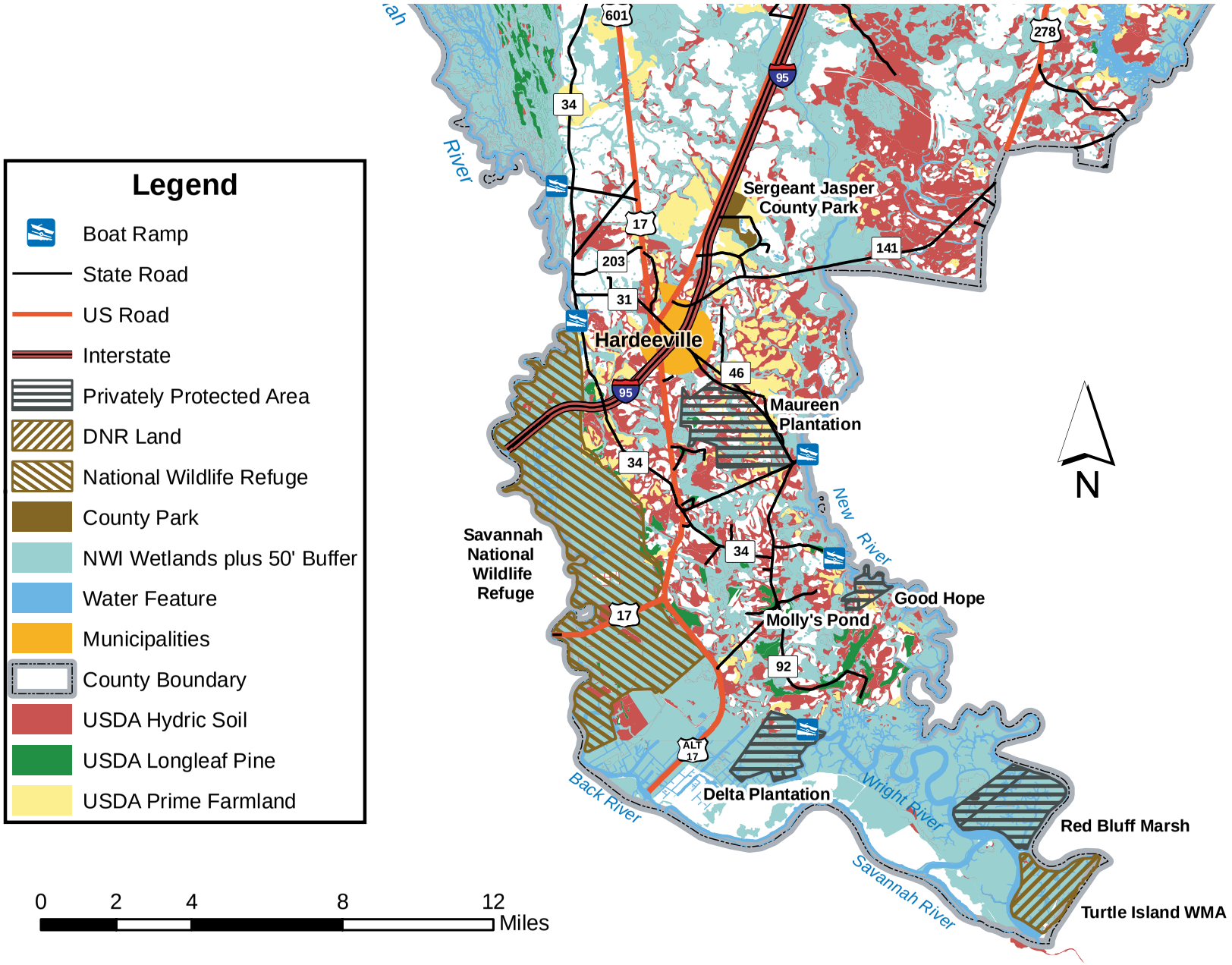
PHILLIP JONES

Rivers connect the County's waterways and feed into the ocean; their health is a good indicator of the state of the land.

