BUTTAHATCHEE RIVER WATERSHED IMPLEMENTATION PLAN

FINAL
April 6, 2004

BUTTAHATCHEE RIVER WATERSHED IMPLEMENTATION PLAN

Prepared for

Big Black – Tombigbee
Tennessee River Basins Team

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GOALS AND ACTIONS FOR BUTTAHATCHEE RIVER WATERSHED IN COMING BASIN MANAGEMENT CYCLE

Goal	Who	What	Where	When	Contacts
Reduce fecal coliform concentrations in Buttahatchee River in Mississippi to state standards	MSU Extension Service	Initiate Phase I of Medallion Farmer Program	Lowndes and Monroe Counties	2004	Larry Oldham, MS Extension Service 662-325-2701
	NRCS, MSWCC, MDAC-NRI, MSU Extension Service	Continue existing projects related to farmer education and implementation of BMPs	Throughout watershed	2004-2008	Larry Williams, NRCS 601-969-5227 Jim Lipe, MDAC-NRI 601-359-1135 Mark Gilbert, MSWCC 601-354-7645
	MSWCC	Buttahatchee River watershed nonpoint source pollution project	Mississippi portion of watershed	2004-2007	Mark Gilbert, MSWCC 601-354-7645
	MS Health Department	Locate failing septic systems	Entire watershed	2004-2005	Eugene Herring, MS State Health Department 601-576-7779
Protect threatened and endangered mussel species present in Buttahatchee River	MSU Extension Service	Initiate Phase I of Medallion Farmer Program	Lowndes and Monroe Counties	2004	Larry Oldham, MSU Extension Service 662-325-2701
	NRCS, MSWCC, MDAC-NRI, MSU Extension Service	Continue existing projects related to farmer education and implementation of BMPs	Throughout watershed	2004	Larry Williams, NRCS 601-969-5227 Jim Lipe, MDAC-NRI 601-359-1135 Mark Gilbert, MSWCC 601-354-7645
	Mississippi Forestry Commission	Aerial survey to determine silviculture activity and develop sampling plan.	Entire watershed	2004	Michael Sampson, MS Forestry Commission 601-359-1812
		Evaluate potential risk to water quality from recently harvested forest tracts		2005	
		Contact owners of forest tracts at-risk for water quality to inform them of risk and suggest BMPs		2005	
	MS Nature Conservancy MDEQ, ADEM, and others	Partnership building	Mississippi and Alabama portions of watershed	2004-2006	Matthew Miller, TNC 662-844-1885 Matt Hicks, TNC 601-713-3355
		Data gathering and evaluation, geomorphological assessment		2004-2005	

GOALS AND ACTIONS FOR BUTTAHATCHEE RIVER WATERSHED IN COMING BASIN MANAGEMENT CYCLE CONTINUED

Goal	Who	What	Where	When	Contacts
	Mississippi Museum of Natural Science	Mussel population survey	Buttahatchee River near Caledonia bridge	2005, 2007	Dr. Bob Jones Mississippi Museum of Natural Science 601-354-7303
	MDEQ	Water quality monitoring	Ambient monitoring station on Buttahatchee River	2005-2008	Henry Folmar, MDEQ 601-664-3910

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1.0 BUTTAHATCHEE RIVER WATERSHED IMPLEMENTATION PLAN MISSION STATEMENT

The mission of the Mississippi Department of Environmental Quality (MDEQ) is to safe-guard the health, safety, and welfare of present and future generations by conserving and improving Mississippi's environment and fostering wise economic growth through focused research and responsible regulations. Restoration of Buttahatchee River water quality and preservation of threatened species in the watershed will not only contribute directly to MDEQ's environmental mission, but also contribute to economic viability within the watershed.

2.0 BUTTAHATCHEE RIVER WATERSHED

2.1 Watershed Description

The Buttahatchee River originates in Alabama and flows southwest into northeastern Mississippi where it joins the Tombigbee River (Figure 2.1). Approximately 128,459 acres of the 556,750 acre watershed is in Mississippi. Portions of the Buttahatchee River watershed lie within Marion, Winston, Fayette, and Lamar counties in Alabama, and Lowndes, Monroe, and Itawamba Counties in Mississippi. We estimate that approximately 40,000 people lived in the watershed in 2000 (based on 2000 census county data). The heaviest concentration of people was in Lowndes County; approximately one-seventh of the people living in the watershed lived here. Approximately two-thirds of the people lived in Alabama. Mississippi towns located in the watershed include Koala Springs, Greenwood Springs, Sipsey Fork, Splunge, and Caledonia, Caledonia being the largest. Alabama towns located in the watershed include Suligent, Crews, Henson Springs, Detroit, Guin, Hamilton, Weston, and Bexar, Hamilton being the largest. Figure 2.2 is a 1993 land use map of the watershed which shows the locations of urban areas. In 1993 the majority of the watershed was forest (73%) (MDEQ 1999).

The majority of the watershed is underlain by the Eutaw, Tuscaloosa, and Gordo formations along with Coker and Pottsville formations in the head waters (MDEQ 1978, Szabo et al. 1988). In the head waters topography is steep, with 1,000 feet of relief. The topography of the remainder of the watershed is open hills with 200 – 400 feet of relief in the upper portion and flat to gently rolling lowlands in the lower portion, near the Tombigbee River (MDEQ 1998). Soils in the watershed tend to be weathered chalk with sand-humus-chert and gravels. Table 2.1 is a list of major soils in the watershed (NRCS 1911,1966). The Buttahatchee River orignates in the Plateau Escarpement ecoregion and the watershed crosses the Fall Line Hill, Flatwoods/Alluvial Prairie Margins, and Blackland Prairie ecoregions. Native vegetation in the watershed is primarily oak-hickory-pine forest, with some sweet gum-oak-juniper forest and prairie (MDEQ 1998, Griffith et al. 2001). There is a good hardwood forest buffer along most of

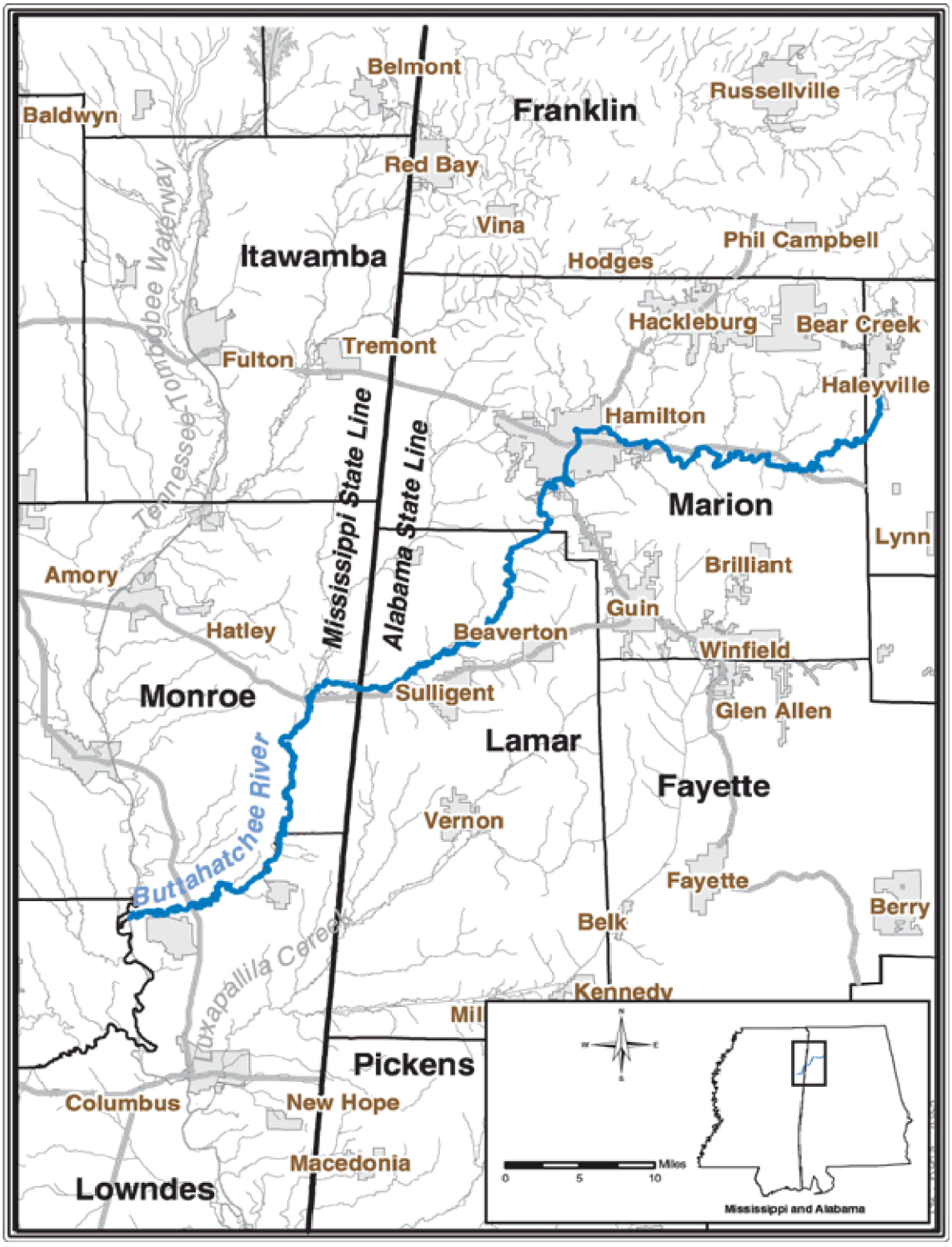

Figure 2.1. Buttahatchee River Watershed

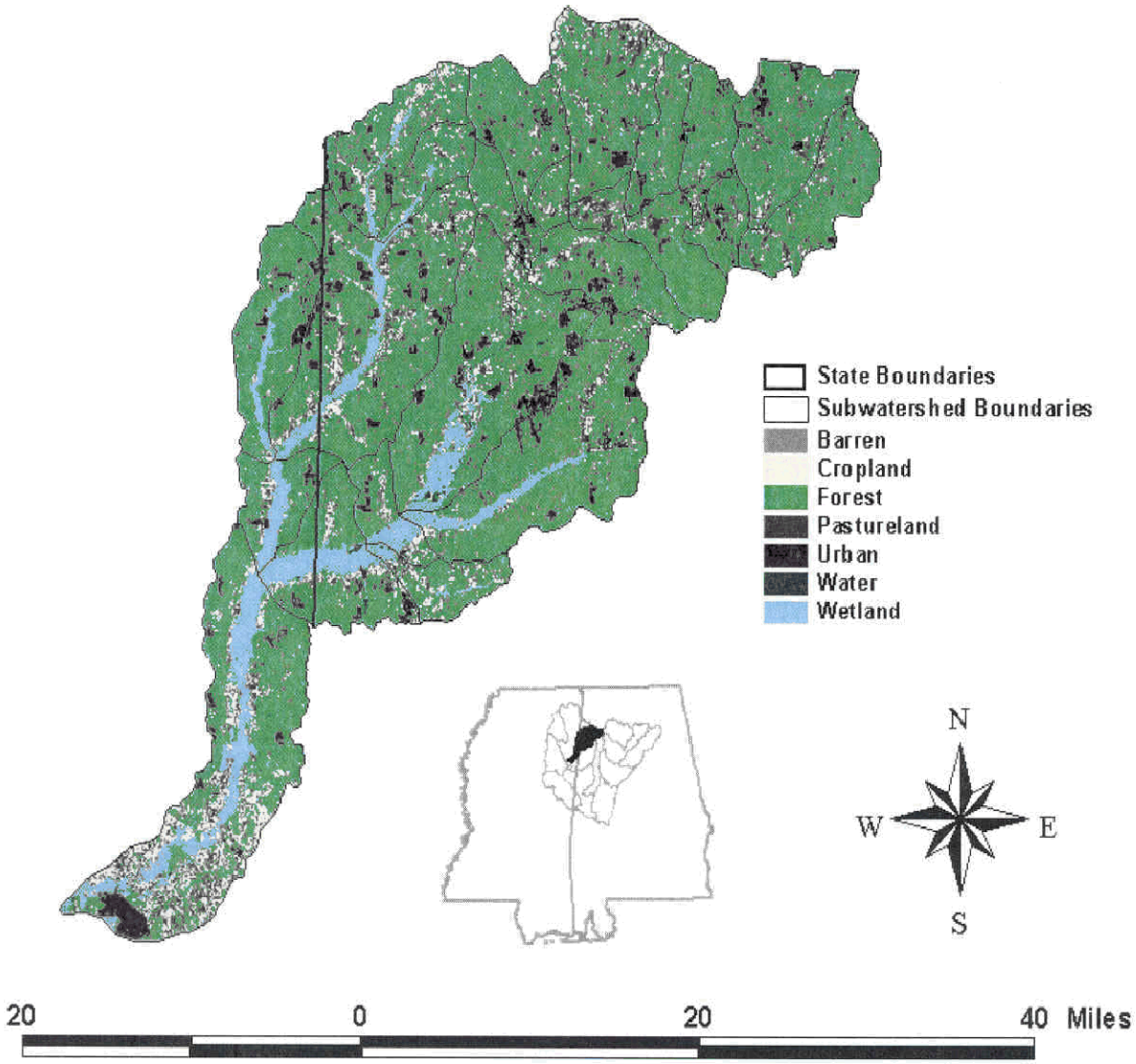

Figure 2.2. Buttahatchee River Land Use (MDEQ 1998).

the Buttahatchee River in Monroe County (Andrew Whitehurst, Mississippi Department of Wildlife, Fisheries, and Parks).

Table 2.1. Major Soils of the Buttahatchee River Watershed.

Soil	Description
Bibb-Mantachie-Alluvial Association	Sandy soils on the bottomland of the coastal plain.
Ruston-Cuthbert-Luverne Association	Soils on narrow ridges and steep side slopes.
Myatt-Stough-Tilden Association	Poorly drained to moderately well drained soils on nearly level and gently sloping stream terraces.
Ora-Savannah Association	Moderately well drained soils of the upland that have fine sandy loam or silt loam surface soil and silt loam or clay loam subsoil with fragpan.
Jean-Mantachie	Well drained and somewhat poorly drained, loamy soils on flood plains.
Prentiss-Rosella-Steens	Moderately well drained, poorly drained, and somewhat poorly drained, loamy soils on terraces
Smithdale-Savannah	Well drained and moderately well drained, loamy soils
Savannah-Caledonia-Guyton	Moderately well drained, well drained, and poorly drained, loamy soils on uplands.

Named streams in the watershed include Buttahatchee River, Sipsey Creek, Splunge Creek, Hurricane Creek, Williams Creek, Clifty Creek, Camp Creek, Barn Creek, Woods Creek, Beaver Creek, and Bogue Creek. Approximately 24,803 acres of palustrine wetlands occur along these primary streams and their tributaries including large areas of intact and functional wetland systems (Matthew Miller, The Nature Conservancy). There are no major lakes or impoundments in the watershed. Water levels in the creeks and wetlands are maintained by a shallow aquifer that underlies the watershed. Deep, confined aquifers are the primary drinking water source in the watershed. Portions of the watershed are recharge areas for Tuscaloosa-Gordo and Coker, and Eutaw-McShan aquifers.

The watershed was occupied by the Chickasaw and Choctaw nations prior to European settlement in the early 1800s. Historically agriculture, primarily cotton production, has been the basis of the economy in this area. Agriculture has been declining in this area since the 1940's, but is still an important economic factor. Forest products and diversified manufacturing are the other two major components of the local economy. A number of sustainable economic

development projects are being developed in northeast Mississippi through the Natural Resources Initiative (Matthew Miller, The Nature Conservancy).

In 2002 there were 169 parcels of privately owned land along the river in Monroe and Lowndes Counties. Thirty-nine of these parcels were owned by Airline Manufacturing Inc. of Columbus, Missouri, a family-owned forest products company. The rest of the privately owned parcels are owned by individuals, families, or small business corporations – including two sand and gravel companies. Five parcels of land along Buttahatchee River were government owned. Columbus Air Force Base owns three parcels in Lowndes County. One parcel in both Monroe and Lowndes Counties is sixteenth Section school board lands held in the public trust by the Mississippi Secretary of State (Matthew Miller, The Nature Conservancy).

Sand and gravel mining has occurred along the Buttahatchee River in Lowndes County for years. Downstream of U.S. Highway 45 many old sand and gravel pits have been captured by the river and the channel is wide and unsTable. Historically this instability has been confined to the river reach downstream of the highway. However, the river channel has begun widening upstream of the highway for about a half a mile, evidence of head cutting apparently induced by the mining activities (Andrew Whitehurst, Mississippi Department of Wildlife, Fisheries, and Parks).

The Buttahatchee River in Mississippi is used for fishing. There are two public boat ramps on the river; One in Lowndes County near Kolola Springs, and one in Monroe County near Lackey off Buttahatchee Road (DeLorme 1998).

2.2 Water Quality

2.2.1 Standards

The designated use for all surface waters of this watershed stated in the Mississippi water quality regulations is fish and wildlife support. Mississippi water quality regulations state that waters with this designated use must also meet water quality standards for secondary contact recreation (http://www.deq.state.ms.us/MDEQ.nsf/page/WQAB_tombigbeedesignate?OpenDocument). Table 2.2 Lists the numeric water quality criteria applicable to Buttahatchee River Watershed surface waters (MDEQ 2002).

Table 2.2. Numeric Water Quality Criteria for Buttahatchee River Watershed.

