FINAL DRAFT

Bon Secour River Watershed Management Plan

March 2004

State Lands Division, Coastal Section
Department of Conservation and Natural Resources
State of Alabama
Bob Riley, Governor

Final Draft
Bon Secour River Watershed Management Plan

Prepared for the

Alabama Department of Conservation and Natural Resources

by

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Contents

Tables

Figures

Executive Summary

The Alabama Department of Environmental Management conducted the only comprehensive survey of the Bon Secour River watershed (HUC 03160205060) in 1996. In 2002, the Auburn University Marine Extension and Research Center (AUMERC) was granted the task of developing this Bon Secour River Watershed Management Plan, whose purpose is to improve water quality in the Bon Secour River watershed in order to meet or exceed present use classifications and meet the goals decided upon by the citizens of the watershed. AUMERC held a series of three public meetings in 2002-2003 to gather public input on the goals for the plan. A steering committee directed the project and developed action plans to meet these goals.

The Bon Secour River drains a land area of approximately 30 mi^2 (19,200 acres) within Baldwin County, Alabama, including portions of the cities of Foley and Gulf Shores and the Bon Secour community. This tidally influenced river is approximately 8 miles in length, flowing into the southeastern portion of Mobile Bay by way of Bon Secour Bay. The headwaters have been modified within the area of the city of Foley, but otherwise the system is mainly rural and suburban. Major tributaries include Bright's Creek, Shutt Creek, Miller's Bayou, and Boggy Branch. The Bon Secour River west of the South Fork, the South Fork proper and Oyster Bay are classified as suitable for shellfish harvesting.

The climate of the watershed is subtropical, influenced by the Gulf of Mexico and the Bermuda High. Lying in the Southeastern Plains and Southern Coastal Plains Level III ecoregions, soils range from sandy loam to poorly drained hydric soils. Groundwater resources are abundant in the sandy soils of the watershed, within 150 feet of the surface.

The historical Bon Secour community was founded in the early 18th century, and has continued historically as a fishing village. The area is rapidly growing, with the U.S. Census Bureau estimating that Baldwin County's population nearly doubling between 1980 and 2001. Agriculture and forestry land practices are being replaced by residential, commercial, and recreational (golf courses) land uses, increasing the impervious surfaces in the watershed.

Analysis of water and sediment by ADEM in their 1996 survey revealed that water quality has been affected by nonpoint sources stemming from land use changes, particularly in turbidity and bacteria, and one unnamed tributary is named on the 2002 Alabama List of Impaired Waterbodies for violation of pathogen standards. The Bon Secour River west of the South Fork, the South Fork proper and Oyster Bay are classified as suitable for shellfish harvesting, and sediment quality appears good.

Citizens have identified 10 broad goals for this watershed management plan in order to improve water quality in the basin:

1. *Support efforts to reduce urban and rural nonpoint source runoff, including runoff from agriculture, construction, and residential areas.*

2. *Educate the public on growth management, zoning issues and planning & zoning processes.*

3. *Conserve existing aquatic and riparian habitats by minimizing shoreline erosion, establishing greenways and other natural areas to improve wildlife habitat and water quality and by promoting the use of alternative shoreline stabilization systems to avoid proliferation of vertical bulkheads.*

4. *Promote and encourage increased public access to the Bon Secour River and its tributaries.*

5. *Implement a public outreach and awareness program, including K-12 education, involving the concepts of watershed responsibilities, nonpoint source pollution awareness, and "environmentally friendly" development.*

6. *Promote smart growth and development principles in the watershed. Encourage the implementation of walkable and bikeable communities, and address flooding issues.*

7. *Implement education and outreach regarding groundwater.*

8. *Reduce nonpoint source pollution from faulty or unmaintained septic tanks. Encourage the use of alternative septic and sewer systems where conventional systems are not effective.*

9. *Reduce nonpoint source pollution from boaters and marinas. Promote the implementation of a Clean Marina Program.*

10. *Coordinate and partner with other agencies, including the Mobile Bay National Estuary Program (MBNEP), USACE, ADCNR and ADEM to achieve the objectives and strategies described.*

Table 1. Table of Acronyms

ACES-BC	Baldwin County Cooperative Extension System
ACNPCP	Alabama Coastal Nonpoint Pollution Control Program
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AL PALS	Alabama People Against A Littered State
AUMERC	Auburn University Marine Extension and Research Center
AWW	Alabama Water Watch
BCHD	Baldwin County Health Department
BCPD	Baldwin County Planning Department
BSRWP	Bon Secour River Watershed Project
BCSWCD	Baldwin County Soil and Water Conservation District
CNA	Conservation Needs Assessment
DISL	Dauphin Island Sea Lab
HCCI	Healthy Coastal Communities Initiative
MASGC	Mississippi-Alabama Sea Grant Consortium
MBNEP	Mobile Bay National Estuary Program
NEMO	Nonpoint Education for Municipal Officials
NRCS	Natural Resources Conservation Service
OSDS	Onsite Sewage Disposal System
SARPC	South Alabama Regional Planning Commission
USA	University of South Alabama
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WBNERR	Weeks Bay National Estuarine Research Reserve

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I. Introduction

A. Previous Studies

The first and only comprehensive study of the Bon Secour River Watershed was completed in 1996 by the Alabama Department of Environmental Management (ADEM) Coastal Program. Entitled *A Survey of the Bon Secour River Watershed: An Overview of Land-Use Practices and Examination of Development on the Aquatic Resources of the Basin*, the survey is the second in a series of studies of coastal river watersheds and was modeled after *A Survey of the Dog River Watershed* (ADEM, 1993).

The *Survey of the Bon Secour River Watershed* found that the area is significantly impacted by nonpoint source pollution, specifically siltation and turbidity, nutrient enrichment, and enteric bacteria contamination. The survey also finds impacts from construction, waterfront real estate development, and shoreline alterations from bulkheading and excavation for boat slips and piers, and notes that appropriate construction best management practices (BMPs) would greatly reduce these impacts on water quality.

In April 2002, the Auburn University Marine Extension and Research Center (AUMERC) was granted the task of developing a management plan for the watershed of the Bon Secour River. This project has been funded by the Alabama Department of Conservation and Natural Resources (ADCNR) Coastal Section and ADEM Coastal Program. The plan follows the model set forth in December 2000 by the Dog River Watershed Management Plan (AUMERC, 2000), with the intention to foster the goals and objectives of the Alabama Coastal Area Management Program (ACAMP). In addition to this plan, AUMERC coordinated

many outreach activities, including a traveling display, promotion of the Clean Water Guardians program and Alabama Water Watch volunteer water quality monitoring, promotion of the Adopt-A-Stream program, and coordination of a Coastal Clean Up zone, all in an effort to better educate the citizens of the watershed and to gain support for the project.

This plan falls within the goals and objectives set forth by the Coastal Alabama Clean Water Partnership, the Mobile Bay National Estuary Program, and the Alabama Coastal Nonpoint Pollution Control Program (ACNPCP) and is intended to support the activities of these three programs. This plan also works to cooperate and promote the Total Maximum Daily Load (TMDL) process set forth by ADEM.

B. Purpose and Goals

The purpose of this management plan is to improve water quality in the Bon Secour River Watershed in order to meet or exceed present use classifications and meet the goals decided upon by the citizens of the Bon Secour River Watershed. ADEM classifies the Bon Secour River for its entire length as swimming and other whole body contact/fish and wildlife. This classification also applies to Boggy Branch (the entire length from the Bon Secour River to its source). Other creeks in the watershed have not been assigned specific use classifications and are therefore considered classified for fish and wildlife standards (ADEM, 1996).

Three meetings for citizens of the Bon Secour Watershed were held in 2002-2003: in Foley, Bon Secour, and Gulf Shores, Alabama. Citizens were informed about the Bon Secour River Watershed Project and were asked to participate in the planning process. Through these meetings, citizens determined the direction of education and outreach programs and developed 10 goals for the Bon Secour Watershed Management Plan. The goals are as follows:

1. *Support efforts to reduce urban and rural nonpoint source runoff, including runoff from agriculture, construction, and residential areas.*

2. *Educate the public on growth management, zoning issues and planning & zoning processes.*

3. *Conserve existing aquatic and riparian habitats by minimizing shoreline erosion, establishing greenways and other natural areas to improve wildlife habitat and water quality and by promoting the use of alternative shoreline stabilization systems to avoid proliferation of vertical bulkheads.*

4. *Promote and encourage increased public access to the Bon Secour River and its tributaries.*

5. *Implement a public outreach and awareness program, including K-12 education, involving the concepts of watershed responsibilities, nonpoint source pollution awareness, and "environmentally friendly" development.*

6. *Promote smart growth and development principles in the watershed. Encourage the implementation of walkable and bikeable communities, and address flooding issues.*

7. *Implement education and outreach regarding groundwater.*

8. *Reduce nonpoint source pollution from faulty or unmaintained septic tanks. Encourage the use of alternative septic and sewer systems where conventional systems are not effective.*

9. *Reduce nonpoint source pollution from boaters and marinas. Promote the implementation of a Clean Marina Program.*

10. *Coordinate and partner with other agencies, including the Mobile Bay National Estuary Program (MBNEP), USACE, ADCNR and ADEM to achieve the objectives and strategies described.*

These citizen-directed strategies will be met through specific actions developed by citizen, agency, and municipality representatives. These actions will be discussed later in this plan.

II. General Watershed Description

A. Physical Setting

The Bon Secour River drains a land area of approximately 30 mi^2 (19,200 acres) within Baldwin County, Alabama, including portions of the cities of Foley and Gulf Shores and the Bon Secour community (Figure 1). This tidally influenced river is approximately 8 miles in length, flowing into the southeastern portion of Mobile Bay by way of the Bon Secour Bay (ADEM, 1996). The river is approximately 2000 feet wide at the mouth, decreasing to a width of 150 feet at Baldwin County Road 10, then narrowing to less than 50 feet upstream of the County Road 10 bridge crossing. Because of its tidal nature, large expanses of marsh exist near the river's mouth (ADEM, 1996).

The headwaters of the Bon Secour River have been significantly modified within the area of the city of Foley. Otherwise, the watershed is mainly rural and suburban. The River west of the South Fork is classified for shellfish harvesting. Major tributaries include Bright's Creek, Shutt Creek, Miller's Bayou, and Boggy Branch.

In the 1998 Conservation Needs Assessment (CNA), the Baldwin County Soil and Water Conservation District (BCSWCD) identified the Bon Secour River Watershed as a part of the Magnolia River Watershed (Hydrologic Unit Code 03160205060). Currently, the CNA is being revised and refined by the BCSWCD.

B. Climate

The climate of the Bon Secour River Watershed is greatly influenced by the Gulf of Mexico (O'Neill and Mettee, 1982; ADEM, 1996). In winter, polar air and precipitation resulting from frontal systems and cyclonic development in the Gulf

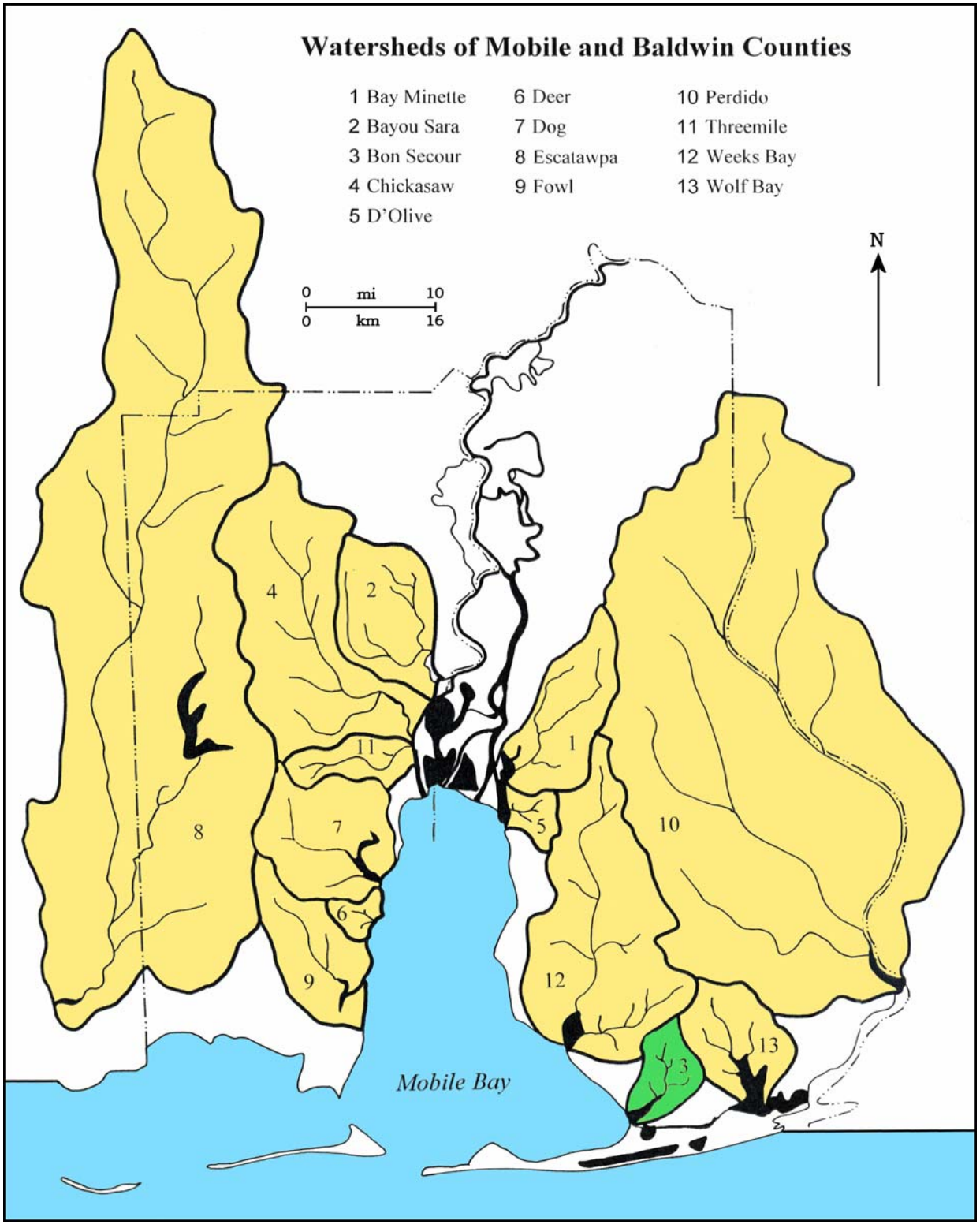

Figure 1. Location of the Bon Secour River Watershed in Baldwin County, Alabama. Courtesy of Department of Geology and Geography, University of South Alabama

dominate area weather. In summer, weather is dominated by tropical maritime air, and thunderstorms and occasional tropical cyclones, including tropical storms and hurricanes, produce precipitation (O'Neill and Mettee, 1982; ADEM, 1996). The summer months are effected by the Bermuda High, a seasonal high-pressure system that spreads over much of the eastern Gulf and south Atlantic coast from May through September, with prevailing southerly winds of high moisture content (O'Neil and Mettee, 1982; SARPC, 1993; ADEM, 1996). Typically winters include northerly winds, strong frontal systems, and cold, continental air masses (O'Neil and Mettee, 1982, ADEM, 1996). Daily temperatures in the area range from highs of 32°C (90°F) in July to highs of 15°C (60°F) and lows of 6°C (43°F) in January (U.S. Department of Agriculture, 1964; O'Neil and Mettee, 1982; ADEM, 1996). The typical growing season for the Bon Secour River Watershed lasts for 300 days (O'Neil and Mettee, 1982; ADEM, 1996)

C. Geology/Soils

Baldwin County is located in the southwest corner of Alabama, in the coastal plain region of the state, in the Southeastern Plains and Southern Coastal Plains Level III ecoregions (Figure 2). Most of the soils in this coastal plain area are derived from marine and fluvial sediments eroded from the Appalachian and Piedmont plateaus from North Alabama. The topography is essentially a flat to gently undulating plain, with surface elevations that do not exceed 30 meters throughout the Bon Secour River Watershed (ADEM, 1996) (Figure 3).