Chapter Seven

Figure 11: Primary Protection Areas




Legend
Boat Ramp
State Road
US Road
Interstate
Privately Protected Area
DNR Land
National Wildlife Refuge
County Park
NWI Wetlands plus 50' Buffer
Water Feature
Municipalities
County Boundary
USDA Hydric Soil
USDA Longleaf Pine
USDA Prime Farmland
0 2 4 8 12
Miles
N
Sergeant Jasper County Park
Hardeeville
Maureen Plantation
Savannah National Wildlife Refuge
Good Hope
Molly's Pond
Delta Plantation
Red Bluff Marsh
Turtle Island WMA
New River
Back River
Wright River
Savannah River
601
278
95
34
17
203
31
141
46
92
ALT 17

CONSERVATION PLAN EVALUATION

We recommend that this document be re-evaluated every 5-10 years to add data, make necessary modifications, and update new issues, concerns, and strategies. The dynamics of natural resources management is constantly changing and thus, alterations to this document will likely be needed to accommodate the needs of our resources. It is probable that many of the issues listed in this document will become a reality. Decision-makers should proactively address the needs of our natural resources and environment now. The key to success will be to implement the concepts and strategies listed in this plan and continue their partnerships with the JSWCD and other natural resource agencies and organizations.

PHILIP JONES

The Great Egret, often seen throughout Jasper County, feeds in shallow water. Conservation efforts have successfully increased the population of this symsbol of the National Audubon Society, although they have seen recent declines in the Southern U.S. due to habitat loss.

Appendix

Appendix A: list of scientific names.

Common and scientific names used to identify **bird species** mentioned in the text.

Common name	Scientific name
Bachman's warbler	*Aimophia aestivalis*
Bald Eagle	*Haliaeetus leucocephalus*
Barn swallow	*Hirundo rustica*
Blue grosbeaks	*Guiraca caerulea*
Carolina wren	*Thryothorus ludovicianus*
Caspian tern	*Sterna caspia*
Great blue heron	*Ardea herodias*
Great crested flycatcher	*Myiarchus crinitus*
Great egret	*Ardea alba*
Hairy woodpecker	*Picoides villosus*
Ivory-billed woodpecker	*Campephilus principalis*
Osprey	*Pandion haliaetus*
Painted bunting	*Passerina ciris ciris*
Pileated woodpecker	*Dryocopus pileatus*
Piping plover	*Charadrius melodus*
Prothonotary warbler	*Protonotaria citrea*
Red cockaded woodpecker	*Picoides borealis*
Ruby-throated hummingbird	*Archilochus colubris*
Seaside sparrow	*Ammodramus maritimus*
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*
Swallow-tailed kite	*Elanoides forficatus forficatus*
White-eyed vireo	*Vireo griseus*
White ibis	*Eudocimus albus*
Wood duck	*Aix sponsa*
Wood stork	*Mycteria americana*

Common and scientific names used to identify **amphibian and reptile species** mentioned in the text.

Common name	Scientific name
American alligator	*Alligator mississipiensis*
Eastern indigo snake	*Drymarchon couperi*
Flatwoods salamander	*Ambystoma cingulatum*
Gopher tortoise	*Gopherus polyphemus*
Pine barrens tree frog	*Hyla andersonii*

Common and scientific names used to identify **tree and plant species** mentioned in the text.

Common name	Scientific name
Ash	*Fraxinus sp.*
Baldcypress	*Taxodium distichum*
Black tupelo (gum)	*Nyssa sylvatica*
Grass Pink	*Calopogon pulchellus*
Hooded pitcher-plant	*Sarrancenia minor*
Loblolly pine	*Pinus taeda*
Longleaf pine	*Pinus palustris*
Nuttall oak	*Quercus nutallii*
Oaks	*Quercus sp.*
Overcup oak	*Quercus lyrata*
Pond pine	*Pinus serotina*
Red maple	*Acer rubrum*
Slash pine	*Pinus elliottii*
Swamp tupelo	*Nyssa biflora*
Sweetbay	*Magnolia virginiana*
Sweetgum	*Liquidambar styraciflua*
Water tupelo	*Nyssa aquatica*
Willow oak	*Quercus phellos*
Canby's dropwart	*Oxypolis canbyi*
Pondberry	*Lindera melissifolia*

Common and scientific names used to identify **fish species** mentioned in the text.