Parameter	Criteria
Dissolved Oxygen	5.0 mg/L daily average, 4.0 mg/L instantaneous
PH	Between 6.0 and 9.0 su
Temperature	32.2 deg C
Fecal coliform	May – October: geometric mean of 200 per 100 ml, 400 per 100 ml less than ten percent (10%) of the time during a 30 day period November – April: geometric mean of 2000 per 100 ml, 4000 per 100 ml less than 10 percent of the time during a 30 day period
Specific conductance	1000 uohms/cm
Dissolved Solids	750 mg/L monthly average, 1500 mg/L instantaneous

MDEQ uses an Index of Biotic Integrity (M-BISQ) to determine if water bodies are achieving their aquatic life support designated use (MDEQ 2003). The aquatic life support attainment threshold M-BISQ score for the bioregion associated with Buttahatchee River is 57.71.

2.2.2 Current Condition

2.2.2.1 Surface water quality

MDEQ maintains an ambient monitoring station on Buttahatchee River (Station 02439400). The data from the ambient monitoring program is included in Appendix A. In 2001, an assessment of water quality, benthics, and habitat was conducted at the routine monitoring station. This data is also included in Appendix A. In 2002, MDEQ conducted a water quality study of the Buttahatchee River. A list of reports with information on the condition of Buttahatchee River and its tributaries is included in Appendix A.

Buttahatchee River is not meeting its water quality standards for fecal coliforms. A portion of the Buttahatchee River in Mississippi is impaired due to pathogens/fecal coliform contamination from nonpoint sources. Backwater from the Tennessee-Tombigbee Waterway affects the lower portion of the river. Buttahatchee River was made eligible for Scenic River status in 1999, although it has not been nominated.

2.2.2.2 Ground Water Resources

The majority of drinking and irrigation water use in this watershed is supplied by groundwater from deep, confined aquifers in the Tuscaloosa-Gordo and Coker, and Eutaw-McShan formations. No issues have yet been raised with regard to the quality or quantity of groundwater in this watershed.

2.2.2.3 Wildlife Resources

The Buttahatchee River was listed as an Important Site for Conservation of Freshwater Biodiversity in North America by the World Wildlife Fund United States in 2000 (Abell et al. 2000). It has also been classified as a Freshwater Conservation Area by the Nature Conservancy (Smith et al. 2002).

A number of threatened and endangered species are present, or have the potential to be present, in the watershed. See Table 2.3 for a list of federally listed species and their habitats. A list of species of special concern for the watershed is included in Appendix B. All but one of the federally listed mussel species (*L. altilis*) are still present in the Buttahatchee River, however, only north of Highway 45. Downstream of Highway 45 these species have been eliminated due to the influence of backwater from the impoundment of the Tombigbee River and removal of mussels by gravel mining (Hartfield and Jones 1990). The number of mussel species in general appears to be declining in the Buttahatchee River. A 1990 survey of the river by Mississippi Museum of Natural Science biologists found 27 mussel species, down from 42 mussel species found during previous surveys performed in the last 30 years (Andrew Whitehurst, Mississippi Department of Wildlife, Fisheries, and Parks).

2.2.3 TMDLs

The Buttahatchee River from Highway 278 to Highway 45 was listed as impaired for secondary contact recreation due to pathogens on the Mississippi 1998 303(d) List. It is also included on the 2002 303(d) List in Section C, Completed TMDLs. Information available through the Alabama Department of Environmental Management website indicates that the

Table 2.3. List of Threatened and Endangered Species in Buttahatchee River Watershed (Site Basic Record 2002, www.fishbase.org.ph, www.NatureServe.org/explorer)

Species	Federal Status	Habitat
Fine-lined pocketbook mussel – *Lampsilis altilis*	Threatened	Stable gravel and sandy gravel substrate in high quality lotic habitats
Orange-nacre mucket mussel – *Lampsilis perovalis*	Threatened	Stable gravel and sandy gravel substrate in high quality lotic habitats
Alabama moccasinshell mussel – *Medionidus acutissimus*	Threatened	Stable gravel and sandy gravel substrate in high quality lotic habitats
Black clubshell - *Pleurobema curtum*	Endangered	Riffles and shoals on sandy gravel-cobble substrates with moderate to fast current, requires clean water
Southern clubshell mussel – *Pleurobema decisum*	Endangered	Stable gravel and sandy gravel substrate in high quality lotic habitats
Bald eagle - *Haliaeetus leucocephalus*	Threatened	
Ovate clubshell mussel – Pleurobema perovatum	Endangered	Stable gravel and sandy gravel substrate in high quality lotic habitats
Southern Combshell *Epioblasma penita*	Endangered	Riffles or shoals with sandy gravel to gravel-cobble substrates in moderate to swift current
Heavy pigtoe - *Pleurobema taitianum*	Endangered	Riffles and shoals on sandy gravel to gravel-cobble substrates with moderate to fast current, requires clean water

Buttahatchee River in Alabama has not been evaluated for attainment of water quality standards and designated uses, although some of its tributaries have.

A TMDL addressing pathogens in Buttahatchee River in Mississippi has been completed and approved by U.S. EPA. For this TMDL the entire Buttahatchee River Watershed, including the portion in Alabama, was modeled for fecal coliform loading. The sources of pathogens identified in the TMDL were cattle in streams and failing septic systems. The TMDL proposed an 85% reduction of fecal coliform load from cattle in streams, and a 50% reduction of load from failing septic tanks. Table 2.4 Lists the TMDL target loads.

Table 2.4. TMDL Target Loads.

Type	Fecal coliform load (counts/30 days)
Waste Load Allocation	5.93E12
Load Allocation	29.0E12
Margin of Safety	(implicit)
TMDL	34.95E12

2.3 Stakeholder Concerns

Populations of threatened and endangered mussel species present in the Buttahatchee River and other watersheds have been adversely affected by both point and nonpoint source pollution (sediment, nutrients, toxics) as land use has changed in those watersheds. The populations of threatened and endangered mussel species present in Buttahatchee River Watershed are isolated from populations in other watersheds by the impoundment of the Tombigbee River. Being cut off from colonization from other watersheds makes the populations in the Buttahatchee watershed less resilient to losses and therefore more vulnerable. This makes it important to utilize any and all measures available to protect these populations.

The adverse effects of increased erosion and sediment loading on mussel species are well understood. Therefore, the benefits of reducing this nonpoint pollutant are also well understood. Sediment is also the most abundant pollutant in the Mobile River Basin (ADEM 1989). As a result, reducing nonpoint sediment loads in the Buttahatchee River Watershed is a priority. Land use based estimates of sediment load in the Mississippi portion of the Buttahatchee River Watershed indicate that cropland, silviculture, pastures, and mining sites are the largest contributors of nonpoint sediment load (TVA 2000).

Increased nutrient inputs to streams is also known to have adverse impacts on aquatic systems (e.g. excessive algal growth, low dissolved oxygen) that could negatively impact threatened and endangered mussel species. Since the majority of human-induced nutrient loading to streams comes from nonpoint sources (LDEQ 1995) managing this source through implementation of BMPs will have the greatest positive effect. Land use based estimates of nitrogen and phosphorus loads in the Mississippi portion of the Buttahatchee River Watershed indicate that residential areas, transportation land uses, croplands, silviculture, and beef cattle are the largest contributors of nonpoint nutrient load (TVA 2000).

Buttahatchee River was selected for implementation of restoration activities based on its 303(d) listing for pathogens. The presence of populations of threatened and endangered mussel species in this portion of the Buttahatchee River and its tributaries, and accelerated erosion in the downstream portion of the river are also concerns. Table 2.5 is a listing of stakeholder concerns that includes suspected causes, locations, and extents of the problems identified. A listing of the causes related to the concerns listed in Table 2.5 is included as Appendix C. The listing in Appendix C includes justification of the suspicion that listed stressors are causing the problems of concern, and listings of locations and extent of the occurrence of the stressors.

Table 2.5 Detailed Listing of Stakeholder Concerns

Status	Description
Concern:	Pathogens
Causes:	Probable causes include point source discharges, malfunctioning on-site wastewater treatment systems, urban stormwater runoff, land application of manure, confined animal operations, pasture runoff, and livestock with access to streams
Location:	Buttahatchee River Watershed
Extent:	Between Highways 278 and 45
Concern:	Mussel habitat alteration
Causes:	Backwater from Tennessee-Tombigbee Waterway, gravel mining, channel modification, sedimentation/siltation, water quality degradation
Location:	Buttahatchee River
Extent:	Tombigbee backwater and gravel mining occur below Highway 45. Information on extent of channel modification was not obtained in time to be included in this version of the Watershed Implementation Plan.
Concern:	Loss of mussel fish host species
Causes:	Probable causes include backwater from Tennessee-Tombigbee Waterway, water quality degradation, and siltation
Location:	Buttahatchee River and tributaries
Extent:	Not known at this time
Concern:	Introduction of invasive, exotic species
Causes:	Zebra mussels could be introduced via barge traffic along Tennessee-Tombigbee Waterway. Method of introduction of Asiatic clam currently unknown. Privet and Cogon Grass were introduced horticulturally and escaped to the wild.
Location:	Buttahatchee River and tributaries for Zebra mussel and Asiatic clam, plants throughout watershed
Extent:	Asiatic clam and privet occurs throughout watershed. Zebra mussels and cogon grass are not known to be present in watershed.
Concern:	Head cutting/accelerated erosion
Causes:	Gravel mining, modifications of river channel
Location:	Buttahatchee River near Highway 45 bridge
Extent:	One reach downstream of bridge to half a mile upstream of bridge

3.0 WATERSHED IMPLEMENTATION PLAN

3.1 Scope

This Watershed Implementation Plan covers only the portion of the watershed that is in Mississippi. All references to the Buttahatchee River Watershed or Basin in this document refer to that portion of the watershed that is in Mississippi. Alabama Department of Enviornmental Management (ADEM) is also managing water quality through a basin management program and will develop a Watershed Implementation Plan for the Buttahatchee River Basin in Alabama in the future. Both plans will incorporate interstate cooperation in dealing with Buttahatchee River Basin issues.

3.2 Goals

The underlying principle of this watershed implementation plan (and the Basin Management Program itself) is adaptive management. The goals and objectives of this plan reflect this principle. The overall goal for this watershed implementation plan is to restore the quality of this watershed. Goals related to other existing or potential issues in this watershed will be included in future implementation plans for this watershed.

This watershed implementation plan has the following goals:

- Reduce the fecal coliform load to the listed water body so it will achieve the state's secondary contact recreation fecal coliform water quality standard within five years.
- Maintain existing populations of threatened and endangered native mussel species in the watershed (i.e. no net decrease in population),
- Prevent loss of good quality habitat for threatened and endangered mussel species and their host fish species,
- Improve the quality of marginal or poor quality habitat for threatened and endangered mussel species and their host species, and

The following actions will need to be taken to meet these goals:

- Develop interstate stream alliance,

- Reduce fecal coliform loads to streams,
  - Reduce livestock access to streams
  - Locate failing septic systems
  - Fix failing septic systems
- Reduce sediment loads to streams,
  - Reduce livestock access to streams
  - Agricultural BMPs
  - Inventory silviculture BMPs
  - Geomorphological assessment
- Reduce nutrient loads to streams,
  - Reduce livestock access to streams
  - Agricultural BMPs
  - Inventory silviculture BMPs
- Manage point source discharges, and
- Research threatened and endangered species.

3.3 Management Actions

Below are detailed descriptions of management actions planned for the next basin management cycle. Note that the values shown for load reductions, number of management practices to be installed, and costs are planning estimates and subject to change.

3.3.1 Develop Interstate Stream Alliance

3.3.1.1 Objectives

As part of a project to develop and implement a comprehensive conservation plan for the Buttahatchee River Watershed (Appendix F), The Nature Conservancy will work to build an active coalition of partners and stakeholders in the entire watershed (Mississippi and Alabama). The presence and actions of an engaged group of local stakeholders is necessary for sustainable and effective conservation. The objectives of this effort are:

- Incorporate Mississippi and Alabama stakeholders into conservation planning and implementation.
- Facilitate the development of a coalition of partners and stakeholders at the community level for participation in conservation planning and implementation, and sustained, long term conservation.

3.3.1.2 Activities

The Nature Conservancy will use the following activities to establish an interstate coalition of conservation partners in the Buttahatchee River Watershed.

- Identify and categorize major landowners along Buttahatchee River and its major tributaries and organize this information into a database with contact information.
- Identify stakeholders and potential partners in conservation.
- Contact potential partners and asses interest and common goals in conservation, and potential for partnership.
- Work with public agencies to review their priorities for funding of conservation actions.
- Conduct two initial stakeholder/partner meetings within watershed to establish a working coalition and solicit input and participation toward meeting educational, conservation planning, and implementation goals.
- Host two additional stakeholders/partner meetings within watershed to establish interstate collaboration strategies.

3.3.1.3 Schedule

Identification of and contact with Buttahatchee River Watershed landowners, stakeholders and partners will take place during the first year of The Nature Conservancy project. The two initial stakeholder meetings will also be conducted during the first year of the project. During the second year of the project community input will be gathered through surveys and meetings, and two stakeholder/partner meetings will be held. The Nature Conservancy will continue to facilitate interstate collaboration as needed during the third year of the project.

3.3.1.4 Budget

The cost for activities related to development of the Buttahatchee River interstate stream alliance to be undertaken by The Nature Conservancy is included in the budget for the Section 319 funded project (see Appendix F). Separate cost information for these activities was not provided.

3.3.2 Reduce Livestock Access to Streams

3.3.2.1 Objectives

The MDEQ Fecal Coliform TMDL specified that livestock access to streams should be reduced by 85% in Mississippi (MDEQ 1999). This is expected to result in the following reductions of pollutant loads:

- Approximately 1.14E10 to 1.83E10 counts/hour fecal coliforms,
- Approximately 30 tons/year of suspended solids,
- Approximately 0.5 to 2.5 tons/year of total nitrogen, and
- Approximately 1.0 ton/year of total phosphorus.

Note that the same reductions in livestock access to streams were suggested for the Alabama portion of the watershed in the TMDL. Implementation of these reductions in Alabama is currently beyond the scope of this watershed implementation plan.

3.3.2.2 Activities

The procedure recommended in the TMDL for reducing livestock access to streams was stream fencing. Recommended procedure for stream fencing is to use a single or double strand of high-tensile electric fence. Alternate water sources for livestock usually have to be developed once livestock are excluded from pasture streams. It may also be necessary to restore riparian vegetation after livestock have been excluded from pasture streams. Therefore, potential practices include:

- Approximately 13,800 feet of stream fencing in pastures where livestock have stream access (TVA 2000) over next three years,

- Approximately 20 alternate water source units over next three years for livestock fenced out of streams, and
- Approximately 13,800 feet by 20 feet of riparian vegetation restoration along fenced streams over next three years.

The Mississippi Soil and Water Conservation Districts for Monroe and Lowndes Counties, Mississippi State University Cooperative Extension Service, USDA Farm Services Agency, The Nature Conservancy, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative are potential sources of technical assistance related to these practices. Natural Resources Conservation Service, and Soil and Water Conservation Districts will bear primary responsibility for getting these measures installed. Ultimate responsibility for ensuring installation of these measures rests with MDEQ under MS Code Ann. 49-17-29(a)(2).

Priority areas for these practices are the beef cattle and horse sites identified adjacent to streams in the TVA nonpoint source survey (see Figures 3.1 and 3.2) (TVA 2000).

3.3.2.3 Schedule

Stream fencing and alternate livestock water source projects will be installed during the period 2004 through 2007. Approximately 4,600 feet of stream will be fenced and riparian vegetation restored as needed each year, and 7 alternate water sources developed for livestock.

3.3.2.4 Cost

Projected costs for installation of stream fencing, restoration of riparian vegetation, and development of livestock water sources are listed in Table 3.2. Potential sources of funding assistance to landowners for these activities include programs of the Mississippi Soil and Water Conservation Districts for Monroe and Lowndes Counties, Natural Resources Conservation Service, USDA Farm Services Agency, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative.

Table 3.2. Projected Costs of Activities Funded Through Programs Other Than 319.

Activity	Unit cost*	Number of units	Total cost
Stream fencing	$3,700 - $5,800/mi	13,800 feet	$9,670 - $15,159
Develop livestock water source	$1,000 - $1,5000 /unit	20 units	$20,000 - $30,000
Restore riparian vegetation	$200 - $300 /acre	13,800 ft x 20 ft	$1,267 - $1,900
TOTAL			$30,937 - $47,059

*Alabama costs from Table B-11, Freedman et al. 2003

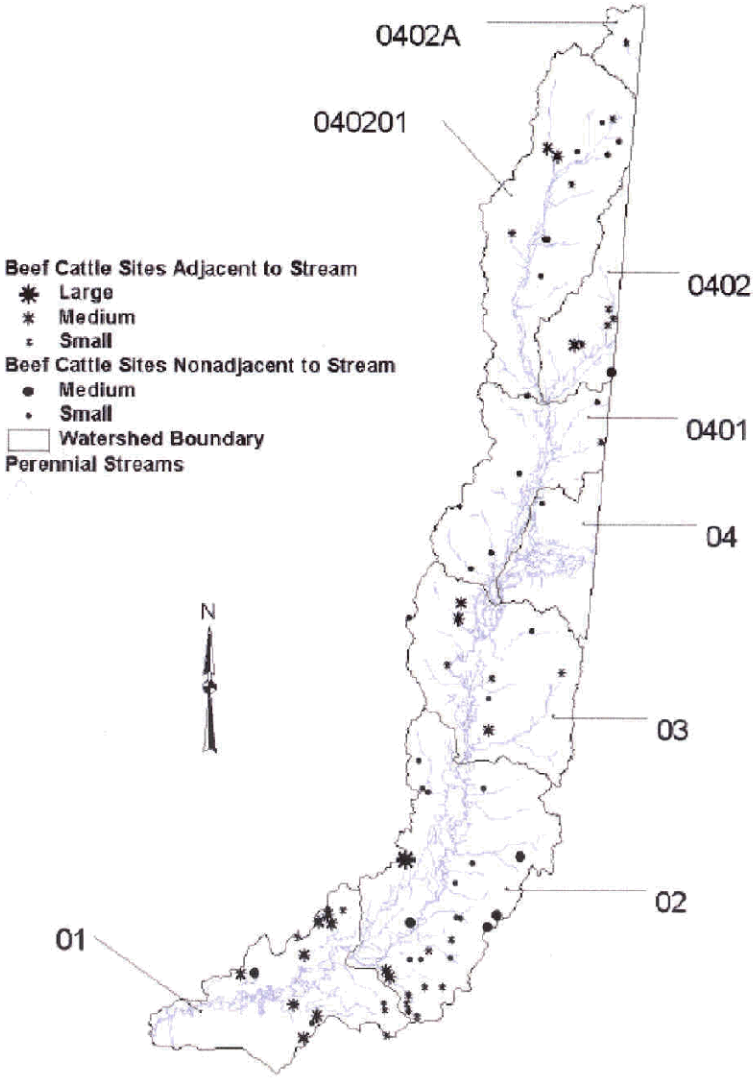

Figure 3.1. Location of Cattle Sites in Buttahatchee River Watershed (TVA 2000).