There are three general areas within the watershed with differing soil characteristics. The Natural Resources Conservation Service (NRCS) classifies these areas as the Lakewood-St. Lucie-Leon, the Marlboro-Faceville-Greenville Association and the Norfolk-Klej-Goldsboro Association. Soils in the lower lying areas of the Lakewood-St. Lucie-Leon comprise 20-25 percent of the watershed. These soils typically have poor drainage properties that are not

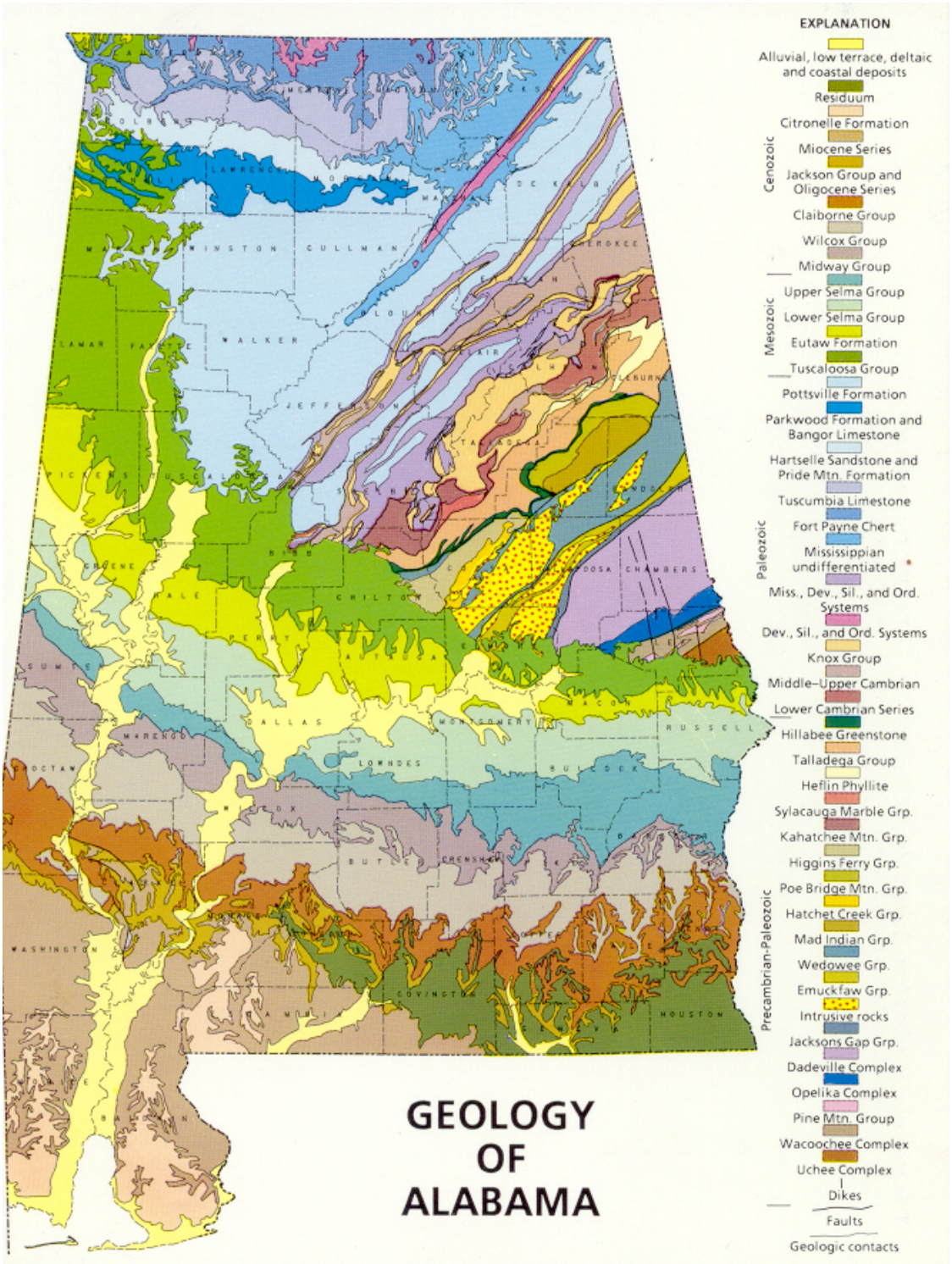

Figure 2. Geology of Alabama. Geological Survey of Alabama

Topo Map

well suited for construction and agriculture, and are normally associated with swamp-forest or marsh vegetation. The Marlboro-Faceville-Greenville Association in the northwestern area comprises approximately 15-20 % of the total watershed area. This upland area bears a gentle slope, therefore the mix of grayish-brown and sandy loam with darker red and brown loam soil is well-drained with good agricultural potential. The Norfolk-Klej-Goldsboro Association is the largest of the three soil type areas, comprising 60-65 percent of the land within the basin. The land is generally level or gently sloping, with soils that are dark grayish sandy loam to dark grayish loamy sand. Overall the soils drain well in this association, although some depressions or bottom lands in the area are exceptions and drain poorly (ADEM, 1996).

D. Groundwater Resources

Groundwater resources are abundant in the permeable sands of the Pliocene-Miocene series of the Bon Secour River Watershed (O'Neill and Mettee, 1982; ADEM, 1996). Wells drilled into this formation within 150 feet of the surface usually produce adequate water supplies for small business, agriculture, and home uses, although this formation is capable of yielding up to 2650 litres/minute (O'Neill and Mettee, 1982; ADEM, 1996).

In its 1996 study, ADEM found water quality from wells drilled into this formation to be good, with low hardness, chloride, and iron. However, it is noted that salt water intrusion has become a significant problem in the Gulf Shores area, and this problem has begun to spread northward toward the Bon Secour River Watershed.

E. Historical Significance

The Bon Secour community was named in honor of Cathedra Notre Dame de Bon Secour, the oldest Cathedral in Montreal, by Frenchman Jacques Cook in the early 18th century. The name was well chosen, and translates to "the best chapel of

ease" in French, and "safe harbor" in English. Like today, early settlers were drawn to Bon Secour for the fertile land and sea, and Foley quickly became the center of business and commerce (ADEM, 1996). The area is also a historical fishing village.

F. Population and Land Use

Baldwin County is primarily rural, but is within commuting distance to both Mobile, AL and Pensacola, FL. This productive location is a contributing factor to Baldwin County being the fastest growing county in Alabama. The U.S. Census Bureau estimated the county's population in 2001 to be just under 146 thousand people and rising, almost double that found in 1980 (Figure 4). The estimated population in the Bon Secour Watershed is approximately 7697, based on the population tracts of the 2000 census (Figure 5).

Driving surveys of the watershed were conducted by the Alabama Department of Environmental Management from January to September in 1995. The survey showed that much had changed in the watershed when compared to previous soil surveys by NRCS and land use surveys by the South Alabama Regional Planning Commission (SARPC) in 1980 (SARPC, 1980; ADEM, 1996) (Figures 6 & 7). According to the 1992 National Land Cover Dataset by the U.S. Geological Survey (USGS), 54% of the watershed is agriculture, 31% forested, 3% urbanized, and 8% wetland/open water (Figure 8) (see Appendix 1 for NLCD Land Cover Class Definitions). Though agriculture still exists in the watershed, development has grown, including the growth of business developments along Alabama State Highway 59, residential developments along Boggy Branch and County Road 10, and recreational facilities (golf courses).

With increasing development, impervious cover has increased, taking the form of parking lots, large commercial structures, residential construction and other structures (Figure 9 & 10). Based on Geological Survey of Alabama flyover