Common name	Scientific name
Black crappie	*Pomoxis nigromaculatus*
Bluegill	*Lepomis macrochirus*
Bowfin	*Amia linnaeus*
Channel catfish	*Ictalurus punctatus*
Largemouth bass	*Micropterus salmoides*
Redbreast sunfish	*Lepomis auritus*
Spotted sucker	*Minytrema melanops*
Striped bass	*Morone saxatilis*
White catfish	*Ameiurus catus*

Common and scientific names used to identify **game species** mentioned in the text.

Common name	Scientific name
White-tailed deer	*Odocoileus virginianus*
Wild turkey	*Meleagris gallopavo*

Appendix B: List of threatened and species of concern species in Jasper County

B1: All species, June 2005, USFWS

Common Name	Scientific Name	Status	Occurrence
American kestrel	*Falco sparverius*	SC	Known
American oystercatcher	*Haematopus palliatus*	SC	Known
Bachman's sparrow	*Aimophia aestivalis*	SC	Known
Bald eagle	*Haliaeetus leucocephalus*	T	Known
Bluebarred pygmy sunfish	*Elassoma okatie*	SC	Known
Canby's dropwort	*Oxypolis canbyi*	E	Possible
Chaff-seed	*Schwalbea americana*	E	Known
Creeping St. Johns-wort	*Hypericum adpressum*	SC	Known
Crested fringed orchid	*Pteroglossaspis ecristata*	SC	Known
Eastern indigo snake	*Drymarchon corais couperi*	T	Possible
Flatwoods salamander	*Ambystoma cingulatum*	T	Known
Florida pine snake	*Pituophis melanoleucus mugitus*	SC	Known
Green sea turtle	*Chelonia mydas**	T	Possible
Gull-billed tern	*Sterna nilotica*	SC	Known
Henslow's sparrow	*Ammodramus henslowii*	SC	Known
Kemp's ridley sea turtle	*Lepidochelys kempii**	E	Known
Kirtland's Warbler	*Dendroica kirtlandii*	E	Possible
Leatherback sea turtle	*Dermochelys coriacea**	E	Known
Loggerhead sea turtle	*Caretta caretta*	T	Known
Loggerhead shrike	*Lanius ludovicianus*	SC	Known
Mimic glass lizard	*Ophisaurus mimicus*	SC	Known
Northern pine snake	*Pituophis melanoleucus melanoleucus*	SC	Known
Painted bunting	*Passerina ciris ciris*	SC	Known
Pineland plantain	*Plantago sparsiflora*	SC	Known
Piping plover	*Charadrius melodus*	T, CH	Known
Pondberry	*Lindera melissifolia*	E	Possible
Pondspice	*Litsea aestivalis*	SC	Known
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	SC	Known
Red-cockaded woodpecker	*Picoides borealis*	E	Known
Red knot	*Calidris canutus*	SC	Possible
Shortnose sturgeon	*Acipenser brevirostrum**	E	Known
Southern Dusky Salamander	*Desmognathus auriculatus*	SC	Known
Southern hognose snake	*Heterodon simus*	SC	Possible
Swallow-tailed kite	*Elanoides forficatus forficatus*	SC	Known
Tortoise, gopher (eastern populations)	*Gopherus polyphemus*	SC	Known
Yellow lampmussel	*Lampsilis cariosa*	SC	Known
West Indian manatee	*Trichechus manutus*	E	Known
Wood stork	*Mycteria americana*	E	Known

E	Federally endangered
T	Federally threatened
CH	Critical Habitat
SC	Federal Species of concern. These species are rare or limited in distribution but are not currently legally protected under the Endangered Species Act.