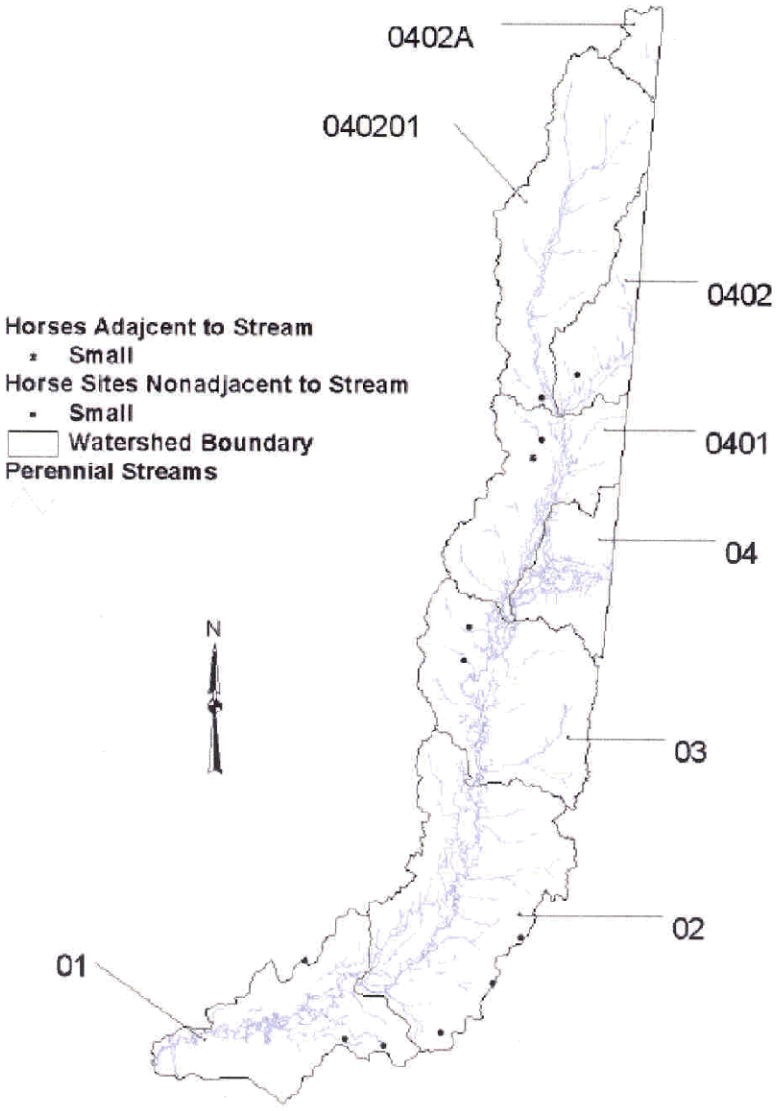

Figure 3.2. Location of Horse Sites in Buttahatchee River Watershed (TVA 2000).

3.3.3 Locate Failing Septic Systems

3.3.3.1 Objectives

The overall objective of this project is the development of GIS layers of the basin management areas statewide to locate nonpoint pollution sources, e.g. individual onsite wastewater systems (IOWS). Specific objectives associated with this action are outlined below.

- Create GIS layers(s) with delineated polygons encompassing all unsewered communities or significant clusters of unsewered dwellings/businesses in the state; compare with PSC maps for percent coverage of the state.
- Create GIS layer(s) showing 90% of existing IOWS, recreational vehicle campgrounds, and food facilities using IOWS and/or having NPDES permits.
- Map 90% of new IOWS
- Provide data analysis to include estimated percent failure rates for IOWS and comparison of GIS layers for IOWS with NRCS soil maps.
- Make recommendations for corrections to enhance surface water quality in the basin management areas.

3.3.3.2 Activities

The Mississippi State Department of Health will use GPS units to identify locations of individual onsite wastewater systems (septic systems), and unsewered areas within Lowndes and Monroe Counties. These locations will then be mapped to a GIS layer. Locations of onsite wastewater systems visited by county personnel for the purpose of permit approval or re-approval, or investigation of complaints will be identified and mapped. Approximately 19,000 locations will be identified statewide and mapped over a one-year period.

3.3.3.3 Schedule

The initiation of the project to map onsite wastewater disposal units will take approximately 12 months, from April 2004 to April 2005.

- Two months are scheduled for purchasing hand held computing devices, GPS units, and their associated software and training personnel in Health Department districts in their use

- The use of GPS units in the field in six districts, and development of maps of unsewered communities is scheduled to begin during the first month.
- All nine districts area scheduled to be using the GPS units in the field within two months.
- Creation of GIS map layers is scheduled to begin in the second month.
- Nine months are scheduled for collection of GPS location data and information about the status of onsite wastewater systems, identification of unsewered areas and onsite wastewater systems located in soils unsuitable for onsite wastewater systems, and making recommendations for corrections to enhance surface water quality in the watershed. During this nine-month period the collected information will be continually added to the developed GIS map layers.
- The GIS map layers will be provided to MDEQ at the end of the 12 month period.

3.3.3.4 Budget

The budget for mapping onsite wastewater systems is shown in Table 3.3 The budget shown is for performing these activities for the whole of Basin Group I.

Table 3.3. Budget for Developing GIS Maps of Onsite Wastewater Systems in Basin Group I.

Category	319 Funds	State Funds	Total
Personnel (15 PHEs)	$0	$70,000	$70,000
Travel	$25,000	$0	$25,000
Equipment	$37,400	$0	$37,400
1 Plotter	$10,000	$0	$10,000
23 PDAs	$4,900	$0	$4,900
15 Computers	$15,000	$0	$15,000
15 Printers	$7,500	$0	$7,500
Commodities (20 GPS's)	$3,000	$0	$3,000
Contractual (ArcView, 2 data collectors, software, contract administration)	$65,100	$0	$65,100
Total	$130,500	$70,000	$200,500

3.3.4 Fix Failing Septic Systems

3.3.4.1 Objectives

The MDEQ Fecal Coliform TMDL specified that the number of malfunctioning on-site waste water treatment units/septic systems in Mississippi be reduced by 50% (MDEQ 1999). This would result in a reduction of approximately 3.16E8 counts/hour of fecal coliforms.

3.3.4.2 Activities

Approximately 144 suspected failing septic systems were identified from aerial photographs by TVA (2000). The condition of these septic systems, (Figure 3.3) wil be verified by Mississippi State Department of Health county personnel. Approximately half of the confirmed failing septic systems will be fixed over the next three years. If all of the suspect septic systems are actually failing, approximately 72 septic systems will be fixed. The Mississippi State Department of Health can provide technical assistance related to fixing failing septic systems, and has primary responsibility for ensuring failing septic systems are fixed.

3.3.4.3 Schedule

The condition of suspected failing septic systems identified by TVA (2000) will be verified during the next year (see Section 3.3.3). Failing septic systems will be fixed during the period 2004 through 2007. Depending on the number of suspect septic systems that are failing, up to approximately 24 failing systems will be fixed each year for the next three years.

3.3.4.4 Budget

Projected costs for repair of failing onsite wastewater systems are listed in Table 3.4. Potential sources of funding assistance to homeowners for these activities include programs of the Mississippi Soil and Water Conservation Districts for Monroe and Lowndes Counties, Natural Resources Conservation Service, MDEQ, USDA Farm Services Agency, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative.

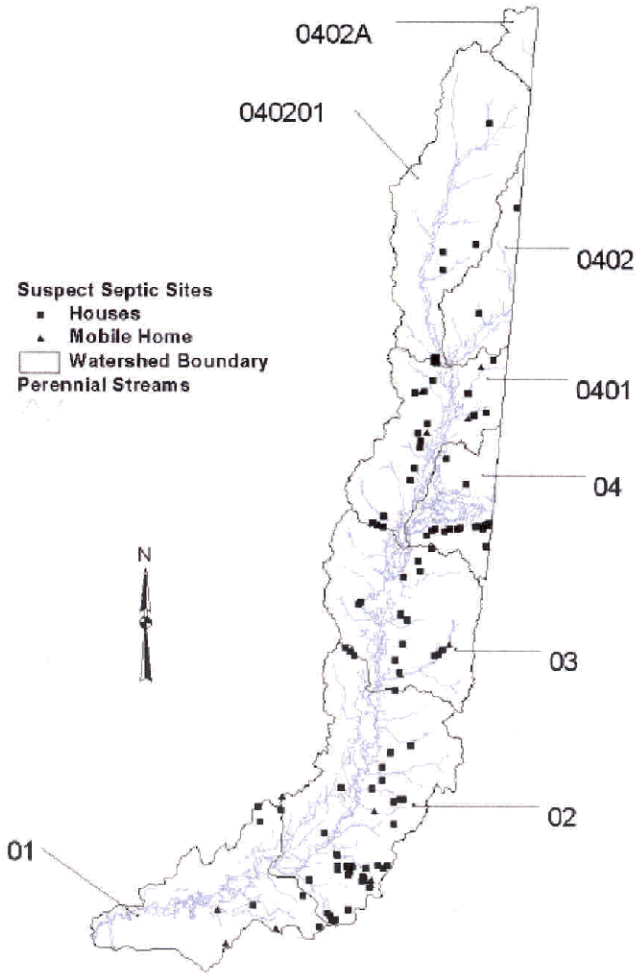

Figure 3.3 Locations of Suspected Failing Septic Systems in Buttahatchee River Watershed (TVA 2000).

Table 3.4 Projected Costs of Activities

Activity	Unit cost*	Number of units	Total cost
Fix failing onsite wastewater systems	$3,300	72 systems	$237,600

*Avg on previous 319 project (Eugene Herring, MSDH).

3.3.5 Agricultural BMPs

3.3.5.1 Objectives

Croplands and pasture were identified as potentially significant sources of sediment and nutrients in Buttahatchee River Watershed (TVA 2000). Installation of agricultural BMPs has the potential to result in the following reductions of pollutant loads:

- Up to approximately 4,000 tons/year of suspended solids load,
- Up to approximately 3 tons/year total nitrogen load, and
- Up to approximately 1.5 tons/year total phosphorus load.

3.3.5.2 Activities

The Mississippi Soil and Waster Conservation Commission will implement a Section 319 nonpoint source pollution project in Buttahatchee River Watershed during the period 2004 through 2007 (see Appendix F). As part of this project the Mississippi Soil and Water Conservation Commission will utilize existing assessment data for the watershed to determine target areas where stressors are causing the greatest damage, and application of BMPs will yield a beneficial reduction in pollutant loadings. Potential target areas include croplands with low residue, and heavily overgrazed pastures, located on Figure 3.4. Potential BMPs to be installed in the watershed include but are not limited to:

- 50 acres of critical area planting,
- 11 grade stabilization structures,
- 900 acres of pasture and hayland planting,
- 2 water and sediment control basins,
- 1,040 acres of nutrient management/grazing land improvement,
- 3,500 acres of pest management,
- 10 livestock watering ponds,

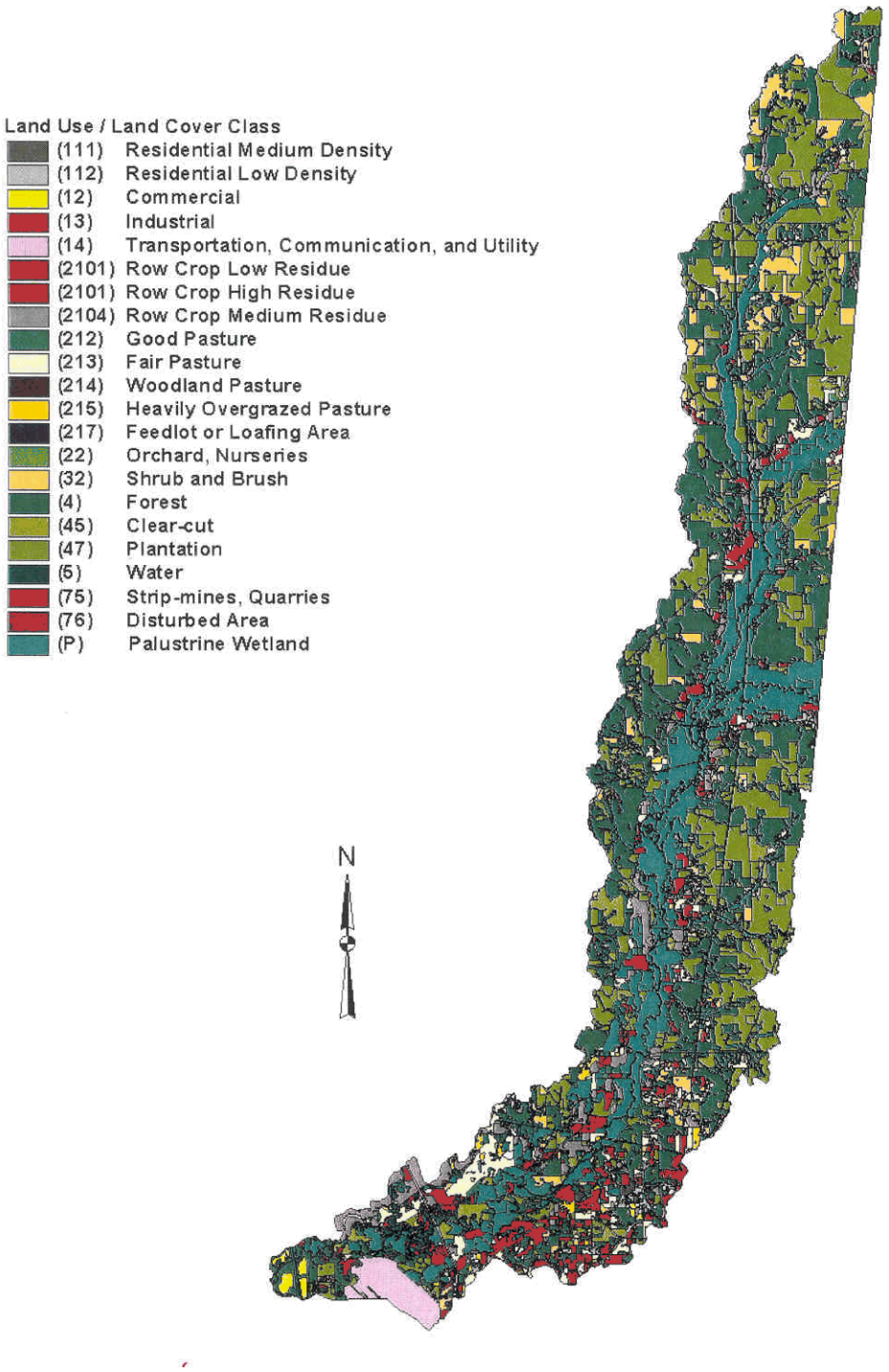

Figure 3.4. Distribution of Land Use/Land Cover for the Buttahatchee Watershed.

- 10 watering troughs or tanks,
- 27,400 feet of fencing,
- 8 stream crossings,
- 2 winter feed stations,
- 1 waste treatment lagoon,
- 1 waste storage facility,
- 500 acres of chiseling and subsoiling,
- 2,000 ft of diversions,
- 10 acres of field borders,
- 25 acres of heavy use area protection,
- 1,000 acres of prescribed grazing, and
- 101 acres of pest management.

The Mississippi Soil and Water Conservation Districts for Monroe and Lowndes Counties, Mississippi State University Cooperative Extension Service, USDA Farm Services Agency, Natural Resources Conservation Service, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative are potential sources of technical assistance related to these practices. Natural Resources Conservation Service, and Soil and Water Conservation Districts will bear primary responsibility for getting these measures installed. Ultimate responsibility for ensuring installation of these measures rests with MDEQ under MS Code Ann. 49-17-29(a)(2).

3.3.5.3 Schedule

One grade stabilization structure, 40 acres of nutrient management, and 101 acres of pest management are scheduled to be installed in the watershed starting in 2004, under the EQIP program.

The Mississippi Soil and Water Conservation Districts of Lowndes and Monroe Counties will work over the next three years to inform potential participants in the watershed about needed BMPs, secure commitments from landowners and operators willing to install BMPs, and assist these participants in developing conservation plans and implementing BMPs. The first meeting to inform potential participants is scheduled for about June 2004. Commitments will be secured during June and July 2004. Conservation planning and BMP installation is scheduled to begin about July or August 2004. All conservation plans will be completed within two to three years.

3.3.5.4 Budget

Projected costs for installation of the BMPs listed in Section 3.3.5.2 are shown in Table 3.5. Potential sources of funding assistance to landowners for these activities include programs of the Mississippi Soil and Water Conservation Districts for Monroe and Lowndes Counties, Natural Resources Conservation Service, USDA Farm Services Agency, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative.

Table 3.5 Projected Costs of Agricultural BMPs.