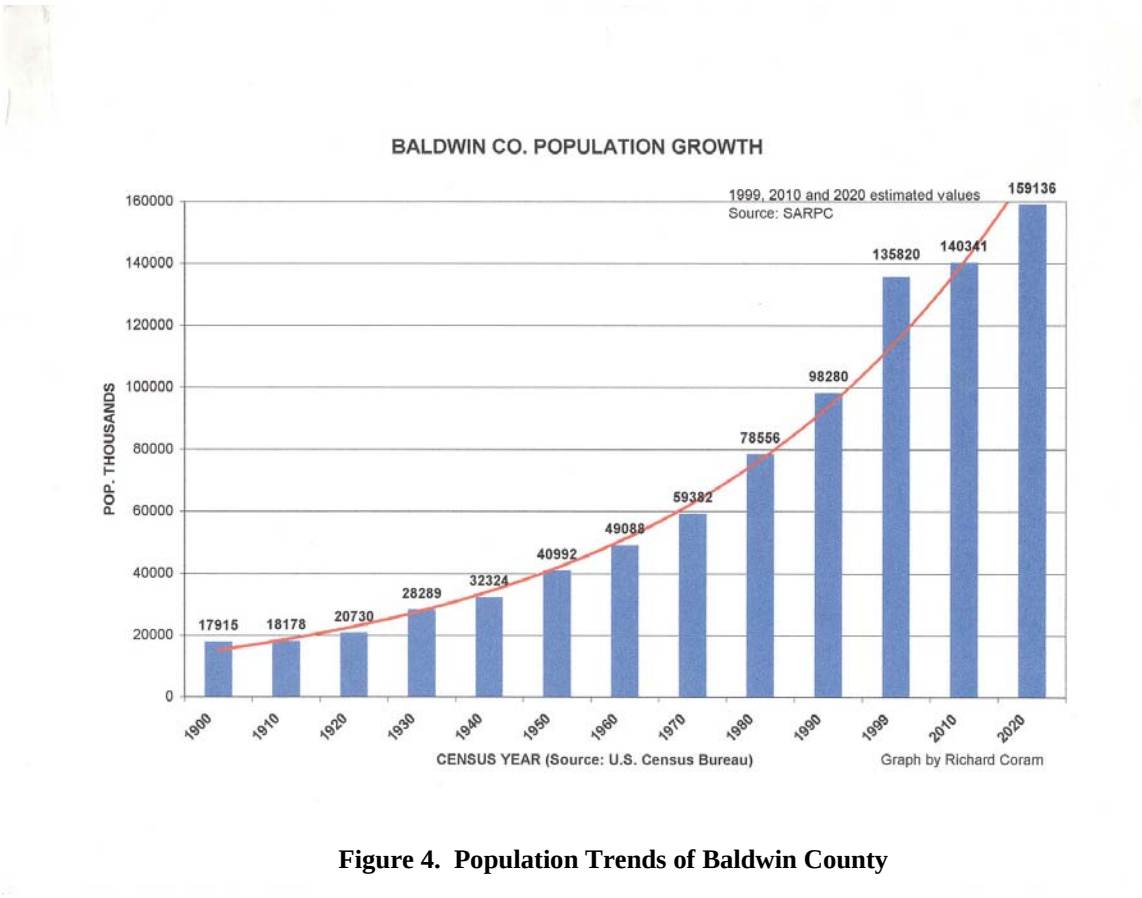

Figure 4. Population Trends of Baldwin County

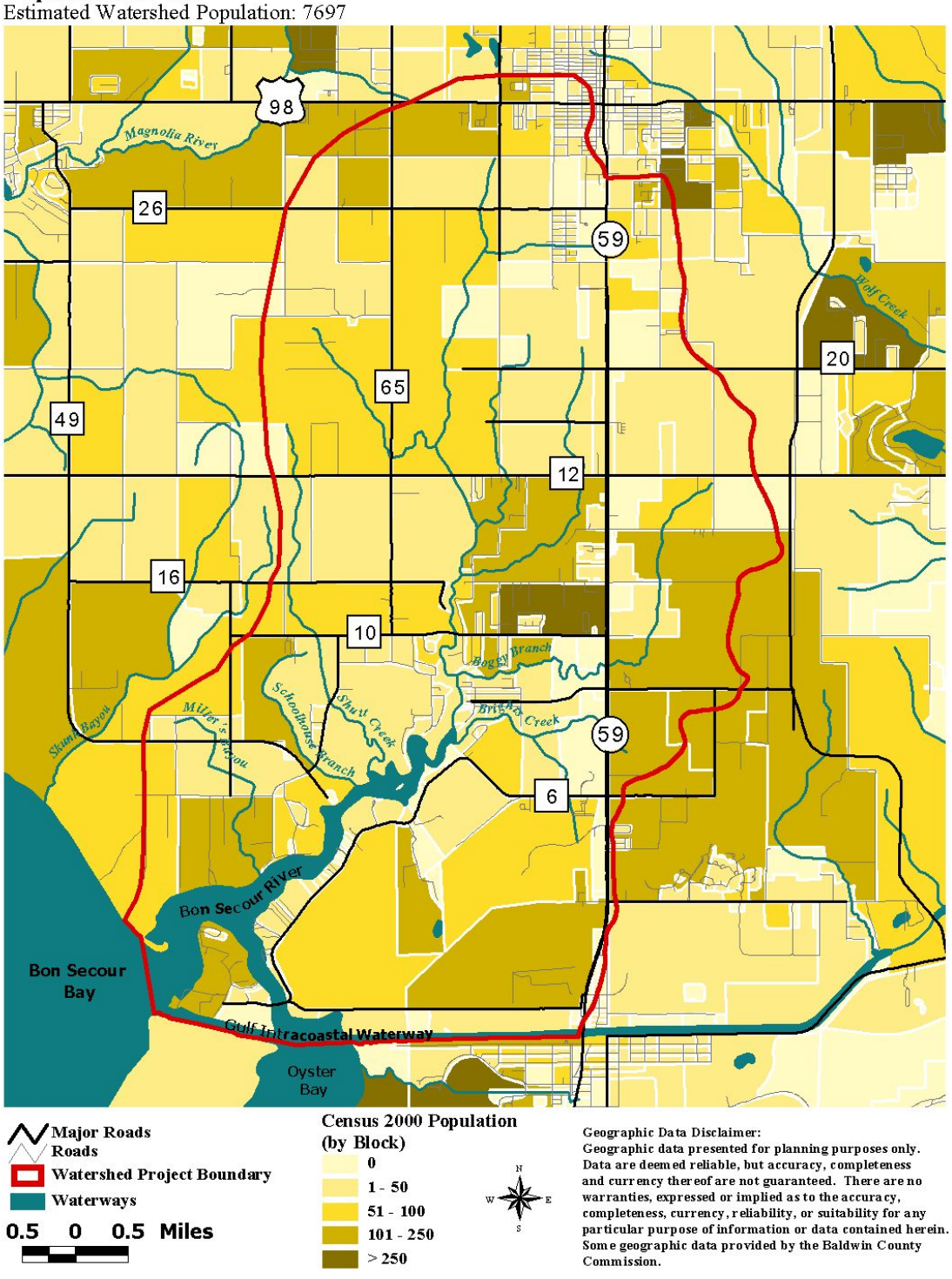

Figure 5. Population Based on 2000 Census Blocks

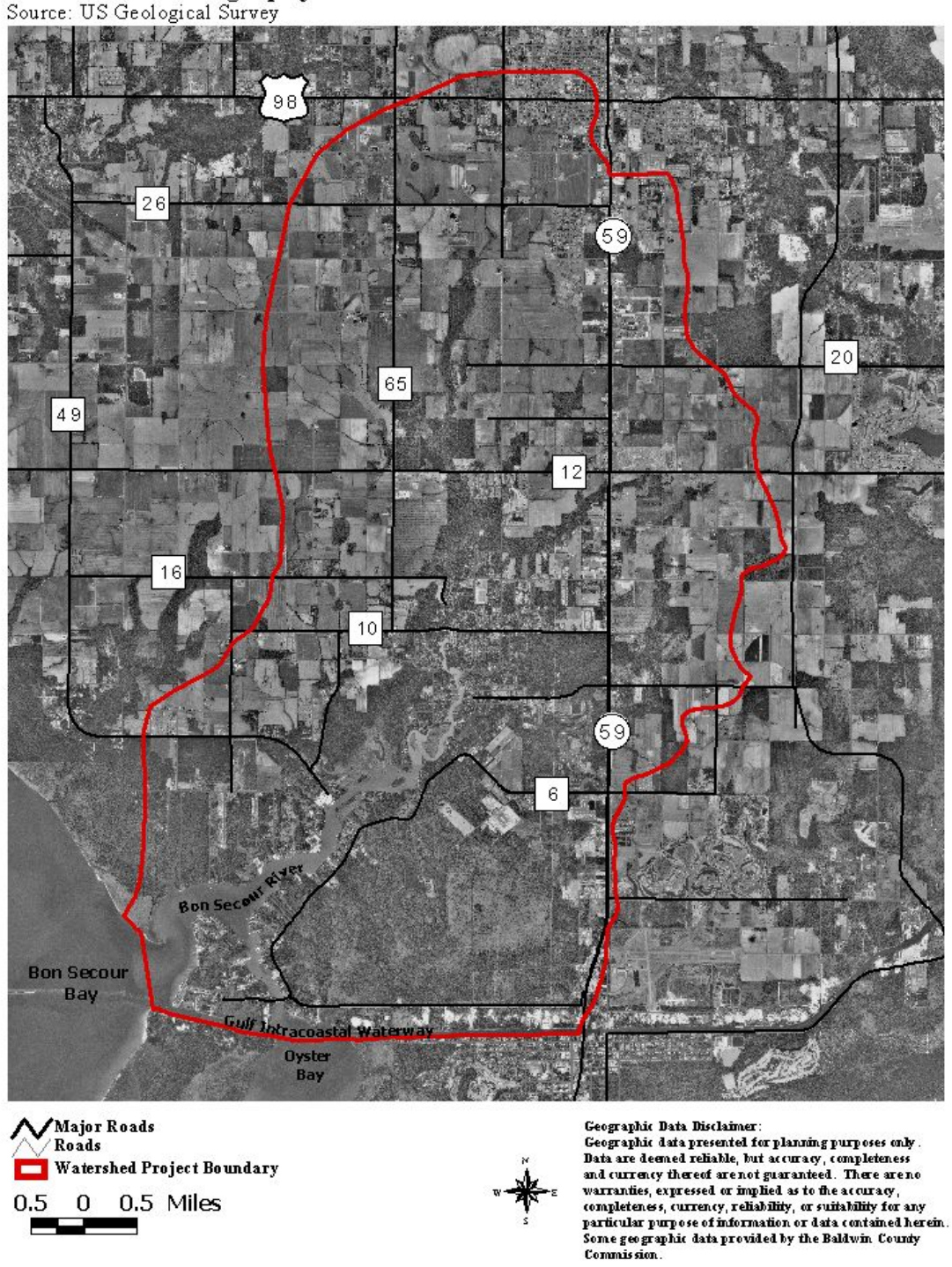

Figure 6. 1996 Aerial Photography of the Bon Secour River Watershed

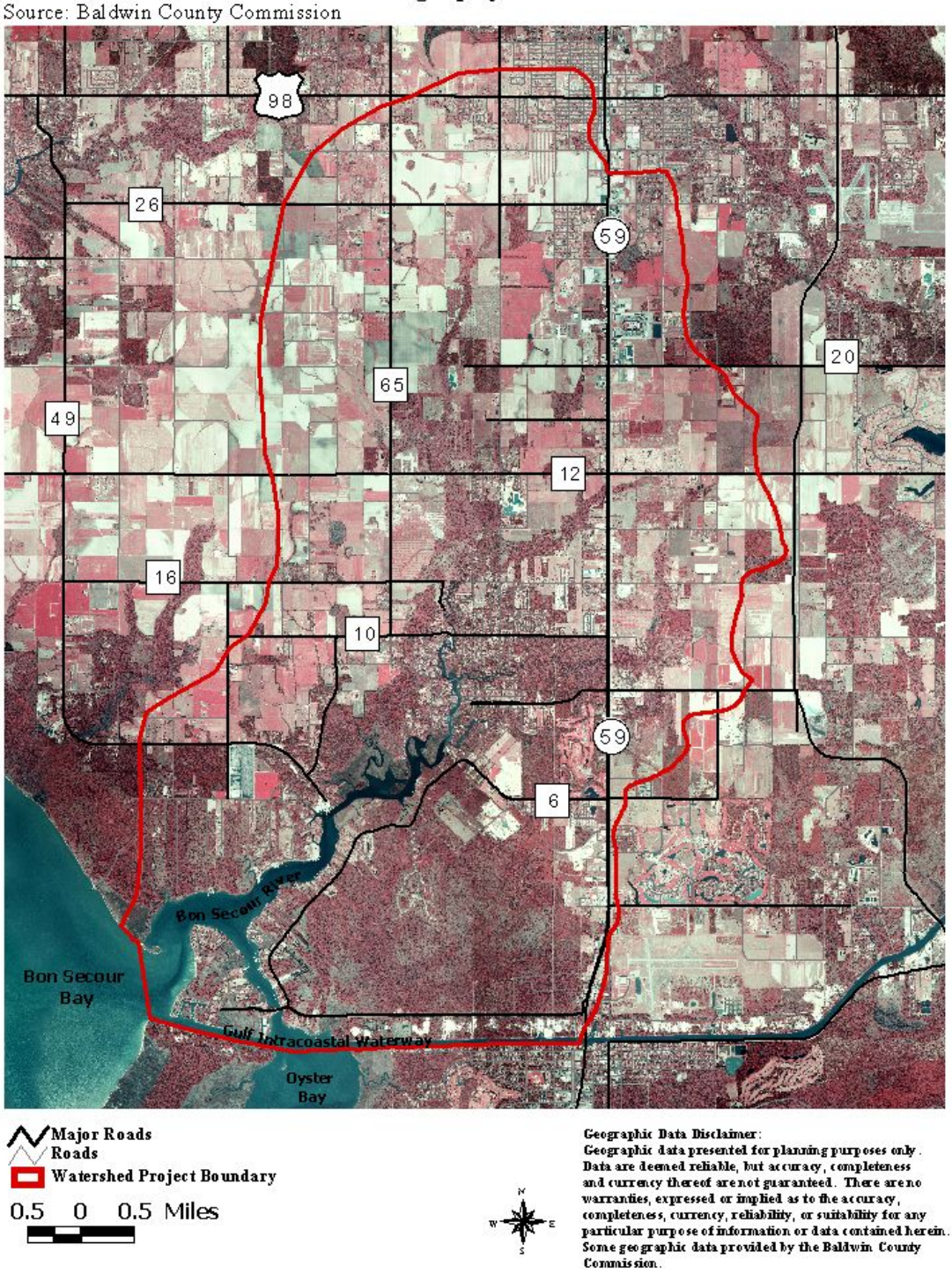

Figure 7. 2001 Aerial Photography of the Bon Secour River Watershed

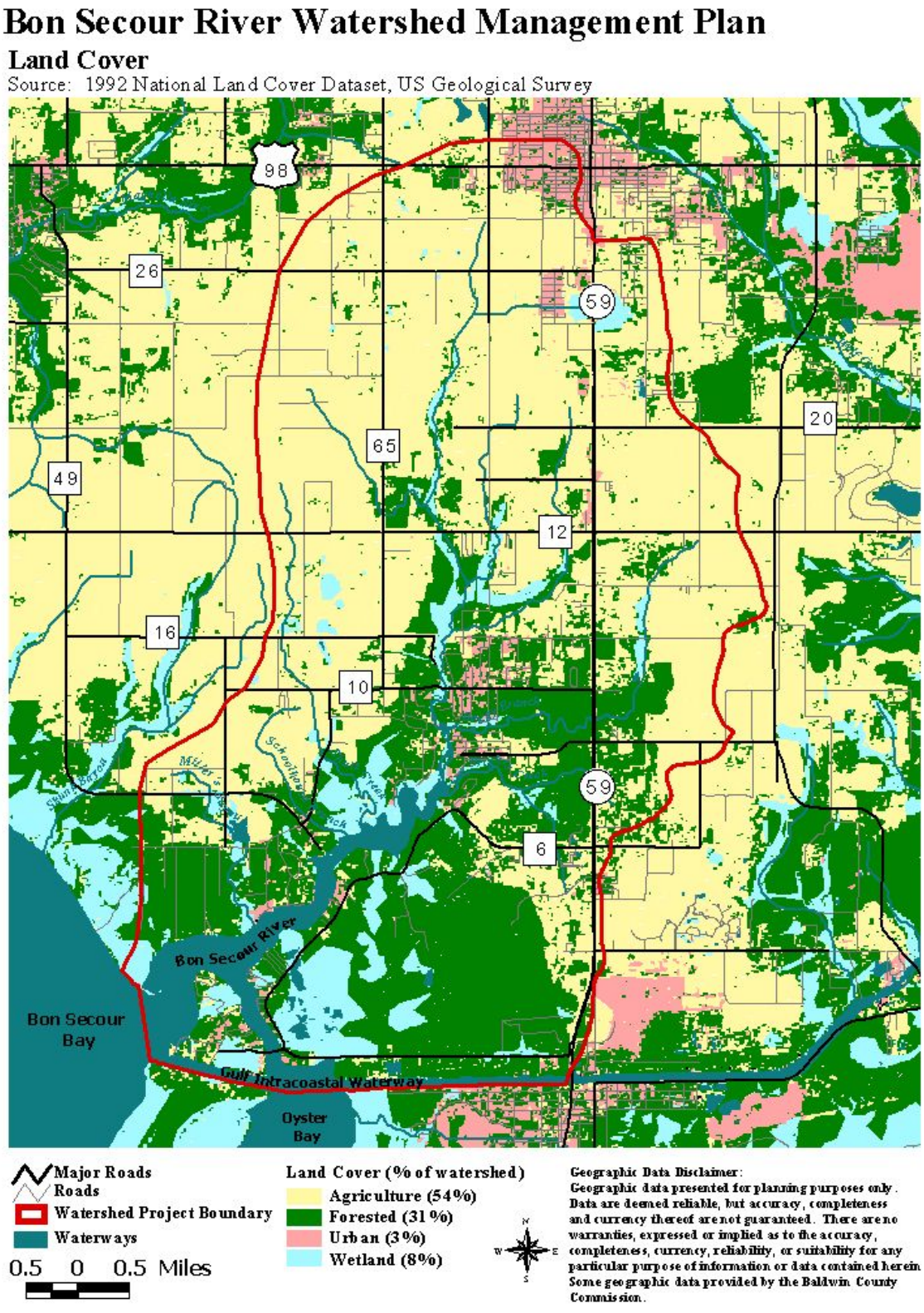

Figure 8. Land Cover of the Bon Secour River Watershed

NOTE: A large area categorized as "Transitional" was included under the "Forested" category, as it was determined to be a large pine savannah.