Table B2. Rare, threatened, or endangered species associated with Longleaf pine, June 2005, USFWS.

Common Name	Scientific Name
American kestrel	*Falco sparverius*
Bachman's sparrow	*Aimophia aestivalis*
Canby's dropwort	*Oxypolis canbyi*
Chaff-seed	*Schwalbea americana*
Crested fringed orchid	*Pteroglossaspis ecristata*
Eastern indigo snake	*Drymarchon corais couperi*
Flatwoods salamander	*Ambystoma cingulatum*
Florida pine snake	*Pituophis melanoleucus mugitus*
Henslow's sparrow	*Ammodramus henslowii*
Loggerhead shrike	*Lanius ludovicianus*
Mimic glass lizard	*Ophisaurus mimicus*
Northern pine snake	*Pituophis melanoleucus melanoleucus*
Pineland plantain	*Plantago sparsiflora*
Pondberry	*Lindera melissifolia*
Red-cockaded woodpecker	*Picoides borealis*
Southern Dusky Salamander	*Desmognathus auriculatus*
Southern hognose snake	*Heterodon simus*
Tortoise, gopher (eastern populations)	*Gopherus polyphemus*

Table B3. Rare, threatened, or endangered species associated with wetlands, June 2005, USFWS.

Common Name	Scientific Name
Bald eagle	*Haliaeetus leucocephalus*
Bluebarred pygmy sunfish	*Elassoma okatie*
Creeping St. Johns-wort	*Hypericum adpressum*
Pondspice	*Litsea aestivalis*
Shortnose sturgeon	*Acipenser brevirostrum**
Southern Dusky Salamander	*Desmognathus auriculatus*
Swallow-tailed kite	*Elanoides forficatus forficatus*
West Indian manatee	*Trichechus manutus*
Wood stork	*Mycteria americana*
Yellow lampmussel	*Lampsilis cariosa*

Table B4. Rare, threatened, or endangered species associated with ocean beaches, marine and estuarine habitat, June 2005, USFWS.

Common Name	Scientific Name
American oystercatcher	*Haematopus palliatus*
Green sea turtle	*Chelonia mydas*
Gull-billed tern	*Sterna nilotica*
Kemp's ridley sea turtle	*Lepidochelys kempii*
Leatherback sea turtle	*Dermochelys coriacea*
Loggerhead sea turtle	*Caretta caretta*
Piping plover	*Charadrius melodus*
Red knot	*Calidris canutus*

Appendix C: Information about Agricultural Districts

Urban development linked both to growth in South Carolina's industry and increasing demand for retirement and second homes throughout the Southeast is changing rural counties. Agricultural Districts were developed to try and find a balance between traditional land management practices such as farming, and the local and second home buyers. Because agricultural districts are voluntary and flexible, the benefits and restrictions can be designed to meet local conditions and goals.

There are terms of enrollment such as minimum acreage requirements, years of enrollment, and limits on development, but they vary widely across participating states, as do the incentives agricultural districts offer. South Carolina has not adopted this program, but land-users in North Carolina are benefiting greatly from the program. Benefits can include agricultural tax assessments, exemptions from local regulation, restrictions on public infrastructure improvements, protections from eminent domain, annexation, and private nuisance lawsuits, and eligibility for purchase of agricultural conservation easement (PACE) or other conservation easement programs. The purpose of agricultural districts in Jasper County would be to increase identity and pride in the agricultural community, its way of life, and to increase protection from nuisance suits and other negative impacts on properly managed lands.

South Carolina's agricultural district program would be designed to preserve agricultural lands and open space and to promote efficient urban growth patterns. It is voluntary, allowing landowners to sign renewable 10-year contracts with participating counties to restrict use of their land to agriculture and open space. It is recommended that Jasper County utilize the JSWCD to administer the program once initiated at the State level. Another attractive component of agricultural districts is a notification provision designed to reduce conflicts with "non-farm" neighbors. The provision requires that a written notice, including warnings of farm-related noise, dust and odors, be sent to anyone buying property within a specific distance of an agricultural district. Additionally, the notice would include information in relation to prescribed burning and other forest management operations, along with traditional hunting practices. The goal would be for developers and home buyers to be fully aware of the implications of living in or near an agricultural district.