Activity	Unit cost*	Number of units	Total cost
Crtical area planting	$200/acre	50 acres	$10,000
Grade stabilization structures	$1,500/structure	10 structures	$15,000
Pasture & hayland planting	$100/acre	900 acres	$90,000
Water & Sediment control basins	$2,500/basin	2 basins	$5,000
Nutrient management/grazing land improvement	$84/acre	1000 acres	$84,000
Pest management	$6/acre	3500 acres	$21,000
Livestock watering ponds	$2,500/pond	10 ponds	$25,000
Watering troughs or tanks	$2,000/tank	10 tanks	$20,000
Fencing	$0.80/foot	27400 feet	$21,920
Stream crossings	$3,000/crossing	8 crossings	$24,000
Winter feed stations	$12,000/station	2 stations	$24,000
Waste treatment lagoon	$1,000/lagoon	1 lagoons	$1,000
Waste storage facility	$1,000/facility	1 facilities	$1,000
Chiseling and subsoiling	$10/acre	500 acres	$5,000
Diversion	$1.66/ft	2000 ft	$3,320
Field Borders	$176/acre	10 acres	$1,760
Heavy use area protection	$2,000/acre	25 acres	$50,000
Prescribed grazing (incentive payment)	$11/acre	1,000 acres	$11,000
Total			$413,000

* Mark Gilbert, MSWCC

The Mississippi Soil and Water Conservation Commission has budgeted approximately $478,000 for implementation of BMPs in the watershed through its Buttahatchee River Watershed Nonpoint Source Pollution Project. Of this amount, $286,800 will come from 319 funds, $10,000 will be provided by Mississippi Soil and Water Conservation Commission's Lowndes and Monroe County Districts through in-kind contributions, and $181,200 will be provided by landowners and operators participating in the project.

3.3.6 Inventory Silviculture BMPs

3.3.6.1 Objectives

The objective of this project is to evaluate the use of voluntary silviculture best management practices (BMPs) in the Big Black, Tombigbee and Tennessee River Basins.

3.3.6.2 Activities

The Mississippi Forestry Commission, in cooperation with the Mississippi Forestry Association, Mississippi Automated Resource Information System, and Southern Group of Foresters, will inventory silviculture best management practices in the Buttahatchee River Watershed. Mississippi Forestry Commission personnel will determine a set of sites harvested within 24 months to be evaluated, based primariy on aerial surveys of the watershed provided by the Mississippi Automated Resource Information System. The number of sites to be evaluated will be statistically determined. Mississippi Forestry Commission water quality team personnel will visit the selected sties and evaluate them with regard to use of silviculture BMPs and the effectiveness of the BMPs in use. Results of these evaluations will be tabulated and summarized in a report that will be prepared by the Mississippi Forestry Commission, a copy of which will be provided to MDEQ. Mississippi Forestry Association and Southern Group of Foresters will assist with determining if silviculture activities pose a significant water quality threat, and developing suggestions for alleviating any threats identifed. The Mississippi Forestry Commission will notify landowners of identifed water quality threats from silviculture activities. Mississippi State University Extension Service will assist with any education and training needed to reduce any water quality threats identified.

3.3.6.3 Schedule

The assessment of silvilculture BMPs by the Mississippi Forestry Commission will take approximately 18 months, from April 2004 to October 2005.

- Six months are scheduled for determining the number of sites to evaluate, perform the aerial survey, and identify the specific sites to be evaluated.

- Three months are scheduled for ground-truthing of the sites selected from the aerial survey.
- Three months are scheduled for visiting the sites to evaluate BMPs. Three months are scheduled for analysis of the results of the evaluations. This will include statistical analysis, evaluation of water quality risks identified, and determination of what is needed to reduce the identified water quality risks.
- Three months are scheduled to prepare the final report of the evaluation. During this three month period landowners will be informed of any water quality risks identified on their properties and provided with recommendations for reducing the identified risks.

3.3.6.4 Budget

The budget for the silviculture BMP evaluation is shown in Table 3.6. The budget shown is for performing these activities for the whole of Basin Group I.

Table 3.6 Budget for Evaluation of Silviculture BMPs in Basin Group I.

Category	319 Funds	MS Forestry Commission Funds	Total
Personnel (salary + fringe benefits)	$48,864	$32,576	$81,440
Travel	$4,000	$0	$4,000
Equipment	$0	$0	$0
Supplies	$1,500	$0	$1,500
Contractual (includes MARIS fee)	$2,000	$0	$2,000
Other (aircraft cost, database construction)	$6,500	$0	$6,500
Indirect Charges	$0	$0	$0
Total	$62,864	$32,576	$95,440

3.3.7 Geomorphological Assessment

3.3.7.1 Objectives

The objective of this assessment is to determine the relative stability of selected stream reaches in the Buttahatchee River system, relative to a desired state of stability. Stream stability affects erosion and sedimentation, which in turn affects aquatic biota, including mussels. This

assessment will provide insight into causes of erosion and sedimentation in portions of the system, and how to deal with this issue.

3.3.7.2 Activities

The Nature Conservancy will conduct this assessment as part of its three year Section 319 funded project in the Buttahatchee River Watershed. This action will consist of an assessment of current and historical hydrological and geomorphological status and trends of the main stem of the Buttahatchee River, and its major tributaries. The assessment will include the following activities:

- Evaluation of existing remotely sensed (GIS) hydrological and morphological data.
- Field collection of the following geomorphological data:
  - Evaluation of relative stability of stream channel for six to 20 channel widths centered on each site.
  - Identification of stage of channel evolution.
  - Collection of bed material samples.
  - Survey of channel slope, and bankfull discharge elevation
- Identification of data gaps and needs and their importance to the development of a comprehensive watershed conservation area plan.
- Recommendation of strategies to obtain needed data.

3.3.7.3 Schedule

These activities will take place during the first year of the project.

3.3.7.4 Budget

The costs for these activities are included in The Nature Conservancy's overall budget for their Section 319 project in the Buttahatchee River Watershed (see Appendix F). Specific cost information for this action was not available.

3.3.8 Manage Point Source Discharges

3.3.8.1 Objectives

Populations of the threatened and endangered mussel species occuring in the Buttahatchee River and other watersheds have been adversely affected by both point and nonpoint source pollution (sediment, nutrients, toxics) as land use has changed in those watersheds. Therefore, managing point source pollution protects the threatened and endangered mussel species in the Buttahatchee River Watershed. The populations of threatened and endangered mussel species present in Buttahatchee River Watershed are isolated from populations in other watersheds by the impoundment of the Tombigbee River. Being cut off from colonization from other watersheds makes the populations in the Buttahatchee River Watershed less resilient to losses and therefore more vulnerable. This makes it important to utilize any and all measures available to protect and improve water quality, which in turn protects the threatened and endangered mussel populations.

3.3.8.2 Activities

Management of point sources of pollution will occur through the Mississippi NPDES and National Toxics Inventory programs. MDEQ is responsible for managing these programs. Detailed information about these programs is available elsewhere and is not included in this watershed implementation plan. The majority of point sources occur in the lower part of the watershed, downstream of Bartahatchie Road bridge.

3.3.9 Research Threatened and Endangered Species

3.3.9.1 Objectives

The biology and ecology of the threatened and endangered mussel species in Buttahatchee River Watershed are poorly known. Information on habitat requirements, life stage sensitivity to contaminants, and mussel host fish species is necessary for successful recovery and protection of listed species. In addition, research into artificial propagation methods provides the potential for restoring lost populations. The following US Fish and Wildlife research objectives

for threatened and endangered mussel species in the Mobile River Basin are applicable in Buttahatchee River Watershed (USFWS 2002).

- Gather information on life history and contaminant sensitivity of endemic species.
- Develop technology for maintaining and propagating endemic species in captivity.
- Reintroduce endemic species into restored habitats as appropriate.

3.3.9.2 Activities

The US Fish and Wildlife Recovery Plan for Mobile River Basin Aquatic Ecosystem outlines the following research activities related to recovery of threatened and endangered species in the basin, which includes the Buttahatchee River Watershed.

- Detailed physical and molecular genetic analysis of endemic species.
- Determine pollution sensitivity of the different life stages of endemic species.
- Identify breeding periods, mussel reproduction strategies, and mussel host fish.
- Determine nutritional requirements of different life stages of endemic species.
- Develop technology for maintaining and propagating endemic species in captivity for reintroduction to the wild.
- Buttahatchee River Watershed has been identified as a candidate for augmentation of mussel populations using mussels bred in captivity (Hartfield 2003).

Research activities in the Mobile River Basin are performed by many different agencies, and institutions. Currently, propagation studies are planned using Southern Combshell mussels collected from the Buttahatchee River Watershed. This research is being performed by the Tennessee Aquarium Research Institute (Paul Hartfield, US Fish and Wildlife).

3.3.9.3 Schedule

Collection of Southern Combshell mussels for propagation studies by the Tennessee Aquarium Research Institute will take place in 2004.

3.3.9.4 Budget

We did not obtain budget information for the Tennessee Aquarium Research Institute project. Potential funding sources for mussel research include US EPA, US Department of Agriculture, US Fish and Wildlife, US Geological Survey, and US Army Corps of Engineers, along with various institutions and foundations.

4.0 EDUCATION STRATEGY

4.1 Objectives

The overall objective of community education in the Buttahatchee River Watershed is to develop an atmosphere that promotes sustained, long-term protection and improvement of aquatic resources in the watershed. Specific objectives of education efforts in the watershed include the following.

- Increase public awareness of the ecological significance of Buttahatchee River Watershed and the associated flora and fauna.
- Increase public awareness of the habitat needs of critical flora and fauna.
- Increase public awareness of the value of clean water.
- Increase public awareness of how common activities affect water quality and critical flora and fauna.
- Increase public awareness of how BMPs can be used to reduce negative water quality and habitat affects.
- Reduce private land use/endangered species conflicts.
- Increase public awareness of the long term environmental and economic advantages of protecting and improving water quality and habitat in the Buttahatchee River Watershed.

4.2 Activities

4.2.1 The Nature Conservancy

Education and outreach are objectives of The Nature Conservancy project to develop and implement a comprehensive conservation plan for Butthatchee River Watershed. This task will involve increasing public awareness of the ecological significance of the Buttahatchee River Watershed and its associated riverine flora and fauna, habitat needs, the value of clean water, acitivities impacting water quality, and the use of BMPs to reduce negative water quality impacts. In addition, it will involve conducting community outreach meetings, surveys, presentations, and volunteer events. Specific education and outreach activities planned by The Nature Conservancy during this three year project include:

- Organize and conduct four public community meetings to be placed strategically across the watershed to attempt to provide an opportunity for all citizens in the watershed to attend at least one. The objective of the meetings will be: 1) to inform the public of the on-going conservation efforts and the ecological significance of the Buttahatchee River, 2) empahsize the importance of community based conservation, 3) allow for the public to express any concerns and ideas for the project, and 4) provide the opportunity for public engagement in the project.
- Conduct surveys of meeting attendees at the above four community meetings that will assess public issues and concerns involving environmental, social, economic development, and public health issues within the watershed.
- Conduct a minimum of two community and stakeholder field trips along the Buttahatchee River or its tributaries to view and discuss water quality issues, ecological values, potential conservation targets, and conservation strategies.
- Prepare semi-annual press releases for area media focusing on the Buttahatchee River, its ecological and natural resource value, water quality issues, and conservation activities within the watershed.
- Conduct four presentations to civic organizations, professional groups, schools, and others focusing on the Buttahatchee River, its ecological and natural resource value, water quality issues, and conservation acitivites within the watershed.

4.2.2 Mississippi State University Cooperative Extension Service

The Mississippi State University Cooperative Extension Service will be initiating the Medallion Farmer Program in Lowndes and Monroe Counties during 2004. The Mississippi Medallion Farmer Program is a voluntary effort aimed at helping Mississippi farmers proactively address agriculturally related environmental issues. The program is a multi-agency effort to help farmers promote environmental stewardship through voluntary, effective and economically achievable best management practices.

The program is designed to help farmers demonstrate that they can reduce the potential impact of agricultural practices on environmental quality in Mississippi by using best management practices. The program includes education programs in environmental stewardship, agricultural production and farm management. By participating in the voluntary program,

farmers will receive commodity-specific information on best management practices and their implementation. Model farms also will demonstrate how these best management practices can reduce the potential impact of agriculture production on environmental resources (http://msucares.com/environmental/medallion/index.html, 2/23/04).

Other educational and outreach activities include newsletters, bulletins, information sheets, research reports, a website (msucares.com), conferences, workshops, seminars, environmental quality programs, and fish and wildlife programs. These activities are performed primarily by county extension agents.

4.2.3 Natural Resources Conservation Service

The Natural Resources Conservation Service in Mississippi provides technical resources and education through a number of conservation programs, the Natural Resource Inventory, public service announcements, technical resources, and their website (http://www.ms.nrcs.usda.gov). Information on some of these programs and resources is provided below. Additional information is available on the Mississippi NRCS website or by contacting NRCS or county USDA Service Centers. Education and outreach activities are performed primarily by county conservationists.

4.2.3.1 Conservation Programs

The Natural Resources Conservation Service assists in implementing a number of conservation programs in Mississippi. These programs provide technical and/or financial assistance to landowners for conservation of particular land uses and restoration of natural habitats. A list of these programs is provided below.

- Agricultural Management Assistance
- Conservation of Private Grazing Lands
- Conservation Security Program
- Conservation Technical Assistance
- Emergency Watershed Protection
- Environmental Quality Incentives Program (EQIP)
- Farm and Ranch Lands Protection Program
- Forestry Incentives Program

- Grassland Reserve Program
- Grazing Lands Conservation Initiative
- Resource Conservation and Development
- Rural Abandoned Mine Program
- Soil Survey Programs
- Soil and Water Conservation Assistance
- Snow Survey and Water Supply Forecasting
- Watershed Protection and Flood Prevention
- Watershed Rehabilitation
- Wetlands Reserve Program
- Wildlife Habitat Incentives Program

NRCS also assists in the Conservation Reserve Program (CRP) managed by Farm Service Agency, and the Stewardship Incentive Program managed by Forest Service. Information about these programs is available on the website, or by contacting the Lowndes or Monroe County USDA Service Centers.

4.2.3.2 Technical Resource Documents

Technical resource documents are available on a wide variety of subjects. These documents can be obtained through the website, or by contacting the Lowndes or Monroe County USDA Service Centers. Technical resource documents are available for the following subject areas:

- Agronomy, wind and water erosion,
- Air quality,
- Conservation practice standards,
- Cultural resources,
- Economics resources,
- Engineering tools and resources,
- Environmental compliance,
- Farmland information center,
- Forestry and agroforestry,
- Invasive species,
- Natural resource data and analysis,
- Nutrient management,
- Pest management,

- Plants,
- Range and pasture,
- Soils,
- Streams,
- Understanding ecosystems,
- Water resources, and
- Wildlife biology.

4.2.3.3 Technical Tools and Models

Technical tools and models are available through the NRCS. These tools are available on the website, or by contacting the Lowndes or Monroe County USDA Service Centers. The available tools and models include:

- Animal waste management software,
- Computer tools for conservation decision making,
- Engineering documents and tools,
- Irrigation and water management tools,
- Manure Master decision support system,
- Pest management,
- Interactive web tool for selecting and sizing buffer practices for the Conservation Buffer Initiative,
- SITES water resources site analysis program,
- Soil Data Viewer,
- Soil quality test kits,
- STATSGO soils browser,
- TR-55, urban hydrology for small watersheds, and
- The web based VegSpec program.

4.2.3.4 Conservation Education Resources

The NRCS is also involved in a number of conservation education efforts. Most of these programs are geared toward children in kindergarten through 12th grade. Information on these programs and how to obtain educational materials is available on the website at http://www.nrcs.usda.gov/feature/education/. Included are materials about soil science education, backyard conservation, conservation history, and living in harmony with wetlands. An

interactive educational program "S.K. Worm Teaches Soils" is available on the website at http://www.nrcs.usda.gov/feature/education/squirm/skworm.html .

4.2.4 Mississippi Soil and Water Conservation Commission

Education and outreach are elements of the Mississippi Soil and Water Conservation Commission's Butthatchee River Watershed Nonpoint Source Pollution Project. Specific education and outreach activities planned as part of this project include:

- Establish at least two demonstration farms to inform the public about BMPs,
- Conduct at least two field days/tours,
- Prepare and distribute at least 1,000 fact sheets highlighting the benefits derived from the BMPs installed as part of the project,
- Publish at least four articles about the project in newsletters and local newspapers,
- Erect at least 20 project roadside signs that designate where water quality management practices are in porgress or have been completed.

The Mississippi Soil and Water Conservation Commission (MSWCC) maintains a number of educational programs and materials. Detailed information is provided below. In addition to these programs, the Soil and Water Conservation Commission and county districts also maintain websites for the purpose of providing information and outreach (www.mswcc.state.ms.us). Education and outreach activities are performed primarily by conservation districts.

4.2.4.1 Educational Videos

Five educational videos have been produced for adults.

- Conservation Tillage
- Native Mississippi Wildflowers
- Scenic Rivers
- Urban Nonpoint Source Pollution: A Citizen's Guide
- Our Little River

These videos can be obtained from local Soil and Water Conservation District (SWCD) offices or from the MSWCC.

4.2.4.2 Models

Working models of an aquifer, farm, urban area, and watershed are available. These models can be used to demonstrate pollution problems, and conservation practices. The models can be obtained from local SWCD offices or from the MSWCC.

4.2.4.3 Activity Booklets

Three activity booklets have been developed for education of children. Two of the booklets are appropriate for ages pre-kindergarten through three years; "Sammy Soil" teaches the basics of soil and water conservation, and "Wendy Water" teaches basic water conservation. One booklet can be used for ages pre-kindergarten through junior high school; "Earthworms, Recycling and Composting in the Classroom". These booklets can be obtained from local SWCD offices or from the MSWCC.