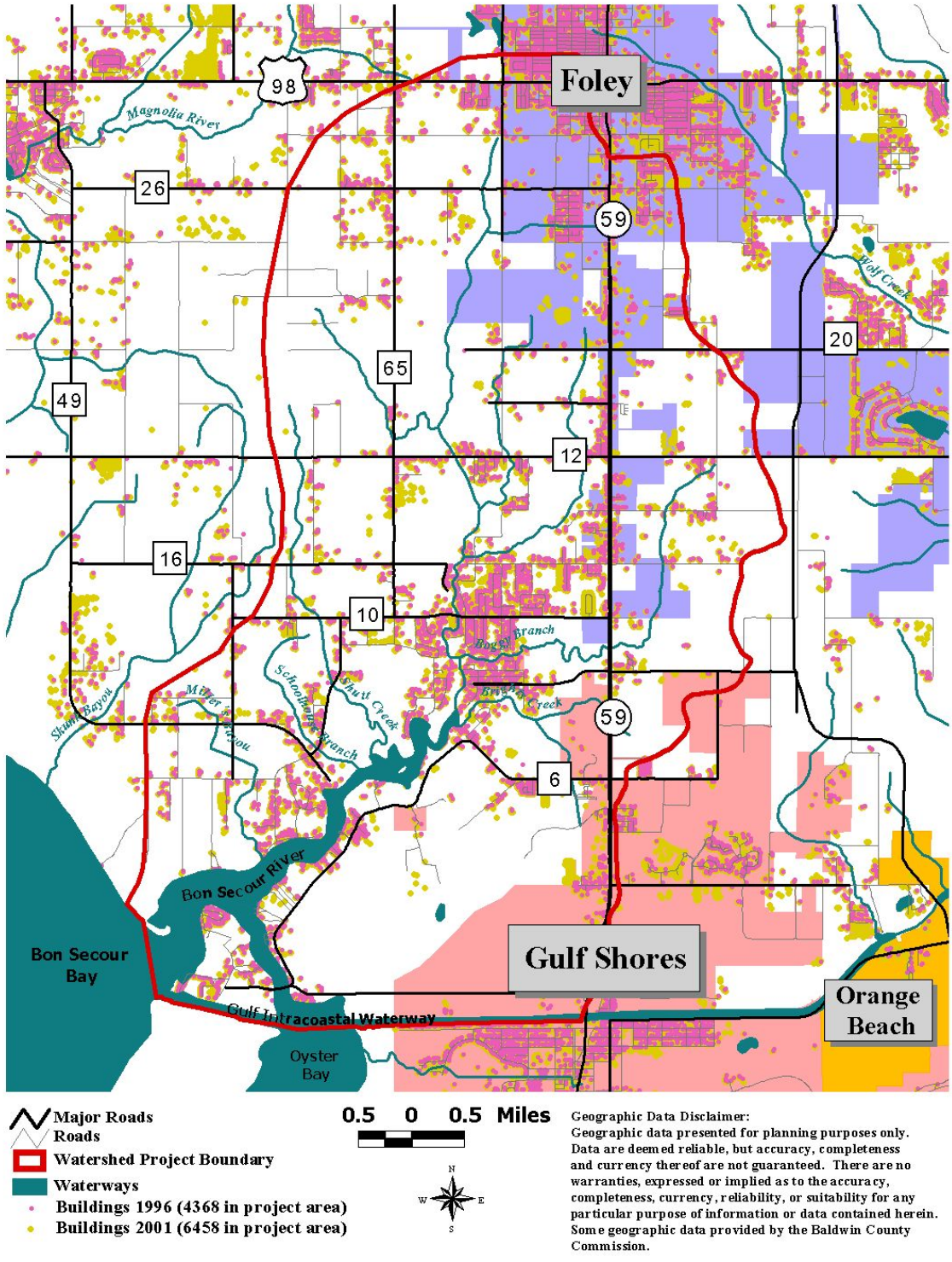

Figure 9. Buildings in the Bon Secour River Watershed, 1996 and 2001

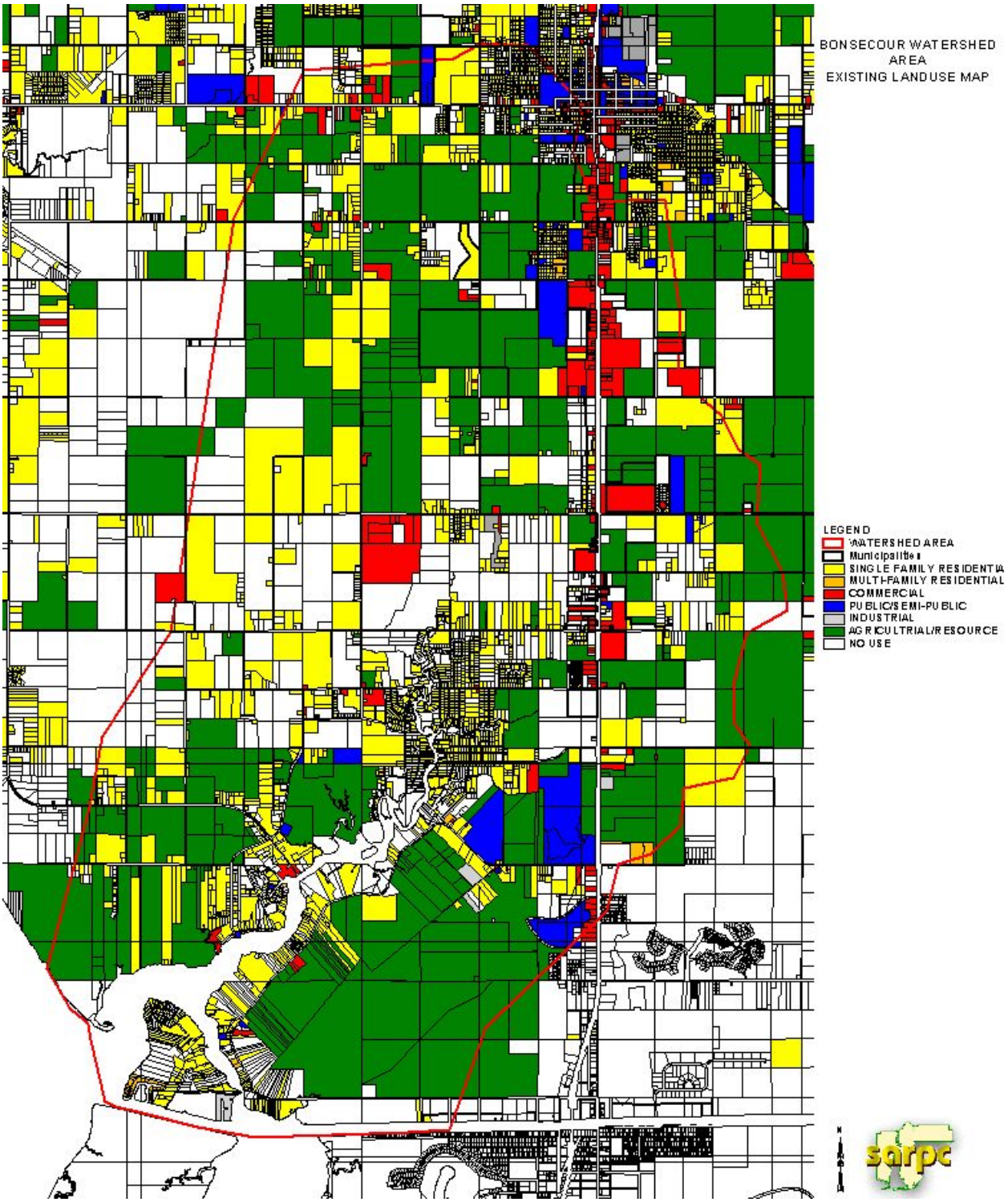

Figure 10. Land Use of the Bon Secour River Watershed. South Alabama Regional Planning Commission

data, 4.7% of the watershed exists in impervious cover (Figure 11). This data is based on photography flown at 30 meter resolution. As the population continues to increase, so does the number of large retail sales enterprises, dining establishments, lodging facilities and multiple unit housing. Shorelines have been significantly altered due to the development of waterfront property.

G. Economic Development

As the population increases in Baldwin County, developmental focus has shifted from predominantly low density residential areas and agricultural fields to subdivisions and commercial businesses in recent years (SARPC 1980 and 1993). South Baldwin County is a quickly developing area for residential, vacation, and retirement communities, waterfront developments, and recreational facilities such as golf courses. Retail business continues to grow, including the Riviera Center Factory Outlet shopping mall, located on Highway 59 in Foley. Demand for shrimp, oysters and blue crabs still remains high, therefore commercial fishing continues to play a strong role in the economy.

H. Environmental Resources

Living Resources

The Bon Secour River west of the South Fork, the South Fork proper and Oyster Bay are classified as suitable for shellfish harvesting (Figure 12). Active fisheries include shrimp, blue crab, and oyster beds. These fisheries, particularly oyster beds, are sensitive to water quality impairments.

Sediment Quality

The sediments in the Bon Secour River Watershed consist mainly of sand and silt mixed with clay. Sand and silt are predominate in the mouth of the river,

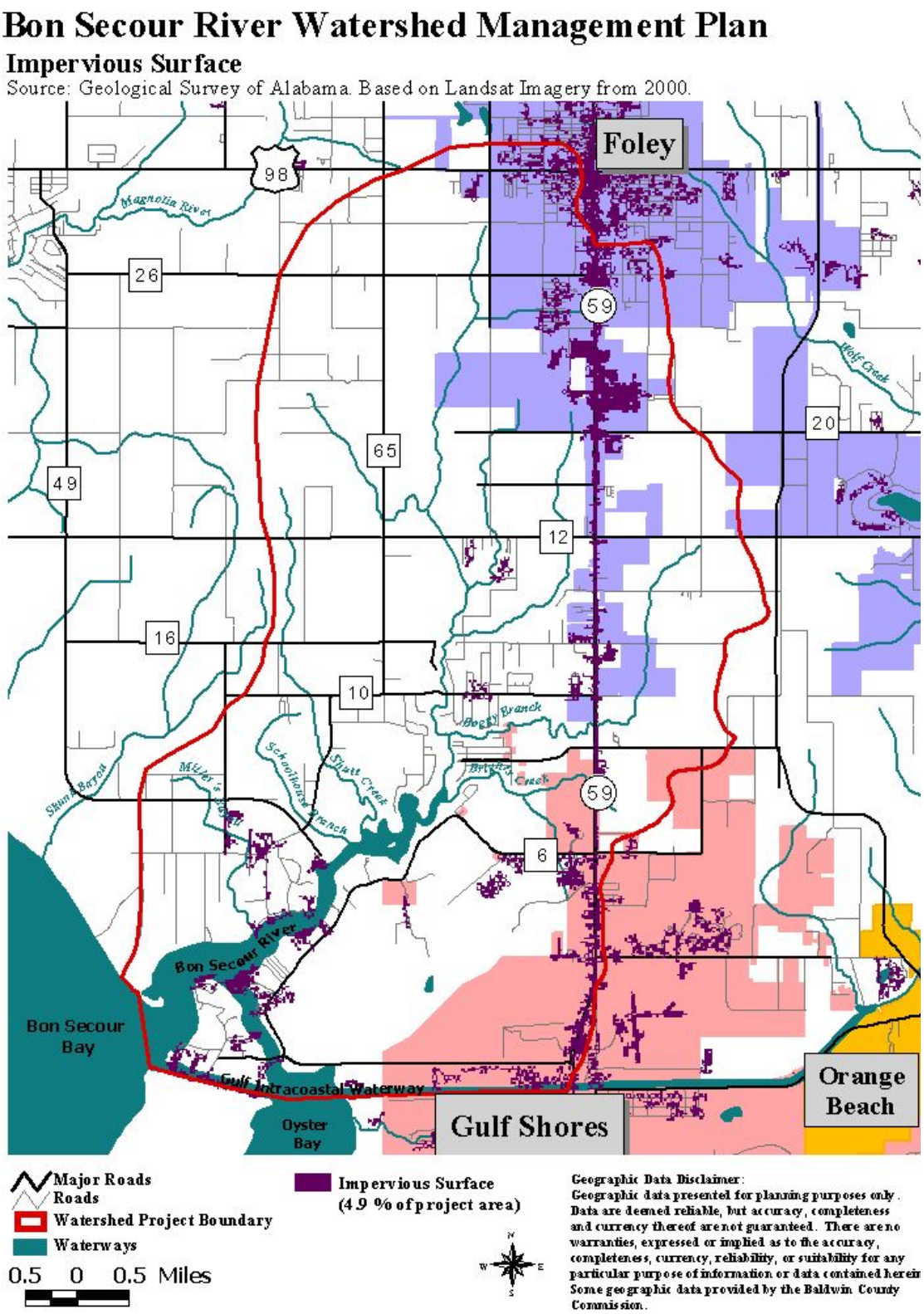

Figure 11. Impervious Cover of the Bon Secour River Watershed

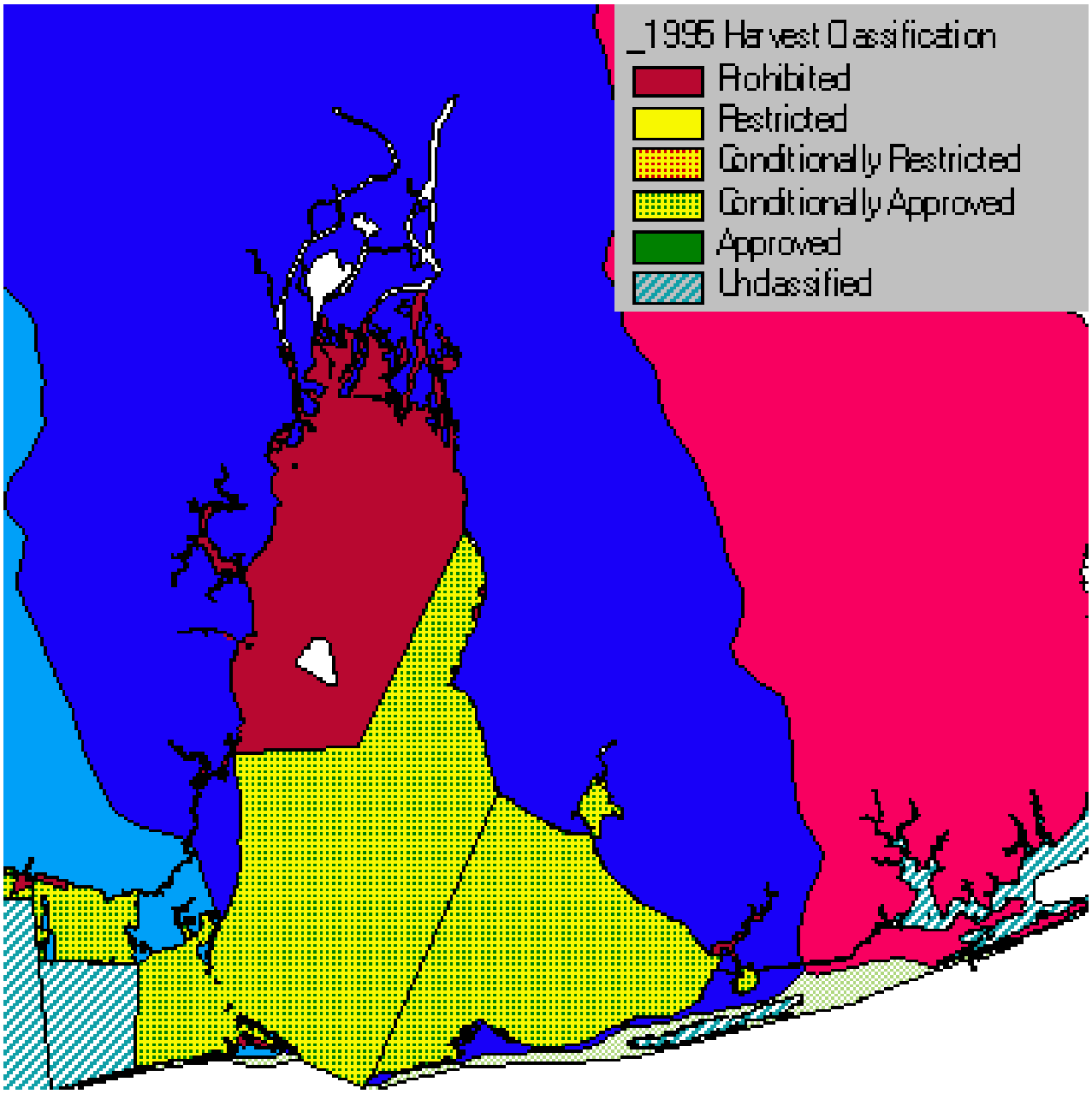

Figure 12. Classified Shellfish Harvesting Areas. Alabama Department of Public Health

tributaries and open shorelines, while finer grained sands and clays predominate in the deeper channel waters of the main river. The U.S. Army Corps of Engineers (USCOE) in 1976 and ADEM in 1991 conducted tests on sediment chemistry in the watershed, and found it to be uncontaminated with relatively clean sediments (ADEM, 1996).