There have been many landowners who have shown an interest in this program in Jasper County. Therefore, the JSWCD is currently working with American Farmland Trust and Beaufort County to push this program to the State level. If the program is adopted by South Carolina, then the JSWCD would work with local landowners to ensure the program meets their needs. The JSWCD would work in conjunction with Jasper County to initiate the program and make it available for all qualified applicants.

Suggested Regulations within the Agricultural District Program

The JSWCD will administer the Agricultural District Program. Within these districts, a number of activities will be permitted, including:

- Any farm use of the land and farm buildings.
- Buildings accessory to primary agriculture structures.
- Forestry uses in compliance with the Best Management Practices of SC.
- Temporary or portable sawmills for cutting timber (provided that machine operation is located at least 200 feet from property line).
- Horticultural activities and associated nurseries and greenhouses.
- Operation of machinery used in farm production or the primary processing of agricultural products.
- Normal agricultural activities and operations conducted in compliance with good husbandry practices.
- Sale of farm products on farm where the sales are made and associated roadside stand(s) selling products grown and/or produced on the farm.

Farm owners within the agricultural district can apply for tax credit, and if qualified, they will be eligible for a 100 percent county property tax credit for a maximum of 10 years. To be qualified for the tax credit program, they must satisfy a number of requirements, including:

- A recorded district agreement with the JSWCD.
- A certified conservation plan, with primary emphasis on soil conservation and water quality, with the USDA-NRCS.
- If a farm owner who has been granted a property tax credit for agricultural land subsequently terminates the agricultural district agreement, the owner is then liable for all back and interest.

Appendix D: list of recognized archeological, historic, and cultural sites of importance in Jasper County (from Historic Resources of the Lowcountry 1979).

Chelsea Plantation
Church of the Holy Trinity
Coca-cola Plant
Coosawhatchie
Davant Plantation
David Freeman House
Delta Plantation
Dr. William Ryan House
Euhaw Baptist Church
Farris House
Fife Plantation
Floyd Brothers General Store
Frampton House
Gillisonville Baptist Church
Gillisonville Town Square
Good Hope Plantation
Gregorie's Neck Plantation
Hardeeville Methodist Church
Heyward House
Honey Hill Battle Site
Ives Place-Cypress Creek Plantation
Jasper County Courthouse
Jugwells
Mackay's Point Plantation
Okeetee Club
Old Methodist Parsonage
Perry House
Pineland Hunting Club
Pocataligo
Purrysburgh
Robertville Baptist Church
Ruins of White Hall Plantation
Smith House

Spring Hill Plantation
Thomas Heyward's Tomb
Tillman Grade School
Tison House
Turkey Hill Plantation
Two Sisters Ferry
Whitner Hunting Club
Wise-Perry House

Appendix E: JSWCD's primary partner agency descriptions

Jasper Soil and Water Conservation District

The Jasper Soil and Water Conservation District is an entity of state government, organized in accordance with Soil Conservation Districts Law No. 182 of the 1937 S. C. General Assembly. Organized on March 13, 1943, it was joined by Beaufort County on August 10 to form the Beaufort-Jasper District. Water management and soil erosion were basic conservation needs of the early program. Jasper became a separate district to better serve the conservation needs of Jasper County on September 2, 1976.

The affairs of the District are administered by a non-paid board of five commissioners, three of which are elected in the General Election and two are appointed by the S. C. Department of Natural Resources. Technical and program assistance is provided to land-users and the district by the USDA-Natural Resources Conservation Service and the S. C. Department of Natural Resources.