4.2.4.4 Newsletters

Three newsletters are published regularly. Current issues are available from MSWCC.

- MSWCC Annual Report
- MACD "Conservation Outlook"
- Envirothon "EnviroUpdate"

4.2.4.5 Awards

An awards program for outstanding conservation teachers at the elementary and secondary levels, and outstanding conservation education program is sponsored. These awards are given yearly and recognized at the annual meeting of the Mississippi Association of Conservation Districts in January. They spotlight the conservation education efforts of individual teachers in local schools who integrate responsible conservation awareness into their everyday classroom curriculum. The Conservation Education Program District Award is presented to the Soil and Water Conservation District that has shown innovative methods of delivering the

conservation message to students as well as adults through a comprehensive education program. Each state winner is nominated for the nation award sponsored by Zeneca and the National Association of Conservation Districts.

4.2.4.6 Carnivals and Field Days

Local SWCDs organize and conduct educational hands-on field days to provide school age students an opportunity to participate in conservation activities in various natural areas. Local and state resource professionals, as well as trained volunteers, conduct the stops and lead or guide the groups in the learning process. The event is often held at local parks or environmental sites, as well as at some schools. The age span varies from kindergarten to eighth grade, depending on the local SWCD. However, fifth grade is the most popular grade attending Carnivals.

4.2.4.7 Conservation Grandparents

This program provides a series of activity sheets and conservation kits for an adult to work with one or more children using everyday materials to teach conservation awareness. Materials are available from SWCD offices or MSWCC. Workshops can be scheduled through Gail Spears at the MSWCC office.

4.2.4.8 Farm Tours

The MSWCC works with a Soil & Water Conservation District and a local landowner to schedule a tour of an installed Best Management Practice (BMP). This also gives those observing the process a hands-on look at the results of using such a conservation practice. Touring these farms along with district personnel and commissioners are other farmers, the general public, local media representatives and local municipal or county officials.

4.2.4.9 Food, Land, and People

FLP is a nonprofit, interdisciplinary, supplementary educational program emphasizing agriculture, the environment, people of the world, and their relationships. This nationwide Pre

K-12 agricultural-environmental education curriculum project provides hundreds of high-quality, objective and easily-integrated curriculum materials. The MSWCC participates and trains teachersand facilitators and is a co-sponsor of this program with USDA/NRCS, MS Farm Bureau, along with other stae and federal agencies and organizations.

4.2.4.10 License Tags for Conservation Education

During the 2000 Legislative Session, the Mississippi Legislature passed the MSWCC's proposal for a distinctive vehicle license tag, with the special tag fee to go into a fund for conservation education. The design on the license plate is a native Mississippi wildflower, the Black-eyed Susan. These tags are available in local county tax collector offices for a $30 fee in addition to your regular license fees.

4.2.4.11 Poster and Essay Contest

A Conservation Education Poster/Essary Contest is held yearly. The poster contest is divided by grade levels, K-1, 2-3, 4-6, 7-9, 10-12. The rules and topic (which is usually the Soil Stewardship topic from NACD) are sent to local districts in the fall with the entries (posters or essays) due in the local SWCD office in the spring. The posters are judged on the local, area and state level with the state winners being entered in the national contest. The essay contest has the same theme but is conducted in grades 7-12 and is only judged on the local, area and state level. The awards on the state level are US Savings Bonds.

4.2.4.12 Teacher Workshops

The Commission conducts teacher workshops on Conservation Education in the Classroom at local schools, state subject area conferences, environmental education conferences, and other educational meetings and summer workshops. These may be in support of the two curriculums MSWCC distributes or developed for the needs of the target audience. In addition, Education Specialists can assist is scheduling workshops for Project Learning Tree and Project Wet. Contact Clay Burns at MSWCC.

4.2.4.13 Envirothon

The Mississippi Envirothon is a hands-on educational competition for students in grades 9-12 who compete as five-member teams. They prepare in the areas of soils, aquatics, forestry, wildlife, and a current environmental issue that changes each year. Students compete at the area level in March to earn the right to compete at the state contest in May. The state champions advance to the international contest, "Canon Envirothon," each summer as Mississippi's representative. The state program is funded by a grant from Chevron Mississippi. Contact Jimmy Booth at MSWCC.

4.2.4.14 Soil and Water Conservation Youth Camp

The Warren A. Hood Soil & Water Conservation Youth Camp is held at Hinds Community College in Raymond the first week of June, starting on Sunday evening and concluding at noon on Thursday. The camp is designed to make learning about conserving our natural resources fun as well as educational. Paricipants from high schools in each SWCD are exposed to all aspects of soil and water conservation including cropland, grassland, woodland, and wildlife. This is achieved through hands-on activities conducted by local and state resource professionals, field trips, and planned recreation. Contact your local SWCD office.

4.2.5 US Fish and Wildlife Service

Public education and outreach activities are included in the Recovery Plan for Mobile River Basin Aquatic Ecosystem. Activities outlined in this plan include:

- Develop and implement programs and materials to educate the public on the need and benefits of ecosystem management, and to involve them in watershed stewardship.
- Encourage and support community based watershed stewardship planning and action.
- Work with State and private partners to promote land and water stewardship awareness.

4.2.6 MDEQ

Nonpoint Source Education/Outreach is a statewide effort that focuses education of the public, students, land managers, road builders, communities, and public officials, on cleaning up and preventing nonpoint source (NPS) pollution in a watershed. One of the primary goals of MDEQ's NPS pollution education program is to create awareness among school age children and adults of where and how polluted runoff is generated. How it affects Mississipians's quality of life, and how practices can be implemented to improve water quality or to maintain a pristine water body. MDEQ reaches the general public with statewide distribution campaigns of NPS literature, the Mississippi Environment newsletter, NPS/water lesson plans to libraries and schools, NPS public service announcement for radio, exhibits at conferences and professional meetings.

Since the inception of the Basin Management Approach to Water Quality in 1998, NPS education activities are being coordinated, as appropriate, with the Implementation Phase activities of each basin group. NPS education activities are described below.

4.2.6.1 Aqua Fair

Aqua Fair is an annual event to educate fifth grade students on water quality. Aqua Fair is presented in a different region of the state each year and reaches an audience of about 2,000 fifth graders, 100 teachers and 250 resource people annually. The students participate in 5 different activities ranging from "building a watershed in a pan" to "running a relay race with buckets of water". Every session is interactive and teaches a concept about water. The spring, 2004 Aqua Fair is scheduled to be held in the Tupelo area at the Lee County Agricultural Center on March 31 – April 1, 2004.

4.2.6.2 Adopt-A-Stream Program

This program involves individual citizens and local community groups in water quality monitoring and protection. Through participation in an educational 2-day workshop, citizens and teachers learn watershed and land use mapping and how to make water quality determinations by conducting water chemistry tests and macroinvertebrate counts on a perennial stream. Some

participants attend for the educational benefits and others commit to monitoring a stream for several years. Co-sponsors of this program include the Mississippi Wildlife Federation, Mississippi Natural Science Museum and Mississippi State University's Coastal Research and Extension Service.

4.2.6.3 Community Growth Readiness (CGR)

CGR is an education program that makes the link between land use and water quality using geographic information systems (GIS) technology. CGR focuses on the role of impervious surfaces in the transport and concentration of pollutants. The core presentation of CGR is divided into three parts. First, GIS images of topography and drainage systems are used to emphasize the water cycle, the watershed concept and the need for watershed management. Second, the land cover/land use data, interspersed with ground and aerial photographs, show local participants the current land use patterns in their town and the common polluted runoff problems associated with each major type of land use. After which, existing land use in critical watersheds is compared with "build-out" scenarios based on the town's zoning regulations. The emphasis is on the potential increases in the amount of impervious surface and how it can reach a problem point where streams will be degraded. Finally, CGR outlines a three-tier strategy of natural resource-based planning, site design and the use of stormwater best management practices that towns can use to address their land use and better plan for future growth while protecting their water resources.

4.2.6.4 Teacher Education

Teacher education is an important component of the NPS pollution education program and a number of lesson plan packages are available for different grades. The *Unclear Future of Clear Creek,* a lesson plan for grades 7-12 is based on Clear Creek in the Big Black River Basin. This lesson Plan package was initially distributed to the County Soil and Water Conservation Districts that placed them in the schools of each of Mississippi's eighty-two counties. The lesson plan package continues to be distributed at teacher workshops and at Adopt-A-Stream workshops. Other educational activities and materials are described below in Table 4.1.

Table 4.1. MDEQ NPS Pollution Educational Activities and Materials.

Educational Activity and Materials	Recommended Audience	Contact Information
Enviroscape & Groundwater Model (Water Model)	5-12 grades	Cooperative Extension Service County Agents & MS Dept. of Health Environmentalists
Storm Drain Marking/Stenciling Project-involves both marking storm drains with an anti-pollution message and a door-to-door awareness campaign in the vicinity of the marked storm drains.	All age groups	MDEQ NPS Pollution Program
The Backyard Conservation Literature Campaign & Demonstration Projects-contains information on how to reduce pesticide usage, how to create a water garden that doubles as a retention basin and how to attract wildlife to your backyard.	Garden clubs, Farmers, and other Individual Landowners	MDEQ NPS Pollution Program
MS Planning & Design Manual for Control of Erosion, Sediment, and Stormwater-contains detailed descriptions of NPS Best Management Practices. An accompanying Field Manual is also available.	Highway Construction Firms, Engineering Firms, Landscape Architects, Homebuilders and Developers	MDEQ NPS Pollution Program

5.0 EVALUATION

5.1 Monitoring

Monitoring activities are planned as part of The Nature Conservancy's Section 319 funded project in the Buttahatchee River Watershed. During the third year of The Nature Conservancy's three year project a long-term monitoring network will be established to measure progress of restoration and conservation efforts in the watershed. It is anticipated that the establishment and implementation of this monitoring network will be performed through coordination with watershed partners. Indicators to be used will be determined through collaboration with partners and based on the evaluation of available data and data collected through the course of the project. Monitoring locations will include historical monitoirng stations, and new fixed monitoring stations determined through collaboration with partners and a probabilistic survey approach. In addition, BMP locations and spatial extents will be tracked using a GIS database.

Those BMPs installed under the Mississippi Soil and Water Conservation Commission Section 319 funded project in the Buttahatchee River watershed will be subject to documentation of pre-installation conditions, and post-installation monitoring. The purpose of the post-installation monitoring is to determine the pollutant load reductions achieved by the installation of the BMPs. During this three year project, the USGS will develop a monitoring plan for this purpose in coordination with the Mississippi Soil and Water Conservation Commission.

MDEQ maintains an ambient water quality monitoring station on Buttahatchee River near the Mississippi-Alabama state line. Biological sampling for determination of the river index of biotic integrity will be conducted at the Buttahatchee River station once a year, and water quality samples will be collected quarterly, (Henry Folmar, MDEQ).

Mussel populations in the Buttahatchee River are routinely monitored by the Mississippi Museum of Natural Science. Every two to three years museum personnel survey mussel populations in the Buttahatchee River near the Caledonia Bridge. During the field visits, shells of dead mussels are collected, and live individuals are classified and counted. Substrate characteristics are also noted. The data collection technique allows for a qualitative

determination of trends in species abundance and substrate change (i.e. evidence of stream channel stability or head-cutting). Surveys are made in the fall, when water levels are usually low. The last survey of the Buttahatchee River site was conducted in the fall of 2003, therefore surveys are planned for fall 2005 and 2007. This program is funded by the museum (Dr. Bob Jones, Mississippi Museum of Natural Science).

The Mississippi Department of Wildlife, Fisheries and Parks conducts fish community composition surveys on Buttahatchee River near the public boat ramps every three to five years. A variety of gear is used to collect fish samples including hoop nets, seines, and electroshock equipment. Sampling takes place during the spring and summer. Buttahatchee River was last surveyed in 2000.

5.2 Assessment of Progress

Agencies responsible for implementing management activities will track implementation and provide annual reports to the Basin Group I Coordinator. Progress will be assessed based on meeting the scheduled management activity milestones outlined in Chapter 3.

During 2007, the Assessment year for Basin Group I under the Basin Management Cycle, progress towards the goals of this watershed implementation plan will be assessed. Water quality and mussel population data, as well as information on activities occuring in the watershed and stakeholder concerns collected during the period from 2003 through 2006 will be utilized. The following criteria will be used to determine progress toward plan goals:

- Achievement of the fecal coliform water quality criteria for Mississippi (see Table 2.2).
- No net reduction in populations of threatened and endangered mussel species.
- Improved condition of populations of threatened and endangered mussel species or no degradation of populations conditions.
- IBI greater than 57.71.
- Achievement of all Mississippi water quality criteria.

Not meeting any one of these criteria warrants investigation of the effectiveness of implementation of management practices, and/or the effectiveness of the management practices themselves.

5.3 Plan Evaluation Procedure

This watershed implementation plan will be evaluated and revised in 2008, the Planning year of the Basin Group I Basin Management Cycle. The evaluation of this plan will be organized by the Buttahatchee River Implementation Team (see Appendix D), beginning in January 2008. At this time the Implementation Team will develop a detailed schedule for review and revision of this watershed implementation plan. The Implementation Team members will be responsible for notifying their stakeholders of the opportunity to propose changes to the watershed implementation plan. One month will be allowed for notification of stakeholders.

The plan will be evaluated by the Team, or their designee, and any interested stakeholders. One month will be allowed for evaluation and submittal of comments. Therefore, comments will be due two months after the evaluation procedure is initiated.

The plan will be evaluated in two ways. First, to determine if the plan goals have been achieved. Second, to determine if it reflects the current condition of the watershed, state of science, and issues in the watershed.

5.4 Plan Revision Procedure

After evaluation, MDEQ will prepare a revised watershed implementation plan incorporating the changes requested by the reviewers. At this point it may be necessary to call a meeting to reconcile any conflicting comments or requests for change.

If the evaluation criteria are all being met in the Buttahatchee River, the watershed implementation plan will be revised to address a different restoration issue or issues, or to protect the quality of the watershed. If the evaluation criteria are not being met, the approach for improving the Buttahatchee River water quality will be revised based on knowledge that has been gained since 2003. The revised watershed implementation plan will be completed in April, one month after the evaluation has been completed.

The draft watershed implementation plan will be submitted to the Implementation Team, and all others who submitted comments. Within two weeks of receiving the draft watershed implementation plan, the Implementation Team will notify their stakeholders of the availability of the revised watershed implementation plan for stakeholder review. One month will be allowed for review of the draft. Comments will be due at the end of this review period.

Within a month after the comments on the draft watershed implementation plan are received, MDEQ will prepare a final watershed implementation plan. The final watershed implementation plan will be submitted to the Implementation Team for review and approval. After the final watershed implementation plan has been approved, the Implementation Team will notify their stakeholders of the completion and availability of the final plan for use as a guide to watershed restoration and protection activities.

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APPENDIX A

Water Quality Data

Table A.1. Summary List of Known Reports that Include Information about the Buttahatchee River.

Report	Summary
Fecal Coliform TMDL for Buttahatchee River, Mississippi, MDEQ Office of Pollution Control, 1999	Cattle in streams and failing septic systems are primary sources 85% reduction of cattle load required 50% reduction of septic system load required Reductions must occur in Mississippi and Alabama
Buttahatchee River Watershed Nonpoint Source Pollution Inventory and Pollutant Load Estimates, TVA, 2000	The two sub basins farthest downstream accounted for majority nonpoint pollutants loads Primary sources TSS are croplands and clear cuts Urban areas predominant source BOD5 TN contributed by cropland, transportation, clear cuts, and beef cattle TP contributed by beef cattle, transportation, and residential areas
Environmental setting and water-quality issues of the Mobile River Basin, Alabama, Georgia, Mississippi, and Tennessee, by G.C. Johnson, R.E. Kidd, C.A. Journey, Humbert Zappia, and J. Brian Atkins	Environmental data include natural factors such as physiography, geology, soils, climate, hydrology, ecoregions, and aquatic ecology, and human factors such as reservoirs, land use and population change, water use, and water-quality issues.
Priority Areas for Freshwater Conservation Action: A Biodiversity Assessment of the Southeastern United States, The Nature Conservancy, 2002.	Buttahatchee River Watershed designated a Freshwater Conservation Area.