Water Quality

ADEM classifies the Bon Secour River for its entire length as swimming and other whole body contact/fish and wildlife (Table 2). This classification also applies to Boggy Branch (entire length from the Bon Secour River to its source). Other creeks in the watershed have not been assigned specific use classifications and are therefore considered classified for fish and wildlife standards (ADEM, 1996). One unnamed tributary to the Bon Secour River (HUC 03160205-060_03), locally known as Turkey Branch, is named on the 2002 Alabama List of Impaired Waterbodies (§303(d)) for failing to meet the fish and wildlife standard (Table 3) (Figure 13). This segment, 2.3 miles from Baldwin County Road 65 to its source, is in non-support status for the parameter of pathogens, meaning more than 25% of samples violated that standard. The suspected pathogen source, as named on the §303(d) list is urban runoff/storm sewers and pasture grazing (ADEM, 2000).

Wetlands

Based on the 1987 Corps of Engineers' definition of jurisdictional wetlands, the Baldwin County Planning and Zoning Department has identified 7531 total wetland acres, or 31.3% of the entire watershed area (Figure 14). This is broken down as follows:

Depressional Wetlands: 245 (1%)
Flat Wetlands: 1296 (5.4%)
Fringe Wetlands: 2931 (12.2%)
Riverine Wetlands: 3059 (12.8%)

Table 2. Alabama Water Use Classification and Standards. Alabama Water Use Classifications, Administrative Code of Alabama, Chapter 335-6-10.

Classification	p.H. (s.u.)	Temperature (°F)	Wastewater Effluent Limits (mg/L)	D.O. (mg/L)	Bacteria (colonies/100ml)	Turbidity (N.T.U.)	Toxicity, Taste, Odor, & Color
Outstanding National Resource Waters	No Discharge (NPS BMPs[1] Mandatory)						
Outstanding Alabama Waters	6.0-8.5	90° (86°)[2] : 5°R[3] Coastal: 4°R Oct-May 1.5°R Jun-Sep	NH_3-N:3.0 BOD_5: 15.0 D.O.: 6.0	5.5	200 (inland) 100 (coastal)	50 R	Substances will not cause acute toxicity or chronic toxicity, impair the palatability or marketability of fish and wildlife or unreasonably affect the aesthetic value of waters for any use.
Swimming	6.0-8.5	90°(86°): 5°R Coastal: 4°R Oct-May 1.5°R Jun-Sep		5.0	200 (inland) 100 Coastal)	50 R	Substances will not render unsafe or unsuitable for swimming/water-contact sports, cause acute toxicity or chronic toxicity, impair the palatability or marketability of fish and wildlife or unreasonably affect the aesthetic values of waters for any use.
Shellfish Harvesting	6.0-8.5	90°(86°): 5°R Coastal: 4°R Oct-May 1.5°R Jun-Sep		5.0	FDA Shellfish Manual Coastal: Jun-Sep	50 R	Substances will not cause acute toxicity or chronic toxicity, impair the palatability or marketability of fish and wildlife or unreasonably affect the aesthetic values of waters for any use.
Public Water Supply	6.0-8.5	90°(86°): 5°R Coastal: 4°R Oct-May 1.5°R Jun-Sep		5.0	1,000/2,000 Jun-Sep: 200 (inland) 100 (coastal)	50 R	Substances will not cause acute toxicity or chronic toxicity will not cause taste and odor difficulties in water supplies which cannot be corrected by treatment as specified, or impair the palatability of fish.
Fish and Wildlife	6.0-8.5	90°(86°): 5°R Coastal: 4°R Oct-May 1.5°R Jun-Sep		5.0	1,000/2,000 Jun-Sep: 200 (inland) 100 (coastal)	50 R	Substances will not cause acute toxicity or chronic toxicity, impair the palatability or marketability of fish and wildlife or unreasonably affect the aesthetic values of waters for any use.
Agriculture and Industrial Water Supply	6.0-8.5	90°(86°): 5°R Coastal: 4°R Oct-May 1.5°R Jun-Sep		5.0	2,000/4,000	50 R	Substances will not render the waters unsuitable for irrigation, livestock, industrial cooling, and process uses; interfere with downstream uses.
Limited Freshwater Fishery				3.0	1,000/2,000	50 R	Substances will not render the waters unsuitable for irrigation, livestock, industrial cooling, and process uses; interfere with downstream uses, or exhibit acute toxicity or chronic toxicity.

[1] NPS BMPs are "nonpoint source best management practices".
[2] For Streams, lakes and reservoirs in the Tennessee and Cahaba River Basins,……,which has been designated by the Alabama Department of Conservation and Natural Resources as supporting small mouth bass, sauger, or walleye, shall not exceed 8°F.
[3] "R" indicates that a maximum "rise" of the indicated magnitude is permitted, not to exceed 90°F maximum.

Table 3. Final 2002 §303(d) List for Alabama, Bon Secour River Watershed Segments. Alabama Department of Environmental Management, 2004

WaterbodyID	Waterbody Name	Support Status	Type of Water	Rank	River Basin	County	Uses	Causes	Sources	Date of Data	Size	Downstream / Upstream Locations	1996 303(d)?	Draft TMDL Date
AL/03160205-060_03	UT to Bon Secour R.	Non	R	H	Mobile	Baldwin	Fish & Wildlife	Pathogens	Urban runoff/Storm sewers Pasture grazing	1995	2.3 miles	Baldwin Co. Rd. 65 / Its Source	No	2007

Figure 13. 303(d) stream

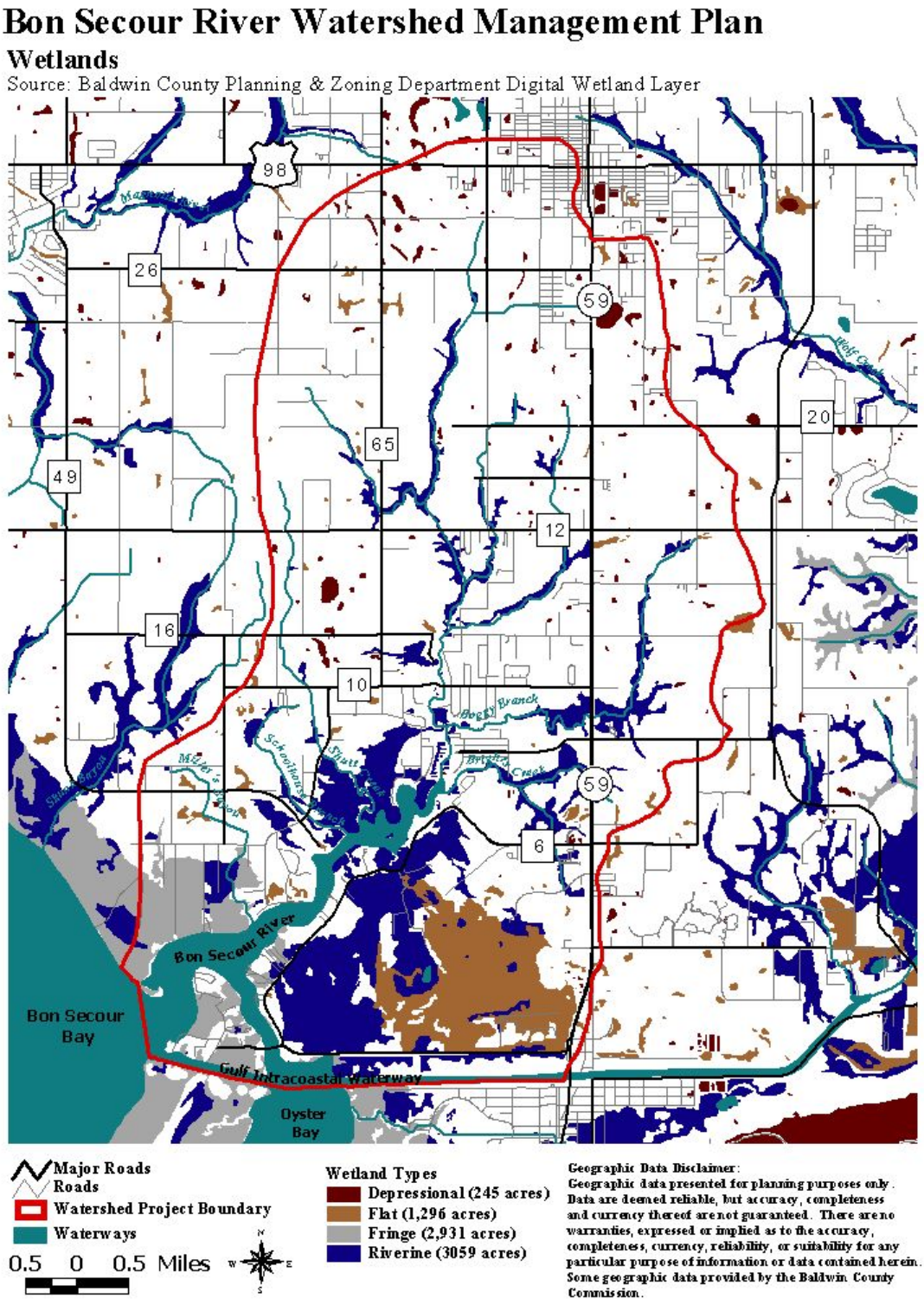

Figure 14. Wetlands of the Bon Secour River Watershed

This digital data has been field validated to an accuracy of 85.6% in correctly identifying wetlands.

III. General Description of Sub-basins

The streams of Bon Secour Watershed were assessed by ADEM in the 1996 study. These streams were surveyed to the upper limits of their navigable waters by boat, and beyond on foot and over bridges, and included the Bon Secour River, Boggy Branch, Shutt Creek and the South Fork. Many parameters were measured, including turbidity, nutrients, fecal coliforms, dissolved oxygen, pH and temperature. Types of development were also noted during this survey, as was vegetation communities and general stream characteristics. The findings from this survey were categorized into upper, middle and lower basin.

The upper part of the basin, north of Baldwin County Road 12, consists of mainly intermittent streams. The upper basin receives substantial stormwater runoff from the populated city of Foley and Highway 59. During sampling related to the 1996 ADEM study, turbidity increases due to runoff were short lived, with water clarity returning to normal levels usually within 48 hours. Bacterial levels in the upper basin, specifically fecal coliform counts, showed high variability due to urban runoff and pasture drainage. These counts at times exceeded the standard for swimming, especially in seasons of substantial rainfall, but generally returned to nominal levels within 48 hours (ADEM, 1996).

The middle basin of the watershed, south of Baldwin County Road 12 through Boggy Branch, consists of tidally influenced streams. Like the rest of the watershed, this area has experienced a significant increase in the amount of impervious cover, along with extensive waterfront residential development (ADEM, 1996). This increase in commercial activities is evident in the amount of turbidity in the water, and has resulted in shifting bar and shoal formations in some locations (ADEM, 1996). Streams met their criteria for their designated

use-classification 80 percent of the time sampled at times following a rain event, and 100 percent of the time at times 72 hours or later past the last rain event (ADEM, 1996).

The brackish waters of the lower basin of the watershed, south of Boggy Branch, are heavily influenced by the tide. Stormwater runoff from hard paved surfaces and other impervious cover appeared to be higher in the middle and upper basins compared to the lower basin during the 1996 ADEM study. There are significant wetland areas, vegetated streambanks and somewhat more natural drainage in the lower basin, benefiting aquatic habitats and water quality in this area. Turbidity and nutrient levels did not appear to be a problem in the 1996 ADEM survey, although severe storm events were noted to cause considerable spikes in fecal coliforms in two of the lower basin streams, Shutt and Schoolhouse Creek.

IV. Problem Identification, Project Goals, and Solutions

In its 1996 survey of the Bon Secour River Watershed, ADEM noted that the watershed is impacted by land use patterns and the associated nonpoint source pollution. These problems were addressed by citizens and other stakeholders of the watershed in a series of three public meetings held by AUMERC. In response to these problems, stakeholders determined the above-listed goals for this Management Plan, and a steering committee developed action plans to alleviate these problems. Each action plan describes steps to be taken to accomplish the goal, and identifies potential partners and a timeline where applicable. Additionally, resources are identified which could be useful in implementing action plans (noted with the symbol➥), and potential funding sources have been identified. See Appendix 2 for a key to funding sources and notes regarding those sources.

1. Support efforts to reduce urban and rural nonpoint source runoff, including runoff from agriculture, construction, and residential areas.

A. Promote the Clean Water Guardians program. Coordinate with the Wolf Bay Watershed Project to develop a sod farm/golf course category.

Responsible parties/Partners: AUMERC; Wolf Bay Watershed Project; ACES-BC
Estimated costs: None
Timeline: Ongoing
Potential Funding Sources: §6217

➥AUMERC coordinates the Clean Water Guardians program, which recognizes groups who work to reduce polluted runoff. The program recognizes:

- Homeowners
- Forestry
- Agriculture
- Construction Sites
- Schools
- Small Businesses

Contact: AUMERC

B. Involve the agricultural community in watershed planning activities and encourage the establishment of voluntary goals for BMPs within the watershed.

Responsible parties/Partners: BCSWCD; ACES-BC; NRCS; ACNPCP; local ag co-ops (can promote through bulletin boards, seminars); ADEM Coastal/Facility Unit; ADCNR Coastal Section
Estimated costs:
Timeline: Ongoing
Potential Funding: §6217

2. Educate the public on growth management, zoning issues and planning & zoning processes.

A. Educate citizens about available tools for managing growth, including tools available through municipalities and the Baldwin County Commission.

Responsible parties/Partners: BCPD; City of Foley; City of Gulf Shores; SARPC; DISL
Estimated costs:
Timeline:
Potential Funding: §306

➥ **See Glossary for descriptions of**:

Overlay Zoning

➥ See Appendix 3 for a model of watershed performance overlay zone regulations from High Point, North Carolina including a Transfer of Development Rights Ordinance from Sarasota, Florida, which allows the transfer of development rights in order to direct development to designated areas while protecting other areas from development.