The first two policies of the JSWCD are to: (1) Provide information and technical assistance to land-users, landowners, and units of government on soil and water conservation and related natural resources issues, and (2) Enter into memorandums of understanding and/or cooperative agreements with other units of government, groups, and individuals to further the protection and wise use of natural resources within the district. The mission of the JSWCD is to help people conserve, maintain, and improve our natural resources and environment by promoting wise land use practices, environmental education, and technical assistance.

The purpose of the JSWCD is to be responsible to the citizens of the district in matters involving resources conservation, to promote wise and responsible use of natural resources, to develop and implement programs to protect and conserve soil, water, farmland, woodland, wildlife, energy, and riparian and wetland resources. The JSWCD also strives to provide quality environmental education for visitors, students, and teachers of all ages. The JSWCD program is dedicated to the orderly development and wise use of the natural resources within the district for the benefit of its citizens.

South Carolina Department of Natural Resources

The South Carolina Department of Natural Resources (SC DNR) is the advocate for and steward of the state's natural resources. SC DNR's vision is an enhanced quality of life for present and future generations through improved understanding, wise use, and safe enjoyment of healthy, diverse, sustainable, and accessible natural resources.

The vision for the DNR is to be a trusted and respected leader in natural resources protection and management, by consistently making wise and balanced decisions for the benefit of the state's natural resources and its people.

Established by law in 1910 as the Office of the Chief Game Warden, the SC DNR was reorganized in 1994. Its responsibilities include managing wildlife, marine, estuarine, water, and land resources. The SCDNR also maintains that the State Climatology Office and State Geological Survey.

The SC DNR's employees provide numerous services, including financial and staff assistance to the 46 soil and water conservation districts in carrying out their programs, as mandated by section 48-9-290, code of South Carolina.

SC Sea Grant Consortium & SC Sea Grant Extension Program

The South Carolina Sea Grant Consortium (SCSGC) is a state agency that, through a

program of research, education, extension, and training, enhances economic opportunities and conservation of coastal and marine resources for South Carolina citizens. As one of the nation's 35 Sea Grant programs, the S.C. Sea Grant Consortium undertakes a diverse range of initiatives to improve understanding of the regions coastal resources and our ability to manage them for long-term benefit. In 1978 the S.C. General Assembly established the SCSGC in an effort to formally united the state's various marine programs (Code of South Carolina, Section 48-4510:100). The SCSGC operates upon three main tenets mandated by this legislation: 1) "To provide a mechanism for the development and management of the Sea Grant Program for the State of South Carolina and adjacent regions that share a common environment and resource heritage;" 2) "To support, improve and share research, education, training and advisory services in fields related to ocean and coastal resources;" and 3) "To encourage and follow a regional approach to solving problems or meeting needs relating to ocean and coastal resources in cooperation with appropriate institutions, programs, and persons in the region." The SCSGC is committed to maximizing the economic, social, and environmental potential of the state's coastal and marine resources through the support of integrated research, education, and extension programs. To achieve this goal, the SCSGC delivers programs which strive to bridge the gap between science and policy, wherein effective management of resources, both physical and human, requires resolution of diverse scientific, economic, social, and environmental questions.

The SC Sea Grant Extension Program (SCSGEP) is a joint outreach program of the Clemson University Extension Service and the SC Sea Grant Consortium. The SCSGEP applies science-based information to educate individuals, businesses, local and state government, and other organizations on the wise use and conservation of coastal and ocean resources. SCSGEP specialists help create a two-way linkage between university-based scientists and the people who live and work on the coast by offering outreach education programs that provide information to solve problems and address coastal resource management issues.

USDA-Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) is administered under the United States Department of Agriculture (USDA). Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private landowners and managers conserve their soil, water, and other natural resources.

NRCS employees provide technical assistance based on sound science and suited to a customer's specific needs. NRCS provides financial assistance for many conservation activities. Participation in NRCS programs is voluntary. The Conservation Technical Assistance (CTA) program provides voluntary conservation technical assistance to land-users, communities, units of state and local government, and other Federal agencies in planning and implementing conservation systems.

The mission of NRCS is to provide leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. The vision of the agency is harmony between people and the land.

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