Program **SSIS** Project **IBI01** Lat: **33 47 24.6** Lon: **88 18 55.2**

Station Id **02439400** Alias **546** Name **BUTTAHATCHEE RIVER**

Location **ABERDEEN** County **MONROE**

Benthics Sample

Sample Id	**369**	Collection Date	**03-07-01**
Activity Id	**B-369**	Collection Time	
Visit Number	**1**	Collection Method	**Ben-01**
Medium	**Biological**	Activity Type	**Sample**
Inten	**Taxon Abundance**	GearName	**D-frame net**
Community	**Benthic Macroinvertebrates**	GearType	**Net/Non-Tow**

Benthics Replicates

Repnu	Activity Category	Grids	Cobble/ Gravel	Snags	Submerged Macrophytes	Vegetate Banks	Sand Silt
0	**Routine Sample**	**0**	**6**	**5**	**0**	**4**	**5**

Benthics

Repnum	Sno	TaxaId	Stag	FinalId	Individuals	Ind Orig	Ind.Rec	TCR
0	1	160	L	Dubiraphia	1	1	0	1
0	2	125	L	Cricotopus bicinctus	5	5	0	1
0	3	6	L	Ablabesmyia mallochi	3	3	0	1
0	4	68	A	Caecidotea	1	1	0	1
0	5	265	L	Hydroptila	3	3	0	1
0	6	271	L	Isonychia	1	1	0	1
0	7	278	L	Labrundinia	1	1	0	1
0	8	425	L	Perlesta	1	1	0	1
0	9	177	A	Enchytraeidae	8	8	0	1
0	10	181	L	Ephemerella	22	22	0	1
0	11	188	L	Erioptera	1	1	0	1
0	12	499	L	Rheocricotopus	14	14	0	1
0	13	503	L	Rheotanytarsus	8	8	0	1
0	14	518	L	Simuliidae	75	75	0	1
0	15	518	P	Simuliidae	3	3	0	1
0	16	551	L	Taeniopterygidae	2	2	0	1
0	17	552	L	Taeniopteryx	1	1	0	1
0	18	556	L	Tanytarsus	50	50	0	1
0	19	569	A	Tropisternus	1	1	0	1
0	20	587	L	Stenonema	2	2	0	1
0	21	609	A	Sphaeriidae	1	1	0	1
0	22	450	L	Polypedilum aviceps	1	1	0	1
0	23	452	L	Polypedilum fallax	1	1	0	1
0	24	781	P	Chironomidae Unid	2	2	0	1
0	25	795	L	Heptageniidae Unid	2	2	0	1
0	26	804	A	Corbiculidae	1	1	0	1
0	27	808	L	Polypedilum obtusum	5	5	0	1
0	28	816	L	Polypedilum flavum	16	16	0	1
0	29	856	L	Perlodidae Unid	1	1	0	1
0	30	977	L	Taeniopterygidae Unid	1	1	0	1
0	31	880	L	Labrundinia/Nilotempus	1	1	0	1
0	32	938	L	Corynoneura/Thienemanniella	1	1	0	1
0	33	1018	L	Orthocladius O.	1	1	0	1

Program **SSIS** Project **IBI01** Lat: **33 47 24.6** Lon: **88 18 55.2**

Station Id **02439400** Alias **546** Name **BUTTAHATCHEE RIVER**

Location **ABERDEEN** County **MONROE**

HABITAT Sample

Sample Id	**36**	Collection Date	**03-07-01**
Activity Id	**H-36**	Collection Time	
Visit Number	**1**	Collection Method	
		Activity Type	**Field Msr/Obs**

HABITAT Replicates

Repnu	Activity Category	Collector	Form Version
0	**Routine Msr/Obs**		**MS DEQ**

Habitat Values

ASSESSMENT DATA

Repnum	**0**
Fallen Trees/Large Woody Debris	**1**
Deep Pools	**1**
Shallow Pools	**1**
Overhanging Shrubbery in Water	**1**
Large Rocks	**0**
Undercut Banks	**1**
Thick Root Mats	**1**
Dense Macrophbyte Beds	**0**
Deep Riffles/Runs with Turbulence	**1**
Bottom Substrate/Available Cover	**18**
Pool Substate Characterization	**14**
Pool Variability	**15**
Channel Alteration	**18**
Sediment Deposition	**15**
Channel Sinousity	**16**
Channel Flow Status	**20**
Bank Vegetative Protection(Left Bank	**6**
Bank Vegetative Protection(Right Bank)	**6**
Bank Stability (Left Bank)	**5**
Band Stability (Right Bank)	**6**
Riparian Vegetation Zone Width (Left Bank)	**7**
Riparian Vegetation Zone Width (Right Bank)	**6**

Program **SSIS** Project **IBI01** Lat: **33 47 24.6** Lon: **88 18 55.2**

Station Id **02439400** Alias **546** Name **BUTTAHATCHEE RIVER**

Location **ABERDEEN** County **MONROE**

Pebble Sample

Sample Id **172** Collection Date **03-07-01**

Activity Id **PC-172** Collection Time

Visit Number **1** Collection Method **Wohlman Pebble Count**

Activity Type **Field Msr/Obs**

Comments

Pebble Replicates

Repnu	Activity Category	CollTime	Comments
0			

Pebble Values

Repnu	Sno	Feature Desc	Particle	Type	Num.Presen	Range E	Range M
0	1	2 - Pool	Silt/Clay	Silt/Clay	9.00	<.062 mm	<.04 inches
0	2	2 - Pool	Fine	Sand	3.00	.125-.25 mm	.04-.08 inches
0	3	2 - Pool	Very Coarse	Sand	2.00	1.0-2.0 mm	.04-.08 inches
0	4	2 - Pool	Fine	Gravel	1.00	4-6 mm	.16-.24 inches
0	5	2 - Pool	Medium	Gravel	2.00	8-12 mm	.31-.47 inches
0	6	2 - Pool	Coarse	Gravel	6.00	16-24 mm	.63-.94 inches
0	7	2 - Pool	Very Coarse	Gravel	4.00	32-48 mm	1.26-1.9 inches
0	8	2 - Pool	Coarse	Gravel	5.00	24-32 mm	.94-1.26 inches
0	9	2 - Pool	Medium	Gravel	3.00	12-16 mm	.47-.63 inches
0	10	2 - Pool	Fine	Gravel	1.00	6-8 mm	.24-.31 inches
0	11	2 - Pool	Very Fine	Gravel	1.00	2-4 mm	.08-.16 inches
0	12	2 - Pool	Medium	Sand	13.00	.25-.50 mm	.04-.08 inches
0	13	4 - Run	Silt/Clay	Silt/Clay	8.00	<.062 mm	<.04 inches
0	14	4 - Run	Very Coarse	Gravel	4.00	32-48 mm	1.26-1.9 inches
0	15	4 - Run	Coarse	Gravel	5.00	24-32 mm	.94-1.26 inches
0	16	4 - Run	Coarse	Gravel	9.00	16-24 mm	.63-.94 inches
0	17	4 - Run	Very Coarse	Sand	4.00	1.0-2.0 mm	.04-.08 inches
0	18	4 - Run	Fine	Sand	1.00	.125-.25 mm	.04-.08 inches
0	19	4 - Run	Fine	Gravel	1.00	4-6 mm	.16-.24 inches
0	20	4 - Run	Medium	Gravel	3.00	8-12 mm	.31-.47 inches
0	21	4 - Run	Fine	Gravel	2.00	6-8 mm	.24-.31 inches
0	22	4 - Run	Medium	Sand	6.00	.25-.50 mm	.04-.08 inches
0	23	4 - Run	Coarse	Sand	7.00	.50-1.0 mm	.04-.08 inches

APPENDIX B

Aquatic Species of Concern and Natural Heritage Inventory

Table B.1. List of Aquatic Species of concern in Buttahatchee River watershed (Site Basic Record 2002, www.natureserve.org/explorer.

Species	Common Name	Habitat
Fish		
Notropis edwardraneyi	Fluvial Shiner	Main channel-small to large rivers often over sand or gravel, sTable sand, gravel or mud bars in impoundments and flowing channels of large rivers
Cyprinella callistia	Alabama Shiner	Gravel and rubble bottom pools and runs of creeks and small to medium rivers, medium streams with swift flowing runs and riffles over boulders, cobble and gravel substrates
Noturus munitis	Frecklebelly madtom	Rocky riffles and runs of medium to large rivers, often near vegetation
Crystallaria asprella	Crystal darter	Clean sand and gravel runs of small to medium rivers, sand and gravel bars in large flowing rivers and streams
Etheostoma zonifer	Backwater darter	Mud-bottomed, often vegetated pools of sluggish creeks and small rivers, small turbid streams
Percina lenticula	Freckled darter	Fast, deep, rocky riffles of small to medium rivers, deep, swift areas of flowing rivers and large streams
Stizostedion vitreum	Walleye (southern strain)	Lakes; pools, backwaters, and runs of medium to large rivers; generally in moderately deep waters. Avoids bright light. Generally in quiet water when not spawning. Often in beds of aquatic vegetation, in holes among tree roots, or in or near similar cover by day. A pH of 8-9 is most suiTable. Adults avoid temperatures above 24 C, if possible. Greatest population densities under moderately turbid conditions or in deep clear lakes with strong deepwater forage base (Sublette et al. 1990). Spawns in turbulent rocky areas in rivers, boulder to coarse gravel shoals of lakes, along riprap on dam face of reservoirs, and flooded marshes (Becker 1983, Sublette et al. 1990). Larvae initially are pelagic, soon become bottom dwellers. Adults tend to return to formerly used spawning (and feeding) areas. big river, creek, high gradient, low gradient, medium river, moderate gradient, pool, riffle, lakes deep water and shallow water, herbaceous wetland
Mussels		
Elliptio arca	Alabama spike	Gravel bar in swift current
Epioblasma penita	Southern combshell	Small rivers, Streams riffles or shoals with sandy gravel to gravel-cobble substrate in moderate to swift current
Lasmigona complanta	White heelsplitter	Small rivers, Streams
Obovaria jacksoniana	Southern hickorynut	Small rivers, Streams of low to moderate gradient
Obovaria unicolor	Alabama hickorynut	Small and Large Rivers of moderate gradient, sand/gravel substrate in moderate current
Pleurobema taitianum	Heavy pigtoe	Big to medium rivers with high to moderate gradients, riffles and shoals on sandy gravel to gravel-cobble substrate with moderate to fast current
Quadrula rumphiana	Ridged mapleleaf	Small rivers, Streams, sand/gravel substrate in moderately silty waters, also reservoirs
Strophitus undulates	Squawfoot	
Truncilla donaciformis	Fawnsfoot	Small rivers, Streams

Table B.2. Monroe and Lowndes County Natural Heritage Inventory.

Species	Common Name	Habitat
Arcidens confragosus	Rock Pocketbook	Found in mud and sand bottom pools in medium to large rivers in standing or slow flowing water. A species typical of large lowland streams with little or no flow.
Cicindela marginipennis	Cobblestone Tiger Beetle	Habitat is almost always cobblestone islands in rivers, rarely cobblestone shore areas. Usually concentrated on the upstream side in sparsely vegetated or unvegetated patches. Larvae live in burrows in small patches of sand. Habitats are subject to natural flooding. Usually found with medium to large rivers, occasionally creeks. Associated plants are SALIX spp., APOCYNUM spp., and occasionally PRUNUS PUMILA.
Crystallaria asprella	Crystal Darter	Small to medium rivers with expanses of clean sand and gravel. Usually in water more than 60cm deep with strong current. Sand and gravel bars in large flowing rivers and streams.
Cyprinella callistia	Alabama Shiner	Flowing, rubble or gravel-bottomed, upland streams of moderate size and varying clarity (Lee et al. 1980). Most frequently in small to moderately large, high-gradient, cool, and clear streams; typically associated with raceways and pools over a gravel and rubble substrate (Mayden 1989). Gravel – and rubble-bottomed pools and runs of creeks and small to medium rivers (Page and Burr 1991). Medium streams with swift runs and riffles over boulders, cobble and gravel substrate.
Elimia cylindracea	Cylinder Elimia	Freshwater
Elliptio arca	Alabama Spike	A lateral gravel bar in swift current (Hartfield and Jones 1990). High gradient
Elliptio arctata	Delicate Spike	Sand and gravel, and sand and limestone rock substrates (Brim Box and Williams 2000), big river, creek, low gradient, medium river, moderate gradient, riffle
Etheostoma zonifer	Backwater Darter	Pools in coastal Plain creeks and small rivers of slow to moderate current, usually over sand or silt bottom, sometimes in aquatic vegetation (Kuehne and Barbour 1983, Page and Burr 1991). Most common in detritus, creek, low gradient, medium river, moderate gradient, pool
Graptemys nigrinoda	Black-knobbed Map	Rivers and streams with moderate current, sand or clay bottom, and logs and other basking sites. creek, low gradient, medium river, moderate gradient, pool
Ichthyomyzon castaneus	Chestnut Lamprey	Adults live in medium and large rivers; larvae burrow in bottom of smaller tributaries in areas of moderate current, later move into more densely vegetated areas with softer bottom (Scott and Crossman 1973)
Ligumia recta	Black Sandshell	
Moxostoma duquesnei	Black Redhorse	Typical of gravelly to rocky, occasionally sandy and silty, creeks and small to medium rivers; prefers pools. Rarely in impoundments. Spawns in gravel and fine rubble runs and riffles in water about 0.2-0.6 m deep (Lee et al. 1980, Becker 1983).
Notropis edwardraneyi	Fluvial Shiner	Main channels of small to large rivers (Page and Burr 1991); usually in areas of good current with water of varying rapidity and mixed substrate of sand gravel, and silt (Lee et al. 1980). STable sand, gravel, or mud bars in impoundments and flowing channels of large rivers.
Noturus munitus	Frecklebelly Madtom	Chiefly in rocky riffles, rapids and runs of medium to large rivers. This small fish's movements are impeded by dams and impoundments. High levels of siltation within streambeds constitute poor habitats for the species (Shepard 1996)

Table B.2. Continued

Species	Common Name	Habitat
Obovaria jacksoniana	Southern Hickorynut	low gradient, moderate gradient
Obovaria unicolor	Alabama Hickorynut	Moderate gradient, sand/gravel substrates in moderately flowing water
Percina lenticula	Freckled Darter	Adults are most common in moderate-fast current of small to medium rivers, in deeper water (>0.8 m) in heavy cover such as log jams, undercut banks, boulders, or potholes. Juveniles occur in shallower water with slower current, such as in vegetation in gently flowing riffles. Dams, impoundments, and inappropriate stream conditions hinder the movements of this darter (Pierson, pers. Comm., 1998). Deep, swift areas of flowing rivers and large streams.
Peromyscus polionotus	Oldfield Mouse	Favors dry sandy fields and beaches with grass/shrub cover
Pseudotriton ruber	Red Salamander	Cold, clear, rocky streams and springs in wooded or open areas. Adults occur in or near water in leaf litter and under rocks, and in crevices and burrows near water. Adults sometimes disperse into woods.
Quadrula metanevra	Monkeyface	Found in medium to large rivers in gravel or mixed sand and gravel (Cummings and Mayer, 1992)
Quadrula rumphiana	Ridged Mapleleaf	Sand/gravel substrate in moderately silty waters in flowing water or reservoirs.
Strophitus connasaugaensis	Alabama Creekmussel	
Strophitus subvexus	Southern Creekmussel	It is found in small to large creeks, in substrates from sand to sandy mud, in slow or no current (Deyrup and Franz 1994).
Strophitus undulatus	Squawfoot	
Truncilla truncata	Deertoe	
Uniomerus declivis	Tapered Pondhorn	creek, low gradient, medium river, pool; lacustrine – shallow water; palustrine – forested wetland, temporary pool; In fine gravel in moderate current (Heard, 1976)
Agalinis pseudaphylla	Shinners' False-foxglove	
Aster ericoides	White Heath Aster	
Callirhoe triangulata	Clustered Poppy-mallow	Sandy prairies
Camassia scilloides	Wild Hyacinth	
Carex gracilescens	Slender Sedge	
Carex jamesii	Nebraska Sedge	
Carex meadii	Mead's Sedge	
Carex microdonta	Small-toothed Sedge	
Carex tenax	Wire Sedge	
Carya laciniosa	Big Shellbark Hickory	
Castilleja coccinea	Scarlet Indian-paintbrush	
Clematis beadlei	Vase-vine Leather-flower	
Cypripedium pubescens	Yellow Lady's-slipper	Boggy areas, swampy areas, damp woods (often with a rich layer of humus and decaying leaf litter), near rivers or canal banks (Great Plains Floral Association 1986, Swink and Wilhelm 1994, Weber and Wittmann 1996, Hulten 1968, Cronquist et al. 1972)
Dodecatheon meadia	Shooting Star	
Erythronium albidum	White Dog's Tooth Violet	
Fraxinus profunda	Pumpkin Ash	

Table B.2. Continued

Species	Common Name	Habitat
Fraxinus quadrangulata	Blue Ash	
Ilex montana	Mountain Holly	
Lesquerella gracilis	Spreading Bladder-pod	
Lilium superbum	Turk's-cap Lily	
Menispermum canadense	Canada Moonseed	
Nemastylis geminiflora	Prairie-iris	
Oenothera grandiflora	Large-flowered Evening-primrose	
Ophioglossum engelmannii	Limestone Adder's-tongue	
Penstemon tenuiflorus	Narrow Flowered Beard Tongue	
Perideridia americana	Eastern Eulophus	
Phacelia strictiflora	Prairie Scorpion-weed	
Polytaenia nuttallii	Prairie Pareley	
Prenanthes aspera	Rough Rattlesnake-root	
Prenanthes barbata	Barbed Rattlesnake-root	
Quercus macrocarpa	Bur Oak	
Rhamnus lanceolata	Lance-leaved Buckthorn	
Senecio pauperculus	Balsam Ragweed	
Swertia caroliniensis	American Colombo	
Thalictrum debile	Southern Meadow-rue	Rich, moist, deciduous woods on limestone-derived soils
Thelesperma filifolium	Stiff Greenthreads	
Anodonta suborbiculata	Flat Floater	
Hobbseus petilus	Tombigbee Rivulet Crayfish	
Polyodon spathula	Paddlefish	
Arabis canadensis	Sicklepod	
Asarum canadense	Canada Wild-Ginger	
Cacalia muehlenbergii	Great Indian-Plantain	
Carex picta	Painted Sedge	
Carex prasina	Drooping Sedge	
Carya leiodermis	Swamp Hickory	
Chelone leiodermis	Swamp Hickory	
Chimpahila maculata	Spotted Wintergreen	
Coelorachis cylindrica	Pitted Jointgrass	
Coreopsis auriculata	Lobed Tickseed	
Dentaria heterophylla	Slender Toothwort	
Euonymus Atropurpureus	Burning Bush	