➥ See *Land Development and Resource Protection Ordinances for Local Governments in the Alabama Coastal Area* (ACAMP, 2000).

B. Produce publications (brochures, posters, etc.) to provide technical information on zoning tools.

Responsible parties/Partners: BCPD; City of Foley; City of Gulf Shores
Estimated costs:
Timeline:
Potential Funding: §306

3. Conserve existing aquatic and riparian habitats by minimizing shoreline erosion, establishing greenways and other natural areas to improve wildlife habitat and water quality and by promoting the use of alternative shoreline stabilization systems to avoid proliferation of vertical bulkheads.

A. Support the development of a local land trust for small conservation easements.

Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding:

B. Educate landowners on conservation options.

Responsible parties/Partners: NRCS; BCSWCD; USFWS; ACES-BC
Estimated costs:
Timeline:
Potential Funding: §6217 (ACNPCP)

➥ **See Glossary for descriptions of**:

Conservation Easement

Forever Wild Land Trust Program
Retained Life Estate

➥ See *Land Development and Resource Protection Ordinances for Local Governments in the Alabama Coastal Area* (ACAMP, 2000) for model open space ordinance language and examples of open space ordinances from around the country.

➥ Several cost-share incentive programs are available through government agencies to encourage citizen participation in habitat restoration and conservation. See descriptions in the Glossary:

Conservation Reserve Program
Environmental Quality Incentives Program
Wetlands Reserve Program
Wildlife Habitat Incentives Program
Partners for Fish and Wildlife
USACE Section 206: Aquatic Ecosystem Restoration
USACE Section 204: Ecosystem Restoration Projects in connection with dredging

C. *Implement a voluntary riparian area conservation program based on the Dog River Treasure Shorelines program. Recruit volunteer leaders who are watershed residents.*
   Responsible parties/Partners:
   Estimated costs:
   Timeline:
   Potential Funding:

D. *Provide technical and cost-benefit information on alternative bulkheading systems and the permitting process to homeowners and developers. Develop publications and distribute at locations including the U.S. Army Corps of Engineers, area Building Departments, libraries, grocery stores, and churches.*
   Responsible parties/Partners: USFWS; ADCNR Coastal; USACE
   Estimated costs:
   Timeline:
   Potential Funding: §306

E. *Develop a webpage about bulkheading options and information. Include information on the bulkhead permitting process and who to contact regarding permits. Investigate the possibility of having it linked from the USACE bulkhead permitting website.*

Responsible parties/Partners: ADCNR Coastal; USACE; USFWS
Estimated costs:
Timeline:
Potential Funding: §306

F. Encourage the development of voluntary signage for boaters (i.e. "Slow down; protect our shorelines").

Responsible parties/Partners: ADCNR Coastal; Alabama Marine Police
Estimated costs:
Timeline:
Potential Funding:

G. Identify open areas for potential greenspace and conservation easements along the Bon Secour River and its tributaries.

Responsible parties/Partners: City of Foley; City of Gulf Shores; BCPD
Estimated costs:
Timeline:
Potential Funding: §306

➥ **See Glossary for descriptions of**:

Conservation Easement
Greenways

4. Promote and encourage increased public access to the Bon Secour River and its tributaries.

A. Gather pertinent information regarding public access ("Alabama Coastal Public Access Management Plan", 2001*).*

Responsible parties/Partners: ADCNR Coastal; BCPD; City of Foley; City of Gulf Shores
Estimated costs:
Timeline:
Potential Funding: §306

➥ Figure 15. Parks, Recreation, and Public Lands denotes existing county/municipal, state, and federal lands within the watershed.

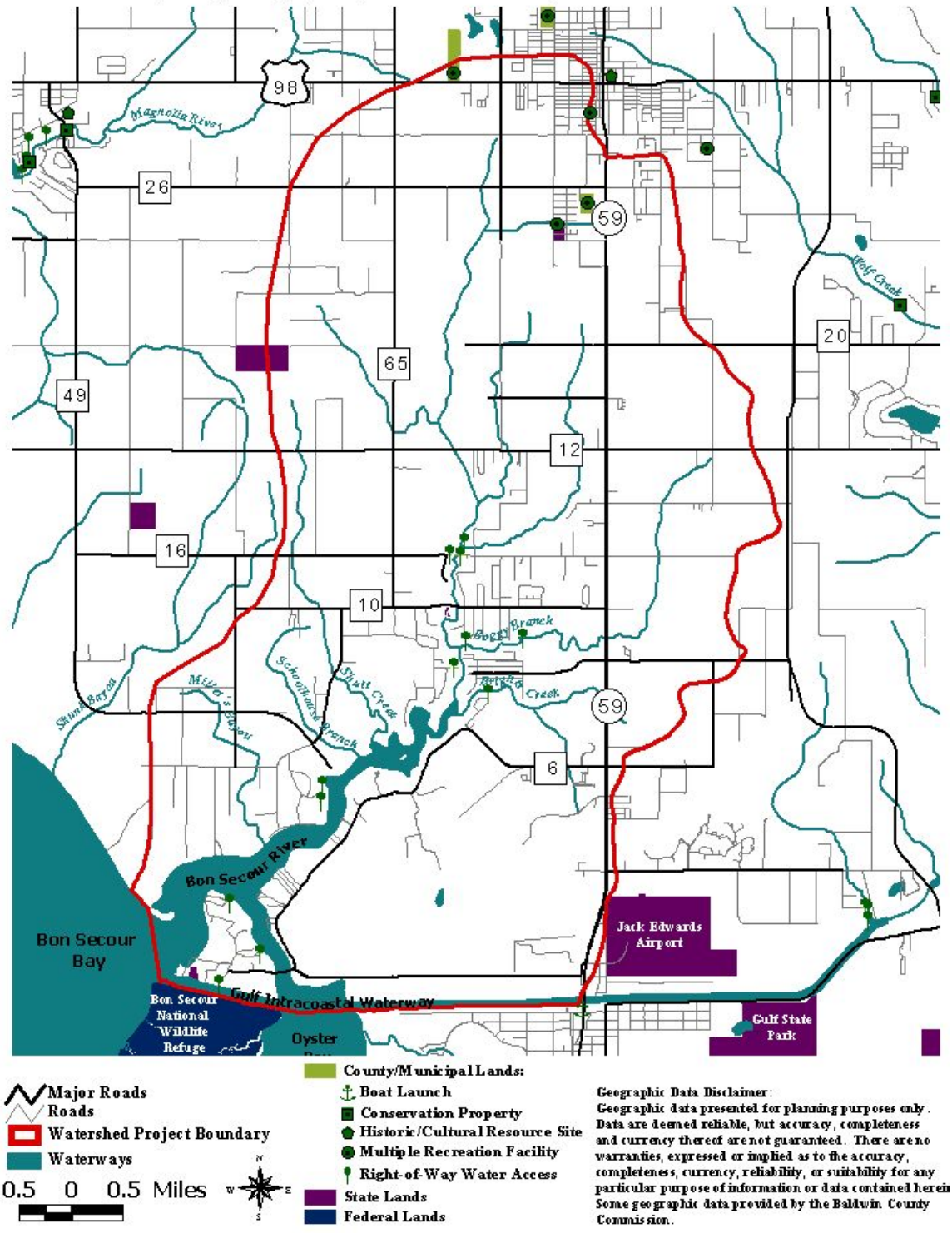

Figure 15. Parks, Recreation, and Public Land Areas of the Bon Secour River Watershed

B. Work with the local municipalities and Baldwin County to increase public access to the Bon Secour River and its tributaries. Work to identify potential open space in the watershed.

Responsible parties/Partners: BCPD; ADCNR Coastal; City of Foley; City of Gulf Shores; ACES-BC
Estimated costs:
Timeline:
Potential Funding: §306, §306(a)

➥ **See Glossary for descriptions of**:

Open Space

5. ***Implement a public outreach and awareness program, including K-12 education, involving the concepts of watershed responsibilities, nonpoint source pollution awareness, and "environmentally friendly" development.***

A. Provide information and support to ongoing efforts by the Baldwin County Cooperative Extension System's Master Environmental Educator program and programs of the Baldwin County Soil and Water Conservation District and Weeks Bay National Estuarine Research Reserve in reaching K-12.

Responsible parties/Partners: ACES-BC; BCSWCD; WBNERR
Estimated costs:
Timeline:
Potential Funding:

B. Investigate the installation of "You are entering the watershed" signage, and produce a target mailing to watershed residents regarding signage once installed.

Responsible parties/Partners:
Estimated costs: In 1999, the Dog River Watershed Project purchased 14 3'x4' industrial-grade road signs, priced at $124.00 per unit. 16 posts were also purchased to install 4 of the signs, at a price per unit of $26.95.
Timeline:
Potential Funding:

C. Promote a Storm Drain Stenciling program.

Responsible parties/Partners: MBNEP; AUMERC; City of Foley; City of Gulf Shores
Estimated costs:

Timeline:
Potential Funding:

D. Promote the Clean Water Guardians program.
See Goal #1, item A.

E. Continue public speaking engagements, printed material distribution, and traveling display.
Responsible parties/Partners: AUMERC
Estimated costs: None
Timeline: through March 31, 2004
Potential Funding:

F. Promote the Adopt-A-Stream program.
Responsible parties/Partners: AL PALS
Estimated costs: None
Timeline:
Potential Funding: N/A

G. Promote the Alabama Water Watch citizen water quality monitoring program.
Responsible parties/Partners: AUMERC; AWW
Estimated costs:
Timeline:
Potential Funding:

H. Coordinate a Bon Secour River Zone for Alabama Coastal Cleanup.
Responsible parties/Partners: AUMERC; ADCNR Coastal; ACES-BC
Estimated costs: None
Timeline: March 31, 2004 (AUMERC participation)
Potential Funding: §306

I. Participate in annual Lowes' Hurricane Awareness Fair.
Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding:

J. Investigate the use of newspaper advertisement space for nonprofits. Produce an advertisement to educate the public about the watershed project, watershed planning and nonpoint pollution.
Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding:

K. Produce targeted mailings to educate the public about the watershed project, watershed planning and nonpoint pollution. Investigate the potential to partner with Riviera Utilities, Baldwin EMC, Gulf Telephone Co., etc.

Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding:

6. Promote smart growth and development principles in the watershed. Encourage the implementation of walkable and bikeable communities, and address flooding issues.

A. Cooperate with the Mobile Bay National Estuary Program's Healthy Coastal Communities Initiative (HCCI) and the Alabama NEMO program to promote smart growth practices in the watershed.

Responsible parties/Partners: MBNEP; MASGC; HCCI; NEMO; AUMERC
Estimated costs:
Timeline:
Potential Funding: §306

➥ Certified presenters statewide provide NEMO workshops. See Appendix 4 for contact information.

➥ **See Glossary for descriptions of**:

Open Space
Greenways
Smart Growth

B. Educate citizens on the pros and cons of planning and zoning within the Bon Secour watershed.

Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding:

C. Cooperate with and ensure the periodic update and revision of Comprehensive Planning documents in the watershed.

Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding: §306

7. Implement education and outreach regarding groundwater.

A. Coordinate groundwater festivals in the Bon Secour River Watershed.
Responsible parties/Partners: City of Foley
Estimated costs:
Timeline:
Potential Funding: §6217

B. Provide information and support to ongoing efforts by the Baldwin County Cooperative Extension System's Master Environmental Educator program's groundwater lesson and septic systems lesson.
Responsible parties/Partners: ACES-BC
Estimated costs:
Timeline:
Potential Funding:

C. Support efforts to host groundwater workshops in the area.
Responsible parties/Partners: MBNEP
Estimated costs:
Timeline:
Potential Funding: §306

D. Explore the feasibility of expanding the use of reclaimed wastewater for irrigation on golf courses and turf farms. This practice is currently being implemented in Gulf Shores at the Gulf State Park Golf Course using wastewater reclaimed from the Gulf Shores Sewage System.
Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding:

8. Reduce nonpoint source pollution from faulty or unmaintained septic tanks. Encourage the use of alternative septic and sewer systems where conventional systems are not effective.

A. Encourage solutions through education and incentives.
Responsible parties/Partners: BCHD; ADPH
Estimated costs:
Timeline:
Potential Funding: §6217

B. Promote the adoption of state, county and local ordinances regarding onsite sewage disposal, containing more stringent requirements for siting and approving OSDS, for homeowner maintenance and repair, and effluent quality.

Responsible parties/Partners: BCHD; ADPH
Estimated costs:
Timeline:
Potential Funding: §6217

C. Encourage additional sewer collection system controls, and encourage the use of BMPs for construction, operation and maintenance of public and privately owned sewer systems.

Responsible parties/Partners:
Estimated costs:
Timeline:
Potential Funding: §6217

D. Cooperate with BCHD OSDS projects and education initiatives.

Responsible parties/Partners: ADPH; BCHD
Estimated costs:
Timeline:
Potential Funding: §6217

E. Provide education and outreach about decentralized on-site systems to developers, to be managed by the ADPH.

Responsible parties/Partners: USA; BCHD; ADCNR Coastal; ADPH
Estimated costs:
Timeline:
Potential Funding: §6217

9. Reduce nonpoint source pollution from boaters and marinas. Promote the implementation of a Clean Marina Program.

A. Cooperate with and promote the Alabama Clean Marina Program, currently under development.

Responsible parties/Partners: MASGC; AUMERC; ADCNR Coastal; ADEM; Gulf Coast RC&D
Estimated costs:
Timeline:
Potential Funding: §306

10. Coordinate and partner with other agencies, including the Mobile Bay National Estuary Program (MBNEP), USACE, ADCNR and ADEM to achieve the objectives and strategies described.

V. Future Needs

In order to insure success of this plan, future funding sources will be necessary to complete the projects listed above, particularly action items concerning workshops and other public outreach and education activities.

Additionally, this plan must be revised every five years at a minimum, so that progress can be gauged and reported to the citizens of the watershed, and so that goals and action plans can be assessed.

VI. Conclusion

The residents, business owners, agencies, and local governments of the Bon Secour River Watershed have given their time and efforts to organize the strategies necessary to improve the water quality of the Bon Secour River, and with it, the quality of life of its watershed. These efforts will continue in order to implement the action plans presented in this document, as well as update and revise strategies as needed.