Table B.2. Continued

Species	Common Name	Habitat
Gentiana quinquefolia	Stiff Gentain	
Hexastylis shuttleworthii	Large-Flowered Hearthleaf	
Hybanthus concolor	Green Violet	
Iris brevicaulis	Lamance iris	
Isoetes engelmannii	Appalachian Quillwort	
Lilium michiganense	Michigan Lily	
Lobelia appendiculata	Appendaged Lobelia	
Luzula acuminata	Hairy Woodrush	
Melanthium virginicum	Virginia Bunchflower	
Muhlenbergia glabriflora	Inland Muhly	
Muhlenbergia sylvatica	Woodland Muhly	
Osmorhiza longistylis	Smoother Sweet-Cicely	
Panax quinquefolius	American Ginseng	
Plantago cordata	Heartleaf Plantain	
Spiranthes magnicamporum	Great Plains Ladies'-Tresses	
Staphylea trifolia	American Bladdernut	
Stenanthium gramineum	Eastern Featherbells	
Tiarella cordifolia	Heart-Leaved Foam-Flower	
Trichomanes boschianum	Bristle-Fern	
Triphora trianthophora	Three Birds Orchid	
Ulmus serotina	September Elm	

APPENDIX C

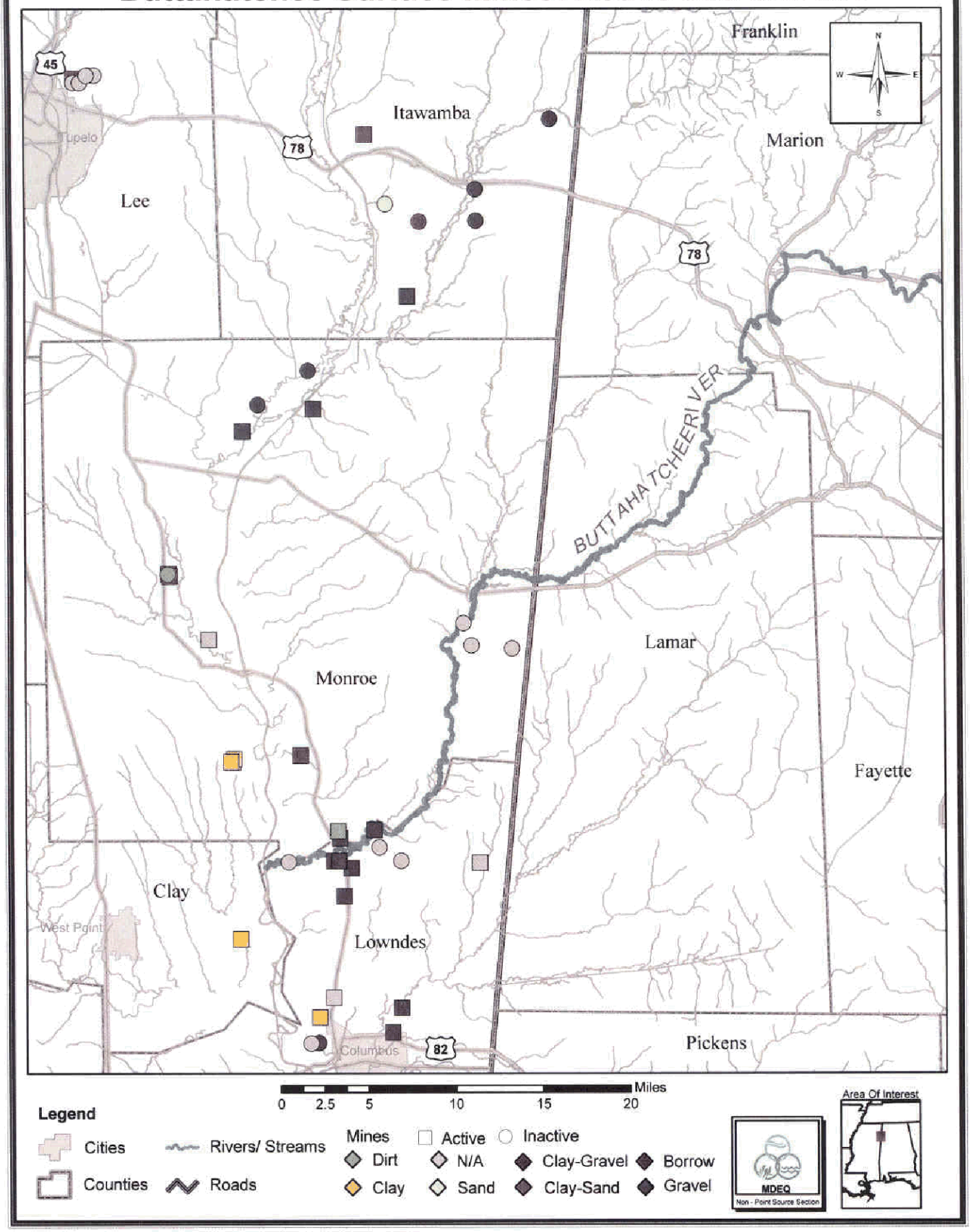
Stressors

Table C1. Description of Stressors (Mississippi)

Status	Description
Stressor:	Malfunctioning on-site wastewater treatment units/septic systems
Justification:	Septic systems and on-site wastewater treatment units have the potential to contribute pathogens and nutrients and nutrients to surface and ground waters when lack of maintenance leads to malfunctions or failure. Thus, malfunctioning and failing systems can contribute to water quality degradation. A number of suspected failing septic systems were identified during the Mississippi TMDL development.
Location:	Locations of suspected failing septic systems in Mississippi shown on Figure 3.3 (TVA 2000).
Extent:	143 suspected failing septic systems in Mississippi
Stressor:	Land application of manure
Justification:	Processed manure from confined animal operations is routinely applied to pastureland April-October. This applied manure has the potential to contribute bacteria and nutrients to surface waters via runoff during rained events. No confined animal operations have been identified in Buttahatchee River watershed in Missisippi.
Location:	There are no confined animal operations in Buttahatchee River watershed in Mississippi
Extent:	There are no confined animal operations in Buttahatchee River watershed in Mississippi
Stressor:	Runoff from pasture
Justification:	Manure deposited by grazing livestock has the potential to contribute bacteria and nutrients to surface waters via runoff during rain events. Poor quality pasture also has the potential to contribute sediment to surface waters. Both elements can contribute to water quality degradation.
Location:	Pasture locations are shown in Figure 3.4. Pasture occurs throughout the watershed.
Extent:	90 livestock sites reported in Mississippi in watershed nonpoint source pollution inventory (TVA 2000). There are 740 acres of heavily organized pasture in the waterhed, and 5,376 acres of pasture in fair condition. There are also 29 acres of feed lots and loafing areas (TVA 2000).
Stressor:	Livestock with access to streams
Justification:	Livestock with access to streams will deposit fecal matter in the water, and disturb stream and riparian habitat. This contributes to degradation of water quality through inputs of bacteria and nutrients. Disruption of stream and riparian habitats can also result in increased erosion and sediment loads. Pastures with stream access were identified during the Mississippi TMDL development.
Location:	Locations of cattle and horse pastures are shown in Figures 3.1 and 3.2 (TVA 2000)
Extent:	42 pastures with stream access identified in Mississippi. Livestock have known access to 349 feet of streams in watershed (0.02%). Livestock have probable access to 15,910 feet of streams (0.75%) in watershed. Livestock have potential access to 22,752 feet of streams in watershed (1.07%) (TVA 2000).
Stressor:	Runoff from croplands
Justification:	Runoff from croplands is known to have the potential to contribute sediment, nutrients, and pesticides to surface and ground waters, which can contribute to water quality degradation. Water quality degradation has the potential to adversely affect threatened and endangered mussel species.
Location:	Cropland locations are shown in Figure 3.4. Croplands primarily occur in the southern portion of the watershed.
Extent:	There are approximately 11,900 acres of cropland in the watershed. Approximately 600 acres had low crop residue in 2000 (TVA 2000).
Stressor:	Silviculture
Justification:	Runoff from silviculture operations, especially during harvest, is known to have the potential to contribute sediment and debris to surface waters. It is also possible for fertilizers and pesticides utilized in silviculture activities to end up in surface waters. Timber harvest along stream corridors also has the potential to affect stream temperature dynamics if stream canopy cover is affected. All of these elements can contribute to surface water quality degradation which can adversely affect threatened and endangered mussel species.
Location:	Locations of forest plantations and clear cuts are shown in Figure 3.4. Silviculture occurs primarily in the middle and upper portions of the watershed.

Status	Description
Extent:	There are approximately 32,000 acres of land in silviculture in the watershed. In 2000, approximately 6,000 acres of these lands were clear cuts.
Stressor:	Impoundment
Justification:	Mussels and their host fish species in Buttahatchee River are adapted to riverine conditions and cannot survive in impoundments.
Location:	The lower end of the Buttahatchee River where it joins the Tombigbee River
Extent:	Estimate approximately 1.5 miles from atlas (DeLorme, 1998).
Stressor:	Gravel mining
Justification:	Concentrated sand and gravel mining in the upper Tombigbee River basin has resulted in the decline or extirpation of rare endemic mollusks (Jones 1991, USFWS 1993). In the Buttahatchee River watershed, sand and gravel mining occurs in the floodplain. However, poorly sited or designed floodplain mines can be "captured" by the associated stream resulting in scouring, erosion, and headcutting (Roell 1999), which adversely affect aquatic communities and mussel populations. Practices that can reduce the chance of stream capture and its adverse effects include locating mines where they are less susceptible to stream capture, use of forested buffers between mines and stream channels, not clearing riparian vegetation, and not disturbing natural stream banks (Roell 1999). Use of such practices would serve to protect the threatened and endangered mussel species of the Buttahatchee River watershed.
Location:	Along Buttahatchee River near Highway 45 (see Figure C.1).
Extent:	There are five active gravel mining operations.
Stressor:	Channel modification
Justification:	Channel modification can involve dredging which could result in removal of mussels, or changing the stream bottom to the point that it is unsuiTable habitat for mussels and/or their host fish species. Channel modification can also destablize the river channel resulting in erosion, increased sediement load, and siltation, often far away from the site of the disturbance (FISRWG 1998, Hartfield 1997).
Location:	This information is available from the US Army Engineers, Vicksburg District, but was not provided in time to be included in this version of the Watershed Implementation Plan.
Extent:	This information is available from the US Army Engineers, Vicksburg District, but was not provided in time to be included int his version of the Watershed Implementation Plan.
Stressor:	Exotic species
Justification:	Studies of the effects of introduction of the Asiatic clam into streams suggest that this species may actively compete with native species for space and nutrients (Clarke 1998), and/or disrupt the prey-predator cycle between muskrats and native mussels (Hurd 1974, Hartfield 1991, Pierson 1991). Introduction of zebra mussels could have the same or similar effects. Introduction of Cogon Grass, a highly invasive exotic, can negatively impact native terrestrial systems and wildlife.
Location:	Asiatic clams are present throughout the watershed. No zebra mussel populations have been documented in the watershed. Cogon Grass is not present in the watershed.
Extent:	Asiatic clams are present in low to moderate numbers and do not appear to be adversely affecting native mussels. No zebra mussel populations have been documeted in the watershed. Cogon Grass is not present in the watershed.

Buttahatchee Surface Mines: Active and Inactive



APPENDIX D

History of Buttahatchee River Watershed Implementation Plan

HISTORY OF THE BUTTAHATCHEE WATERSHED IMPLEMENTATION PLAN

In 1998 the Mississippi Department of Environmental Quality implemented the Basin Management Approach (BMA) to Water Quality to carry out the mandates of the Clean Water Act. This approach brings together state, federal, and local agencies to improve and maintain the quality of Mississippi's water resources on a basin wide scale through comprehensive long range water quality planning and management strategies.

The BMA is based on a repeating, five-year management cycle, with each year dedicated to a different management activity (Figure 3.1). This document is an implementation plan from year five.

The BMA is implemented on a basin scale. The nine major watershed basins in Mississippi were combined into five basin groups (Figure 3.2). Buttahatchee is located in basin group I, which consists of the Big Black, Tombigbee, and Tennessee River Basins in Mississippi. Each basin group is managed by a Basin Team. The agencies on the Basin Group I Basin Team are listed in Table 3.1. The goal of this team is to develop and implement management plans for its Basin Group.

In 2003 Basin Group I is in year 5 of its management cycle. The basin management plan has been developed, and in this plan, Buttahatchee River watershed was selected for implementation of restoration activities. Buttahatchee River watershed was one of several areas in Basin Group I identified by the Basin Team as having water quality issues. During the planning phase (year 1) the Basin Team identified water quality issues in Basin Group I. These issues were then prioritized by five work groups with different perspectives; 1) point sources, 2) agriculture, 3) on-site wastewater systems, 4) silviculture, and 5) hydrologic modification/wetlands protection. Each work group prioritized the issues based on six criteria: 1) extent of the problem, 2) value of the resource, 3) risk or seriousness of the threat, 4) level of local support for addressing the problem, 5) probability for success, and 6) the quality of the TMDL. Buttahatchee River was ranked as a high priority.

In August 2003 the Basin Group I Team met at a workshop and selected three high priority issues to act on. These three issues were selected based on additional criteria: 1) number of agencies interested in working in the watershed, 2) value of the resources, 3) high probability of success with minimal effort/funding, 4) degree/intensity of impairment, 5) availability of

funding, 6) urgency for action, and 7) source of impairment. Buttahatchee River was one of the water bodies selection for implementation. At the workshop agencies also committed to participating in addressing the issues in the Buttahatchee River watershed (Table 3.2) as members of the Buttahatchee River Watershed Implementation Team.

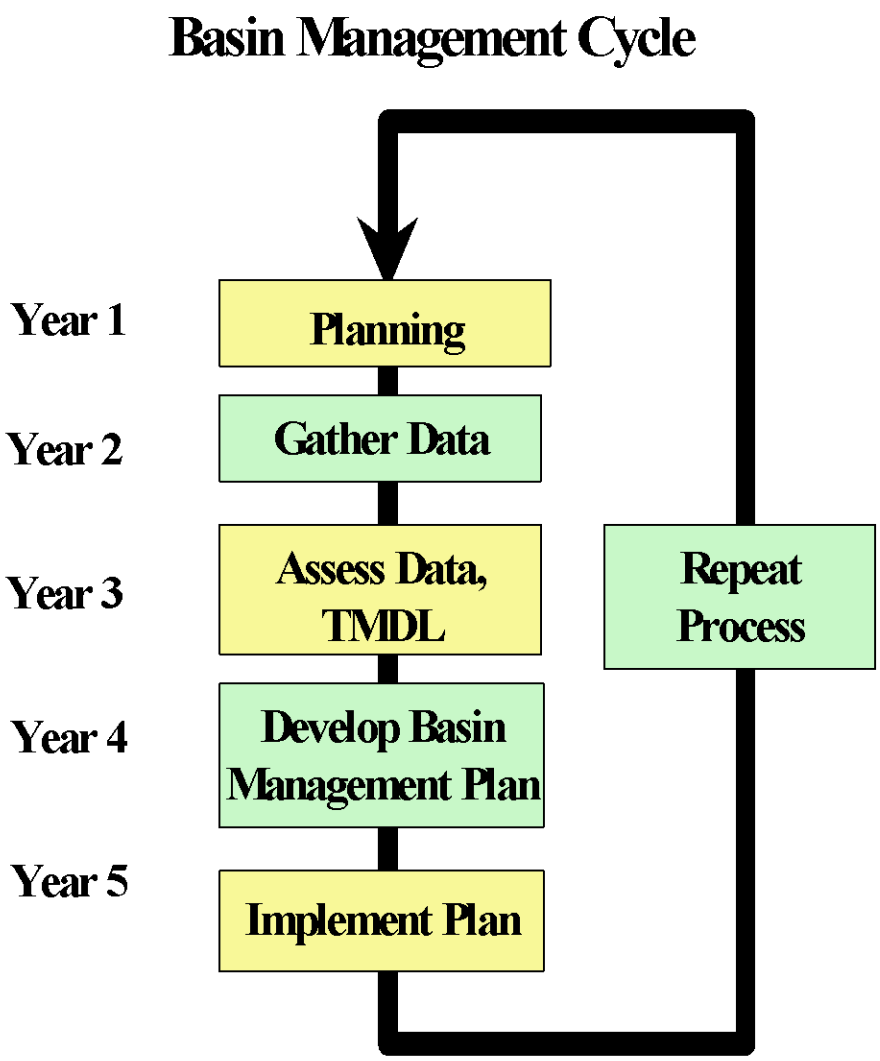
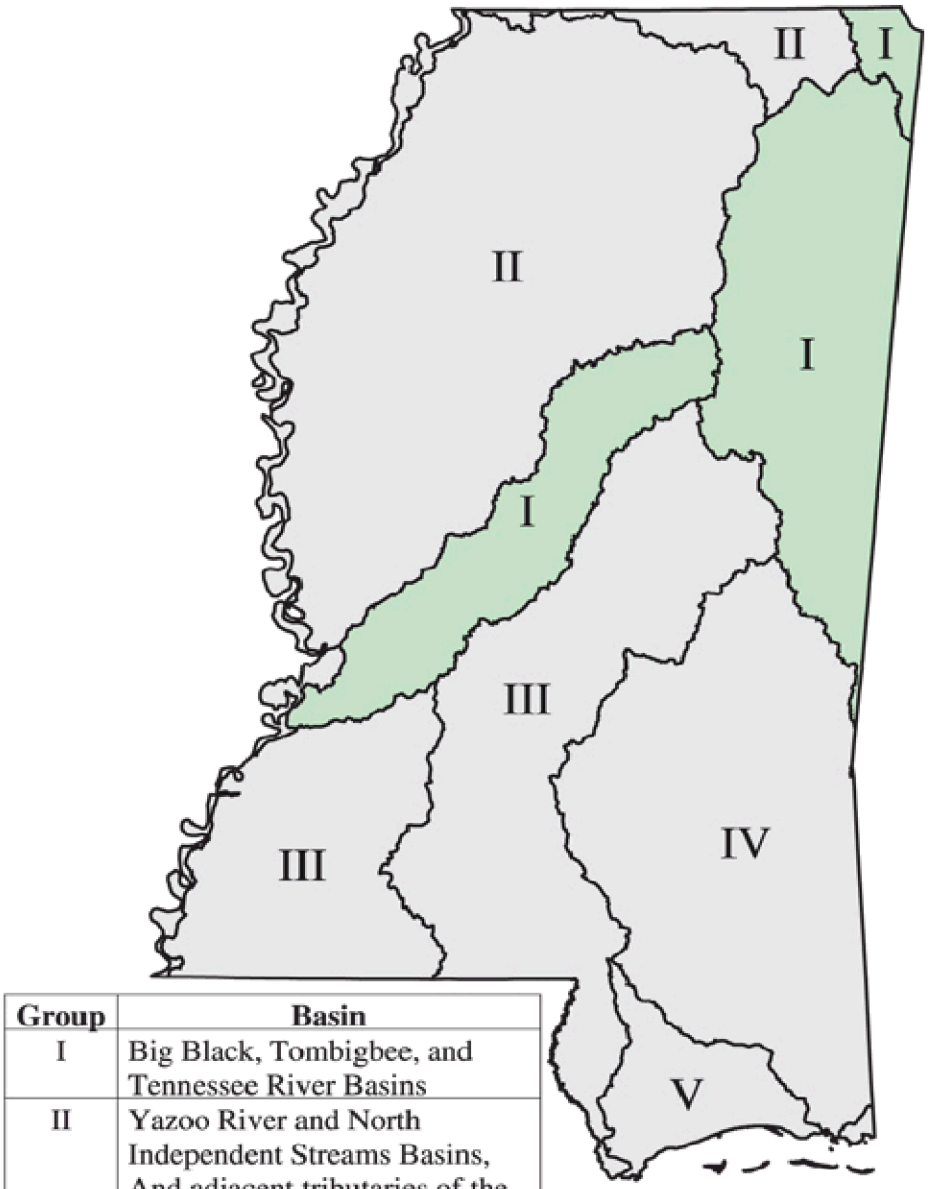


Figure 3.1. Basin Management Cycle.