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Glossary

Conservation Easement – This is a tool that may be used by a landowner to ensure their land remains undeveloped. According to Tammy L. Shaw of the Mississippi-Alabama Sea Grant Legal Program, in a letter to AUMERC dated March 29, 2000, a conservation easement is provided for in the Alabama Code (Sections 35- 18-1 and 35-18-6) and is a legal agreement between a landowner and a holding body (government body, or charitable corporation, association, or trust) which imposes limitations (restrictions) on the uses, or property rights, of all, or a portion of, a parcel of land. These restrictions may include relinquishing the right to develop, improve, or modify the property, or any building on it, in order to retain and protect natural, scenic, or recreational resources, open space use, maintaining or enhancing air or water quality, or preserving the historical, architectural, archaeological, paleontological, or cultural aspects of the property. However, the landowner retains the right to sell, gift, or transfer ownership of the property, to reside on the property, develop portions excluded from the easement, and any subsurface mineral rights. Because some, but not all, property rights are transferred, a conservation easement is known as a transfer of limited rights between the landowner and the holder, who is given the right to enforce the easement. In addition, a third party may be given enforcement rights, and this party may be a government body, or charitable corporation, association, or trust. However, typically the landowner remains responsible for maintenance of the tract of land, or a monetary donation is made to the maintaining body (Potter-Witter and Leighty, 1998; Sea Grant, March 2000). In return, the landowner may receive federal income and inheritance tax benefits, including reduced or avoided inheritance taxes on the property after the landowner's death, a federal income tax deduction on the gift of the development rights, and lower property tax assessments. The transfer of development rights of property can substantially lower inheritance or estate taxes by reducing land value. In some cases, the estate value may be lowered below the minimum taxable estate, therefore avoiding federal estate taxes. If the easement qualifies under Section 170(h) of the Federal Internal Revenue Code "Qualified Conservation Contributions", the landowner may deduct up to 30% of his or her adjusted gross income each year for six years (Potter-Witter and Leighty, 1998). Alabama state income tax benefits only occur under the **Forever Wild Land Trust program**.

Alabama law requires the purpose of a conservation easement to be for maintaining land in a natural scenic, or open space condition for wildlife habitat, for agricultural, recreational, or open space use, or for conserving buildings or other aspects of historic, archaeological, paleontological, or cultural value. Any property that possesses one or more of these values is potentially eligible to be a conservation easement (Sea Grant, March 2000). In order to create a conservation easement, first an appropriate holder must be identified. The Alabama Department of Conservation and Natural Resources is eligible to be a holder for the easement (see Appendix H for contact information). Land may be put into conservation easement for perpetuity, or for any time specifically stated in the agreement. However, federal income tax benefits apply only to perpetual easements. Landowners should consult with a financial advisor and attorney who are experienced in dealing with conservation easements, so that maximum tax benefits are obtained (Potter-Witter and Leighty, 1998; Sea Grant, March 2000).

Conservation Reserve Program (CRP)
This program reduces sedimentation, improves water quality, and establishes wildlife habitat by encouraging farmers to convert sensitive land to vegetated areas through cost sharing.
Contact: USDA, NRCS

Environmental Quality Incentives Program (EQIP)
EQIP provides fifty percent of funding to farmers and ranchers who agree to five or ten year contracts. Soil, water and natural resources concerns are addressed through a site conservation plan detailing land management practices.
Contact: USDA, NRCS

Forever Wild Land Trust Program – Created by an amendment to the Alabama Constitution, this program allows the State to acquire lands for preservation and protection. State income tax benefits accrue in the amount of twice the ordinary deduction in a conservation easement given to the program. If the State is to maintain the parcel, a cash donation must be made in the amount of 15% of the value of the easement.

Greenways - Linear parks or open spaces that provide natural areas for walking, hiking, or bicycling.

Open Space – Open space development creates fewer impervious surfaces and reduces the need to clear and grade large areas of land. Often used for recreation, stormwater management, and/or conservation, land preserved in a natural state needs little maintenance and improves water quality through stormwater reduction and treatment.

Overlay Zoning – Imposes additional zoning requirements within a designated area in addition to a municipality's zoning code. Overlay zoning allows for protection and management of development in environmentally sensitive areas without the requirement of amending existing zoning districts.

Partners for Fish and Wildlife Program - Formerly known as the Partners for Wildlife program, this program offers technical and financial assistance to landowners to restore wetlands and other fish and wildlife habitats by reestablishing native vegetation and ecological communities. The landowner agrees to maintain the restoration project for a minimum of ten years, in exchange for technical advice and funding.
Contact: U.S. Fish and Wildlife Service

Retained Life Estate - Another option for a landowner to protect a piece of land is through the transfer of title through a retained life estate. The property is donated to a charitable organization but the original owner can use the land as usual for a lifetime and perhaps the lifetimes of other members of the immediate family. The original owners retain a "life estate" and the interest given to the charitable organization is called the "remainder interest." For tax purposes, the deduction available for such a contribution is decreased by the value of the life estate retained by the donor.

Smart Growth – Smart growth recognizes connections between development and quality of life. It leverages new growth to improve the community. The features that distinguish smart growth in a community vary from place to place. In general, smart growth invests time, attention, and resources in restoring community and vitality to center cities and older suburbs. New smart growth is more town-centered, is transit and pedestrian oriented, and has a greater mix of housing, commercial and retail uses. It also preserves open space and many other environmental amenities (Smart Growth Network, 2004). There are 10 principles of Smart Growth:

- Create Range of Housing Opportunities and Choices
- Create Walkable Neighborhoods
- Encourage Community and Stakeholder Collaboration
- Foster Distinctive, Attractive Places with a Strong Sense of Place
- Make Development Decisions Predictable, Fair and Cost Effective
- Mix Land Uses
- Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas
- Provide a Variety of Transportation Choices
- Strengthen and Direct Development Towards Existing Communities
- Take Advantage of Compact Building Design

USACE Section 204: Ecosystem Restoration Projects in connection with dredging - Provides for protection, restoration, and creation of aquatic and wetland habitats in connection with construction and maintenance dredging of an authorized project.
Contact: USACE

USACE Section 206: Aquatic Ecosystem Restoration – Provides for the restoration and protection of aquatic ecosystems if the project will improve the environment and is in the public interest.
Contact: USACE

Wetlands Reserve Program (WRP) - A voluntary program to restore wetlands that have previously been drained and converted to agricultural uses, participating landowners can enter into conservation easements permanently or for thirty years, or into cost-share restoration agreements with no easements. A landowner receives payment up to the agricultural value of the land and 100% of restoration costs. A thirty year easement receives 75% of both land value and restoration costs. Restoration cost-share agreements

are for ten years and provide for 75% of restoration costs. In each case, the landowner continues to control access to their land.
Contact: USDA, NRCS

Wildlife Habitat Incentives Program (WHIP) - WHIP provides cost-share incentives to develop fish and wildlife habitat on private lands, granted that participants agree to implement a wildlife habitat development plan for a minimum of ten years.
Contact: USDA, NRCS

Appendix 1. USGS National Land Cover Dataset Land Cover Classification System

NLCD Land Cover Classification System Land Cover Class Definitions

Water - All areas of open water or permanent ice/snow cover.

11. Open Water - areas of open water, generally with less than 25 % or greater cover of water (per pixel).

12. Perennial Ice/Snow - All areas characterized by year-long cover of ice and/or snow.

Developed - areas characterized by high percentage (approximately 30% or greater) of constructed materials (e.g. asphalt, concrete, buildings, etc).

21. Low Intensity Residential - Includes areas with a mixture of constructed materials and vegetation. Constructed materials account for 30-80 % of the cover. Vegetation may account for 20 to 70 % of the cover. These areas most commonly include single-family housing units. Population densities will be lower than in high intensity residential areas.

22. High Intensity Residential - Includes heavily built up urban centers where people reside in high numbers. Examples include apartment complexes and row houses. Vegetation accounts for less than 20 % of the cover. Constructed materials account for 80-100 % of the cover.

23. Commercial/Industrial/Transportation - Includes infrastructure (e.g. roads, railroads, etc.) and all highways and all developed areas not classified as High Intensity Residential.

Barren - Areas characterized by bare rock, gravel, sad, silt, clay, or other earthen material, with little or no "green" vegetation present regardless of its inherent ability to support life. Vegetation, if present, is more widely spaced and scrubby than that in the "green" vegetated categories; lichen cover may be extensive.

31. Bare Rock/Sand/Clay - Perennially barren areas of bedrock, desert, pavement, scarps, talus, slides, volcanic material, glacial debris, and other accumulations of earthen material.

32. Quarries/Strip Mines/Gravel Pits - Areas of extractive mining activities with significant surface expression.

33. Transitional - Areas of sparse vegetative cover (less than 25 % that are dynamically changing from one land cover to another, often because of land use activities. Examples include forest clear cuts, a transition phase between forest and agricultural land, the temporary clearing of vegetation, and changes due to natural causes (e.g. fire, flood, etc.)

Forested Upland - Areas characterized by tree cover (natural or semi-natural woody vegetation, generally greater than 6 meters tall); Tree canopy accounts for 25-100 % of the cover.

41. Deciduous Forest - Areas dominated by trees where 75 % or more of the tree species shed foliage simultaneously in response to seasonal change.

42. Evergreen Forest - Areas characterized by trees where 75 % or more of the tree species maintain their leaves all year. Canopy is never without green foliage.

43. Mixed Forest - Areas dominated by trees where neither deciduous nor evergreen species represent more than 75 % of the cover present.

Shrubland - Areas characterized by natural or semi-natural woody vegetation with aerial stems, generally less than 6 meters tall with individuals or clumps not touching to interlocking. Both evergreen and deciduous species of true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions are included.

51. Shrubland - Areas dominated by shrubs; shrub canopy accounts for 25-100 % of the cover. Shrub cover is generally greater than 25 % when tree cover is less than 25 %. Shrub cover may be less than 25 % in cases when the cover of other life forms (e.g. herbaceous or tree) is less than 25 % and shrubs cover exceeds the cover of the other life forms.

Non-natural Woody - Areas dominated by non-natural woody vegetation; non-natural woody vegetative canopy accounts for 25-100 % of the cover. The non-natural woody classification is subject to the availability of sufficient ancillary data to differentiate non-natural woody vegetation from natural woody vegetation.

61. Orchards/Vineyards/Other - Orchards, vineyards, and other areas planted or maintained for the production of fruits, nuts, berries, or ornamentals.

Herbaceous Upland - Upland areas characterized by natural or semi- natural herbaceous vegetation; herbaceous vegetation accounts for 75-100 % of the cover.

71. Grasslands/Herbaceous - Areas dominated by upland grasses and forbs. In rare cases, herbaceous cover is less than 25 %, but exceeds the combined cover of the woody species present. These areas are not subject to intensive management, but they are often utilized for grazing.

Planted/Cultivated - Areas characterized by herbaceous vegetation that has been planted or is intensively managed for the production of food, feed, or fiber; or is maintained in developed settings for specific purposes. Herbaceous vegetation accounts for 75-100 % of the cover.

81. Pasture/Hay - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops.

82. Row Crops - Areas used for the production of crops, such as corn, soybeans, vegetables, tobacco, and cotton.

83. Small Grains - Areas used for the production of graminoid crops such as wheat, barley, oats, and rice.

84. Fallow - Areas used for the production of crops that are temporarily barren or with sparse vegetative cover as a result of being tilled in a management practice that incorporates prescribed alternation between cropping and tillage.

85. Urban/Recreational Grasses - Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.

Wetlands - Areas where the soil or substrate is periodically saturated with or covered with water as defined by Cowardin et al.

91. Woody Wetlands - Areas where forest or shrubland vegetation accounts for 25-100 % of the cover and the soil or substrate is periodically saturated with or covered with water.

92. Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for 75-100 % of the cover and the soil or substrate is periodically saturated with or covered with water.

Appendix 2. Potential Funding Sources

Potential Funding Sources

1. Alabama Department of Conservation and Natural Resources, State Lands, Coastal Section

Many of the action items described in this document could be supported by Coastal Zone Management Act funding under §306, §306(a) or §6217 of the CZARA. All of these funds are administered by ADCNR, State Lands Division, Coastal Section. Please note the following limitations that exist:

a. All of these funds require a local government sponsor (state or municipal government) who is willing to provide 1:1 matching funds. Match may be hard cash or in-kind services.
b. A local government sponsor must request funds from ADCNR.
c. Funding under §306 cannot be used for construction purposes. Eligible uses are limited to activities such as education, outreach, and planning. §306 funding must be consistent with the Alabama Coastal Area Management Program policy document.
d. Funding under §306(a) may be used for construction improvements at publicly owned water access facilities that are within the designated Alabama Coastal Area (waterward of the continuous 10’ contour elevation).
e. Funding for the Alabama Coastal Nonpoint Pollution Control Program (§6217) must be coordinated with ADEM/ADCNR and must be consistent with the ACNPCP 5-year implementation strategy. Coastal nonpoint funding may be used for construction BMP demonstration projects on a limited basis, provided that activities occur on public lands.
f. All requests for funding under these authorities will be considered by ADCNR on the merit to the project and its benefit to the Coastal Zone.

2. USDA Natural Resources Conservation Service

The USDA NRCS sponsors several conservation cost-share programs. Below are descriptions of some of these programs. To find out more information, contact the NRCS office.

Conservation Reserve Program (CRP)

This program reduces sedimentation, improves water quality, and establishes wildlife habitat by encouraging farmers to convert sensitive land to vegetated areas through cost sharing.

Environmental Quality Incentives Program (EQIP)

EQIP provides fifty percent of funding to farmers and ranchers who agree to five or ten year contracts. Soil, water and natural resources concerns are addressed through a site conservation plan detailing land management practices.

Wetlands Reserve Program (WRP)

A voluntary program to restore wetlands that have previously been drained and converted to agricultural uses, participating landowners can enter into conservation easements permanently or for thirty years, or into cost-share restoration agreements with no easements. A landowner receives payment up to the agricultural value of the land and 100% of restoration costs. A thirty year easement receives 75% of both land value and restoration costs. Restoration cost-share agreements are for ten years and provide for 75% of restoration costs. In each case, the landowner continues to control access to their land.

Wildlife Habitat Incentives Program (WHIP)

WHIP provides cost-share incentives to develop fish and wildlife habitat on private lands, granted that participants agree to implement a wildlife habitat development plan for a minimum of ten years.

3. U.S. Fish and Wildlife Service

Partners for Fish and Wildlife Program

Formerly known as the Partners for Wildlife program, this program offers technical and financial assistance to landowners to restore wetlands and other fish and wildlife habitats by reestablishing native vegetation and ecological communities. The landowner agrees to maintain the restoration project for a minimum of ten years, in exchange for technical advice and funding.

4. U.S. Army Corps of Engineers

For more information on the programs listed below, contact the USACE.

§206: Aquatic Ecosystem Restoration

Provides for the restoration and protection of aquatic ecosystems if the project will improve the environment and is in the public interest.

§204: Ecosystem Restoration Projects in connection with dredging

Provides for protection, restoration, and creation of aquatic and wetland habitats in connection with construction and maintenance dredging of an authorized project.

5. Legacy, Inc. Partners in Environmental Education

For more information, contact Legacy, Inc.

Competitive Grants

Legacy provides environmental education grants annually through the Competitive Grants Program. Funds for this program are allocated specifically to assist with helping to create environmentally responsible citizens through education. Any Alabama organization planning a community based environmental program is encouraged to apply. Competitive grants are available for up to $10,000

Mini-grants

The Environmental Education Mini-Grant program provides funding for hands-on environmental education programs to communities in Alabama. Mini-grants assist Alabama citizens with local environmental projects. Although teachers make up the majority of applicants, any non-profit organization wishing to pursue a community-based environmental project in Alabama is encouraged to apply. Applicants may apply for up to $2,500.

6. Mobile Bay National Estuary Program

Mini-grants

Mini Grants are awarded to implement innovative ideas for education and resource management and to promote a greater awareness and understanding of the five environmental issues of concern for the Mobile Bay and Delta. Research mini-grants are also available to provide some support for undergraduate and graduate research directly relating to the five environmental issues of concern. All grants must promote implementation of the action plans identified through the Comprehensive Conservation and Management Plan (CCMP) process. For more information, contact the MBNEP office.

Appendix 3. Model Ordinance: High Point, North Carolina

X" - HIGH POINT, NC

ARTICLE G

ERSHED PERFORMANCE OVERLAY ZONE REGULATIONS

Purpose — Section 9-3-131

The Watershed Performance Overlay Zone is a special designation for the watersheds of the municipal water supply reservoirs for the purpose of managing development in these environmentally sensitive areas. In addition to the underlying zoning district requirements, development within this zone must meet performance standards designed to protect the water quality of these water supply reservoirs.

Applicability — Section 9-3-132

The requirements of the Watershed Performance Overlay Zone shall apply to: (1) all major subdivision development; (2) all development within Office/Institutional-Developing, Office/Warehouse, and Planned Business districts; (3) all road construction within the Zone; (4) all single lot development within 2,000 feet of High Point City Lake, Oak Hollow Lake, and the East, West, and Main Fork of Deep River above the High Point City Lake Dam.

Boundary of the Zone — Section 9-3-133

The boundary of the zone is as follows:

BEGINNING at a point, said point being located at the intersection of North Main Street and the intersection of the Davidson-Forsyth-Guilford Counties lines and the City of High Point Corporate Limits; thence in a northerly and easterly direction along the western and northern City of High Point corporate limits to its intersection with the centerline of N.C. 68; thence in a southerly and southeasterly direction along the City of High Point extraterritorial jurisdiction line to its intersection with the City of High Point corporate limits and the High Point City Lake property line; thence in a northerly, easterly and southerly direction along the City of High Point corporate limits and the High Point City Lake property line to their intersection with Greensboro Road (U.S. 29A-70A); thence in a southwesterly direction

LAKE MANAGEMENT RATING SYSTEM
NON-RESIDENTIAL

Maximum Point Value	Factor	Point Value	Points Earned
20	1. Building Coverage - low percentage of building coverage		
	> 12%	0	
	9-12%	5	
	6-9%	10	
	3-6%	15	
	< 3%	20	
	2. Impervious Surface - low percentage of non-permeable surface		
	0-3%	20	
	3-7%	15	
	7-10%	10	
	10-15%	5	
	> 15%	0	
25	3. Proximity to Lake, Deep River, Boulding Branch - long distance from the Lake or major tributary		
	> 2000 ft. from nearest point of Lake or stream	25	
	1000-2000 ft.	20	
	500-1000 ft.	15	
	100-500 ft.	10	
	66-100 ft.	5	
	66 ft.	0	
10	4. Soil Type - suitable for residential development		
	suitable for development	10	
	moderately suitable	5	
	unsuitable for development	0	
25	5. Drainage - protect and use natural drainageways		
	piped, ditched, or improved drainage	0	
	piped or improved drainage with rip-rap	5	
	dispersed drainage or protected drainageways	10	
	dispersed drainage and protected drainageways	20	
	enhanced and protected natural drainageways	25	
25	6. Slope - low percentage of slope		
	0-5% average slope of subdivision of lot	25	
	5-10%	15	
	10-15%	5	
	> 15%	0	
25	7. Land Cover - high percentage of natural and stabilizing vegetation		
	vegetation natural or stabilizing vegetation along drainage and on > 25% of lot	25	
	natural or stabilizing vegetation along drainage and on 15-25% of lot.	20	
	natural or stabilizing vegetation along drainage and on 10-15% of lot.	15	
	natural or stabilizing vegetation between units and water	10	
	ornamental lawn on >5% of the lot	5	
	vegetation on <5% of the lot	0	
25	8. Run-off Control Strategies - high percentage of runoff control		
	maximum runoff detention	25	
	moderate runoff detention	20	
	runoff detention in excess of minimum requirements of Erosion Control Ordinance	15	
	runoff detention equal to minimum requirements	5	
10	9. Sewage Disposal - sanitary sewer		
	sanitary sewer service	10	
	septic tank and nitrification field	0	
15	10. Road and Driveway Design - high percentage of permeability and natural drainage		
	permeable road surface with vegetated ditches	15	
	impermeable road surfaces with vegetated ditches	10	
	permeable road surface with structural drainage	5	
	impermeable road surface with structural drainage	0	
		TOTAL	

9-1-137

ARTICLE H

GREENWAY REGULATIONS

Purpose **Section 9-3-151**

Regulations contained in this Article are intended to encourage the dedication of land in fee-simple to the City of High Point Greenways system.

Applicability **Section 9-3-152**

(a) For the pupose of this Ordinance, a greenway shall be considered as active and/or passive open space owned and maintained by or through the City of High Point for public recreation purposes which has been designated in the officially adopted Greenway Plan.

(b) The requirements of this Article shall apply to all areas within the city and the environs for which the city exercises extraterritorial jurisdiction.

Dedication Provisions **Section 9-3-153**

(a) Land donated to and accepted by the City of High Point in fee-simple for the expressed purpose of establishing a public greenway shall be credited toward the donating parcel's lot or tract area for the purpose of Density of Development and Area Coverage calculations though no longer part of the parcel.

(b) Dedicated land credits shall be transfered to subsequent holders if properly noted in transfer deeds.

(c) All required setbacks shall be measured from the border of the remaining parcel with the donated greenway area.

Reserved **Sections 9-3-154 through 9-3-170**

(1) Natural Drainageways

Developments should be designed to protect and use natural drainageways on the site.

(2) Name Duplication

The name of a proposed development shall not duplicate nor closely approximate the name of another development within the jurisdiction of the City of High Point.

(3) Blocks

a. The lengths, widths, and shapes of blocks shall be approved by the Technical Review Committee based on:

1. provision of adequate building sites
2. vehicular and pedestrian circulation
3. control and safety of street traffic
4. topography

b. In conventional subdivisions, blocks shall have sufficient width to allow two tiers of lots of minimum depth. Single tier blocks are permitted under the following conditions:

1. to separate residential development from through vehicular traffic
2. to separate residential development from another use
3. in nonresidential subdivisions

c. Where deemed necessary by the Technical Review Committee, a pedestrianway at least 15 feet in width may be required to provide convenient public access to public areas such as parks, greenways, schools, shopping centers, religious facilities or transportation facilities.

Appendix 4. Program Contacts

Program Contacts

Organization	Mailing Address	Phone	Programs	Website
Alabama Clean Water Partnership		334/514-8326	The Alabama Clean Water Partnership (ACWP) is a coalition of public and private individuals, companies, organizations and governing bodies working together to protect and preserve water resources and aquatic ecosystems throughout the state.	http://www.cleanwaterpartnership.com/
Alabama Department of Conservation and Natural Resources, Coastal Programs	23210 US Highway 98 Stonebrook Executive Complex Suite B-1 Fairhope, AL 36532	251/929-0900	Conservation and natural resources, enforcement of Alabama conservation laws, and management of state lands; Coastal zone management, Coastal Cleanup, Presentations/workshops including Better Site Design, Effects of Urbanization, NEMO, NPS for Marinas, etc.	http://www.conservation.alabama.gov/SL/index_Coastal.htm
Alabama Department of Conservation and Natural Resources	State Lands Division 64 North Union St. Montgomery, AL 36130	334/242-3484	Potential holding body for conservation easements	www.dcnr.state.al.us/
Alabama Department of Environmental Management	1400 Coliseum Boulevard Montgomery, AL 36110-2059 Field Office: 2204 Perimeter Rd. Mobile, AL 36615	334/ 271-7700 251/450-3400	Enforcement of state environmental codes	www.adem.state.al.us
Alabama Department of Transportation	1409 Coliseum Boulevard Montgomery, Alabama 36110	334/242-6358	Assistance with installation of signage	www.dot.state.al.us/

Alabama PALS	340 N. Hull St. Montgomery, AL 36104	1-800-ALA-PALS	Coordinate statewide Adopt-A-Stream program; provide total support to adoptees, including signage and trash bags	http://www.alpals.org/
Alabama Rivers Alliance	2027 2nd Avenue North, Suite A Birmingham, Alabama 35203	205/ 322-6395	Provides assistance to grassroots watershed groups statewide	www.alabamarivers.org
Alabama Water Watch	203 Swingle Hall Department of Fisheries Auburn University, AL 36849	1-888-844-4785	Provides support of statewide citizen water quality monitoring program	http://www.alabamawaterwatch.org/
Auburn University Marine Extension and Research Center	4170 Commanders Dr. Mobile, AL 36615	251/438-5690	Can provide assistance with: Storm Drain Stenciling, Adopt-A-Stream, Guardian Awards, Traveling Display, Watershed signs, NEMO, Cleanups, presentations, management planning and stakeholder involvement . Coordinates Alabama Clean Marina Program	www.ag.auburn.edu/faa/aumerc/
Baldwin County Extension Office	302A Byrne Street Bay Minette, AL 36507	251/937-7176	Provides environmental education	http://www.aces.edu/Baldwin/
Baldwin County Soil and Water Conservation District	1504-C Hwy. 31 So. Bay Minette, AL 36507-2611	251/937-3297, Ext. 3	Provide assistance with Watershed Conservancy Districts and Management Authorities	http://www.swcc.state.al.us/directory/baldwin.htm
Dauphin Island Sea Lab Coastal Policy Initiative	101 Bienville Blvd. Dauphin Island, AL 36528	251/861-2141	Can provide assistance in workshops, presentations, and other education projects, including NPS for Marinas, Better Site Design and Effects of Urbanization	www.disl.org
Dog River Clearwater Revival	c/o Linda Stefan 1953 River Road Mobile, AL 36605		Citizens group; can offer advice on citizen involvement and coordinating an grassroots organization	www.usouthal.edu/geography/fearn/DRCR.htm

Earthwater Stencils	4425 140th Ave SW Rochester, WA 98579	360/956-3774	Storm Drain Stencils available for purchase; many tips and ideas for a Storm Drain Stenciling project	www.earthwater-stencils.com/
Geological Survey of Alabama	P.O. Box O Tuscaloosa, AL 35486-9780	205/349-2852	Potential resource for area maps	www.gsa.state.al.us/
Legacy, Inc.	P.O. Box 3813 Montgomery, AL 36109	1-800-240-5115	Nonprofit organization providing programs and funds statewide for environmental education	www.legacyenved.com/
Mobile Bay National Estuary Program	4172 Commanders Dr. Mobile, AL 36615	334/431-6409	Federal program; The Dog River Watershed falls under their study area and Comprehensive Conservation & Management Plan; provides funding for Action Plan Demonstration Projects, including Storm Drain Stenciling.	www.mobilebaynep.com
Natural Resources Conservation Service	1504-C Hwy. 31 So. Bay Minette, AL 36507-2611	251/937-3297, Ext. 3	Can provide technical assistance and funding for habitat projects	http://www.nrcs.usda.gov/
South Alabama Regional Planning Commission	P. O. Box 1665 Mobile, Alabama 36633	251/433-6541	May provide technical assistance	www.sarpc.org/
US Army Corps of Engineers	P.O. Box 2288 Mobile, AL 36628-0001	251/471-5966	Dog River Watershed Reconnaissance Study; Permits wetland filling operations(Section 404); provides funds for wetlands restoration	www.sam.usace.army.mil/
US Coast Guard	150 N. Royal Street Mobile, AL 36652-2924	251/441-5121	Responsible for oil spills, etc.	
US Environmental Protection Agency, Region IV	61 Forsythe St. Atlanta, GA 30303	1-800-241-1754	Federal environmental protection agency	www.epa.gov/region04

US Fish and Wildlife Service	1208-B Main Street Daphne, AL 36526	251/441-5181	Responsible for endangered and other species; reviews many water permits including NPDES and wetland filling permits (Section 404); potential funding for habitat projects	www.fws.gov/
US Geological Survey	2350 Fairlane Drive, Suite 120 Montgomery, AL 36116	334/213-2332	Potential resource for area maps	www.usgs.gov
Weeks Bay National Estuarine Research Reserve	11300 U. S. Highway 98 Fairhope, AL 36532	251/928-9792	Coordinates workshops and education efforts.	

Program Matrix

	Adopt-A-Stream	Storm Drain Stenciling	Guardians Award Program	Volunteer Water Monitoring	Watershed Signage	River Cleanups	NEMO	Better Site Design Presentations	Effects of Urbanization Presentations	Habitat Restoration Projects	Watershed Management Planning	Stakeholder Involvement	Enforcement	Funding Source
Alabama Clean Water Partnership				•							•	•		•
Alabama Department of Conservation and Natural Resources													•	
Alabama Department of Conservation and Natural Resources, Coastal Programs				•		•		•	•		•	•		•
Alabama Department of Environmental Management		•					•						•	
Alabama Department of Transportation					•									
Alabama PALS	•					•								
Alabama Rivers Alliance										•	•	•		
Alabama Water Watch				•										
Auburn University Marine Extension and Research Center	•	•	•	•	•	•	•	•	•	•	•	•		
Baldwin County Extension Office						•						•		

	Adopt-A-Stream	Storm Drain Stenciling	Guardians Award Program	Volunteer Water Monitoring	Watershed Signage	River Cleanups	NEMO	Better Site Design Presentations	Effects of Urbanization Presentations	Habitat Restoration Projects	Watershed Management Planning	Stakeholder Involvement	Enforcement	Funding Source
Baldwin County Soil and Water Conservation District										•		•		•
Dauphin Island Sea Lab Coastal Policy Initiative				•				•	•	•				
Dog River Clearwater Revival			•	•		•						•		
Earthwater Stencils		•												
Legacy, Inc.														•
Mobile Bay National Estuary Program		•				•				•	•	•		•
Natural Resources Conservation Service										•				•
South Alabama Regional Planning Commission											•			
US Army Corps of Engineers										•			•	•
US EPA				•				•	•	•	•	•	•	•
US Fish and Wildlife Service										•			•	•
Weeks Bay National Estuarine Research Reserve	•			•	•	•				•	•	•		