Group	Basin
I	Big Black, Tombigbee, and Tennessee River Basins
II	Yazoo River and North Independent Streams Basins, And adjacent tributaries of the Mississippi River
III	Pearl River and South Independent Streams Basins, And adjacent tributaries of the Mississippi River
IV	Pascagoula River Basin
V	Coastal Streams Basin

Figure 3.2. Basin groups in Mississippi Basin Management Program.

Table 3.1. Basin Group I Team Members.

1.	MS Department Agriculture and Commerce
2.	MS Development Authority
3.	MS Department of Environmental Quality
4.	MS Forestry Commission
5.	MS Department of Health
6.	MSU Cooperative Extension Service
7.	MS Soil & Water Conservation Commission
8.	MS Department of Wildlife, Fisheries, and Parks
9.	U.S. Army Corps of Engineers, Vicksburg and Mobile Districts
10.	U.S. Environmental Protection Agency, Region 4
11.	U.S. Fish and Wildlife Service
12.	U.S. Forest Service
13.	U.S. Geological Survey
14.	U.S. Natural Resource Conservation Service
15.	Alabama-Tombigbee River Basins Clean Water Partnership
16.	Tennessee Valley Authority
17.	Tenn-Tom Waterway Development District
18.	Tombigbee River Valley Water Management District

Table 3.2. Members of the Buttahatchee River Watershed Implementation Team

1.	Natural Resources Conservation Service
2.	Mississippi Soil & Water Conservation Commission
3.	U.S. Fish & Wildlife Service
4.	Mississippi Department of Health
5.	MDEQ Field Services Division
6.	MDEQ Water Quality Assessment Section
7.	MDEQ SRF and DWI Loan Programs
8.	MDEQ TMDL Section
9.	MDEQ NPS Section
10.	MDEQ Surface Water Division
11.	Mississippi Department of Agriculture & Commerce
12.	Alabama-Tombigbee River Basins Clean Water Partnership
13.	U.S. Environmental Protection Agency
14.	Mississippi Forestry Commission
15.	The Nature Conservancy
16.	U.S. Army Corps of Engineers, Mobile District
17.	MSU Cooperative Extension Service
18.	U.S. Geological Survey
19.	Alabama Department of Environmental Management

APPENDIX E

Checklist of Watershed Implementation Plan Elements

FY03/04 319 Watershed-Based Plans Guide

Name of Watershed-Based Plan: Buttahatchee Creek Watershed Implementation Plan

Required Watershed Elements	Location
a. An identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this watershed-based plan (and to achieve any other watershed goals identified in the watershed-based plan), as discussed in item (b) immediately below. Sources that need to be controlled should be identified at the significant subcategory level with estimates of the extent to which they are present in the watershed (e.g., X numbers of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility; Y acres of row crops needing improved nutrient management or sediment control; or Z linear miles of eroded streambank needing remediation).	Table 2.5, Appendix C
b. An estimate of the load reductions expected for the management measures described under paragraph (c) below (recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time). Estimates should be provided at the same level as in item (a) above (e.g., the total load reduction expected for dairy cattle feedlots; row crops; or eroded streambanks).	Chapter 3, Section 3.3.2.1, 3.3.4.1, 3.3.5.1
c. A description of the NPS management measures that will need to be implemented to achieve the load reductions estimated under paragraph (b) above (as well as to achieve other watershed goals identified in this watershed-based plan), and an identification (using a map or a description) of the critical areas in which those measures will be needed to implement this plan.	Chapter 3, Sections 3.3.1.2, 3.3.2.2, 3.3.3.2, 3.3.4.2, 3.3.5.2, 3.3.6.2, 3.3.7.2, 3.3.8.2, 3.3.9.2
d. An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement this plan. As sources of funding, States should consider the use of their Section 319 programs, State Revolving Funds, USDA's Environmental Quality Incentives Program and Conservation Reserve Program, and other relevant Federal, State, local and private funds that may be available to assist in implementing this plan.	Chapter 3, Sections 3.3.1.4, 3.3.2.4, 3.3.3.4, 3.3.4.4, 3.3.5.4, 3.3.6.4, 3.3.7.4
e. An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented.	Chapter 4
f. A schedule for implementing the NPS management measures identified in this plan that is reasonably expeditious.	Chapter 3, Sections 3.3.1.3, 3.3.2.3, 3.3.3.3, 3.3.4.3, 3.3.5.3, 3.3.6.3, 3.3.7.3, 3.3.9.3
g. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.	Same as above

Required Watershed Elements	Location
h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether this watershed-based plan needs to be revised or, if a NPS TMDL has been established, whether the NPS TMDL needs to be revised.	Chapter 5, Section 5.2, pg 5-2
i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item (h) immediately above.	Chapter 5, Section 5.1, pg 5-1

APPENDIX F

Proposed Section 319 Funded Projects

Best Management Practice Implementation Monitoring in the Big Black, Tombigbee, and Tennessee River Basin

Michael Sampson
Water Quality Coordinator

A proposal submitted to

Mississippi Department of Environmental Quality
Office of Pollution Control
Water Quality Management Branch
Box 10385
Jackson, MS. 39289-0385

January 13, 2003

Accepted

PROJECT TITLE: Best Management Practice Implementation Monitoring in the Big Black, Tombigbee, and Tennessee River Basins.

PROJECT ABSTRACT: The Mississippi Forestry Commission plans to evaluate the implementation of Forestry Best Management Practice throughout the Big Black, Tombigbee, and Tennessee River Basins. The guidelines set forth in "Silviculture Best Management Practices Implementation Monitoring: A Framework for State Forestry Agencies" will be used to develop the survey (see Attachment 1). The total cost of the Best Management Practice Monitoring Project cost is **$95,440.00.**

In 2003, the Mississippi Forestry Commission conducted a statewide assessment of the use of voluntary Best Management Practices in Forestry. The assessment showed that BMP's are being utilized on 89% of locations where they are applicable. The statewide assessment, however, is not statistically accurate at the Basin or MFC district level and therefore, is of only limited value at the local level. It is the intent of this project to increase the sampling intensity in the Big Black, Tombigbee and Tennessee River Basins in order to provide accurate statistical information on the implementation of Forestry Practices for these basins.

An assessment of forest harvesting activity in the basins will be conducted in order to determine how many sites to evaluate in each watershed. The basis for this assessment will be the 2000 Resource Assessment conducted by the Mississippi Forestry Commission in cooperation with MARIS Technical Center.

LEAD ORGANIZATON: The Mississippi Forestry Commission will serve as the lead organization. The Project Manager will be

Michael Sampson, Water Quality Coordinator
Mississippi Forestry Commission
301 N. Lamar St., Suite 300
Jackson, MS 39201
Phone: 601-359-1812
Fax: 601-359-1349
E-mail: msampson@mfc.state.ms.us

COOPERATIVE ORGANIZATIONS: Mississippi Forestry Association, Mississippi Automated Resource Information System and Southern Group of State Foresters

FINANCIAL OFFICER: Lezlin Proctor will serve as the chief financial officer on the project. She can be reached at the following:

Lezlin Proctor, Chief Financial Officer
301 N. Lamar St., Suite 300
Jackson, MS 39201

Phone: 601-359-2834
FAX: 601-359-4063
E-mail: lproctor@mfc.state.ms.us

PROJECT LOCATION: Big Black, Tombigbee and Tennessee River Basins.

HUCs included for the Big Black River Basins are as follow:

- 08060201
- 08060202

HUCs included for the Tombigbee and Tennessee River Basins are as follow:

- 03160201 03160106 03160103 06030006
- 03160202 03160105 03160102 06030005
- 03160108 03160104 03160101 06040001

(Attached is two maps of the Big Black, Tombigbee and Tennessee River Basins with 8-Digit HUCs).

PROJECT OBJECTIVE: The objective of this project is to evaluate the use of voluntary best management practices (BMP's) in the Big Black, Tombigbee and Tennessee River Basins.

PROJECT DESCRIPTION: Best Management Practice monitoring will be conducted in the Big Black, Tombigbee and Tennessee River Basins. The Bogue Chitto Creek, Buttahatchee Creek, and Luxapallila Creek are priority watersheds where BMP monitoring activities will begin first.

A. Purpose

The purpose of the BMP monitoring is to evaluate the use of voluntary BMPs by the forestry community in the Big Black, Tombigbee, and Tennessee River Basins. The Bogue Chitto Creek, Buttahatchee Creek, and Luxapallila Creek are priority watershed where silvicultural activities are not noted for impairing water quality on the TMDL 303d list.

Best management practice monitoring provides useful information on where problem areas are geographically. By knowing this information we can determine areas to provide training and education efforts. By monitoring silvicultral activities the overall integrity of water quality will improve as well as the restoration and protection of all watersheds.

B. Statistical sample

The number of sites to be evaluated will be determined by a random stratified sample of forest removals identified in the 2000 Mississippi Forestry Commission Resource Assessment. The Resource Assessment identified the forest removals and other cover changes in each county by classifying TM satellite imagery for the periods 93/94 and 96/97

To maximize the validity and credibility of the monitoring results, the number of sites evaluated for BMP implementation will be calculated to provide minimum error (+/- 5%) and high confidence (95%).

C. Selecting sites

Once the number of sites to be evaluated per county is determined, an aerial reconnaissance will be used to identify the specific sites to be evaluated on the ground. The following criteria will be used in identifying sites to be evaluated on the ground.

- Forested harvesting activity must have occurred within 24 months.
- Sites must be 10 acre or greater.
- Sites will be selected for monitoring without regard to ownership.

Note: Mississippi Forestry Commission decided that ten-acre site with silvicultural activity would be the minimum acre to monitor, because it is easier to determine the activity from air and locate a candidate site. However, for the purpose of this study we will consider smaller sites.

D. Collecting data

Data will be collected by members of the MFC water quality team. This will help to insure consistency and credibility. Applicable BMP practices will be evaluated on each site. Each member of the water quality team is trained specifically on BMPs and water quality monitoring. Water quality team members are local specialists for there area.

E. Results

A BMP Implementation Monitoring Report will be prepared summarizing the data collected for each basin. This report will be provided to the Department of Environmental Quality.

If a significant risk to water quality is noted during monitoring, the landowner will be contacted and recommendations provided for repairing the problem. If landowner does not comply with corrective measures in a timely matter, landowner name and site location will be forward to state regulatory agency (MSDEQ).

MILESTONES: The project will begin when funds are available by the Department Of Environmental Quality. Estimated time to complete BMP monitoring for the Big Black, Tombigbee, and Tennessee River Basins is 18 months. The 18-month time cycle will be divided as needed by Basin and priority watersheds. Each milestone listed will take approximately three months to complete.

- Site selection
- Ground truth for accessibility
- Site evaluation

- Statistical Analysis
- Final report
- Aerial reconnaissance

EVALUATION CRITERIA: After the best management practice implementation survey is complete, the Mississippi Forestry Commission will work with the Mississippi Forestry Association and other partners to evaluate and determine what issues to address. The best management practices monitoring survey will be available for the MFC, MDEQ and others to implement strategies to address problem areas. Once the problems are detected, the MFC will work with MSU Extension to provide education, training, and awareness in the problem area to limit the impact on water quality.

PROJECT PERIOD: Project period will be for 18 months.

BUDGET: See Attachments

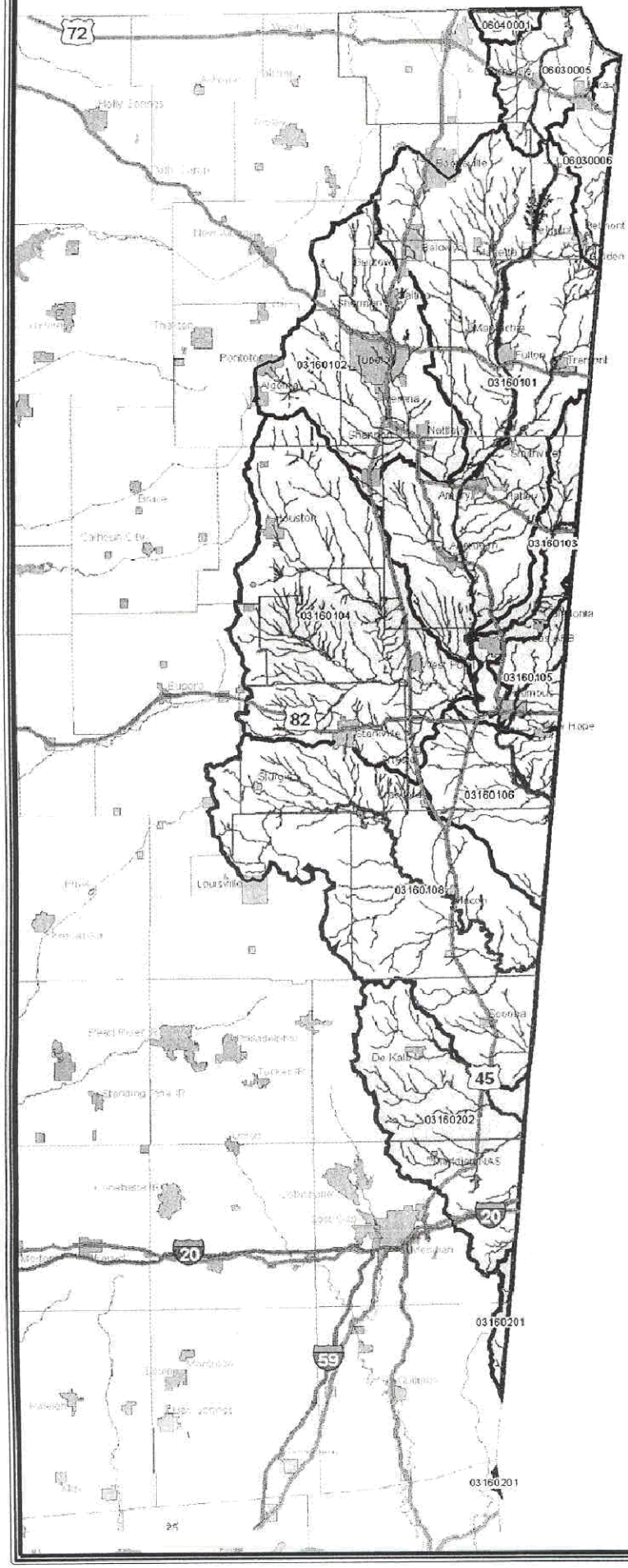
Mississippi Forestry Commission Grant Proposal Budget

Budget Categories	Federal Funds	Non - Federal Funds	Total
Personnel (Salary + Fringe)	$48,864.00	$32,576.00	**$95,440.00**
Travel	$4,000.00		
Equipment	$0.00		
Supplies	$1,500.00		
Contractural	$2,000.00		
Other	$6,500.00		
Indirect Charges	$0.00		
Total	**$62,864.00**	**$32,576.00**	**$95,440.00**

MFC water quality team members salaries is the source of matching funds.

Contractual Expense covers Maris Technical Center fee for developing the statical analysis and sample points.

Other expense covers aircraft cost, and construction of data base.



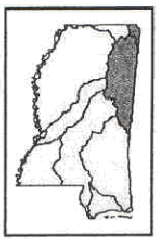
Tennessee and Tombigbee Basins

8-Digit HUCs

5 0 5 10 15 Miles

Legend

- Perennial Stream
- Major River with Labels
- Waterbody
- Interstate
- Highway
- Basin
- Basin County
- City
- 8-Digit HUC



Mississippi Basins

This map produced by the Department of Environmental Quality (MDEQ), Office of Pollution Control, Surface Water Division, Water Quality Assessment Branch, Data Management Section on 12 January 2004.

Map data are from the Mississippi Automated Resource Information System (MARIS). Projection: Mississippi Transverse Mercator

The Mississippi Department of Environmental Quality makes no warranties, expressed or implied, as to the accuracy, completeness, currentness, reliability, or suitability for any particular purpose, of the data contained on this map.

MDEQ

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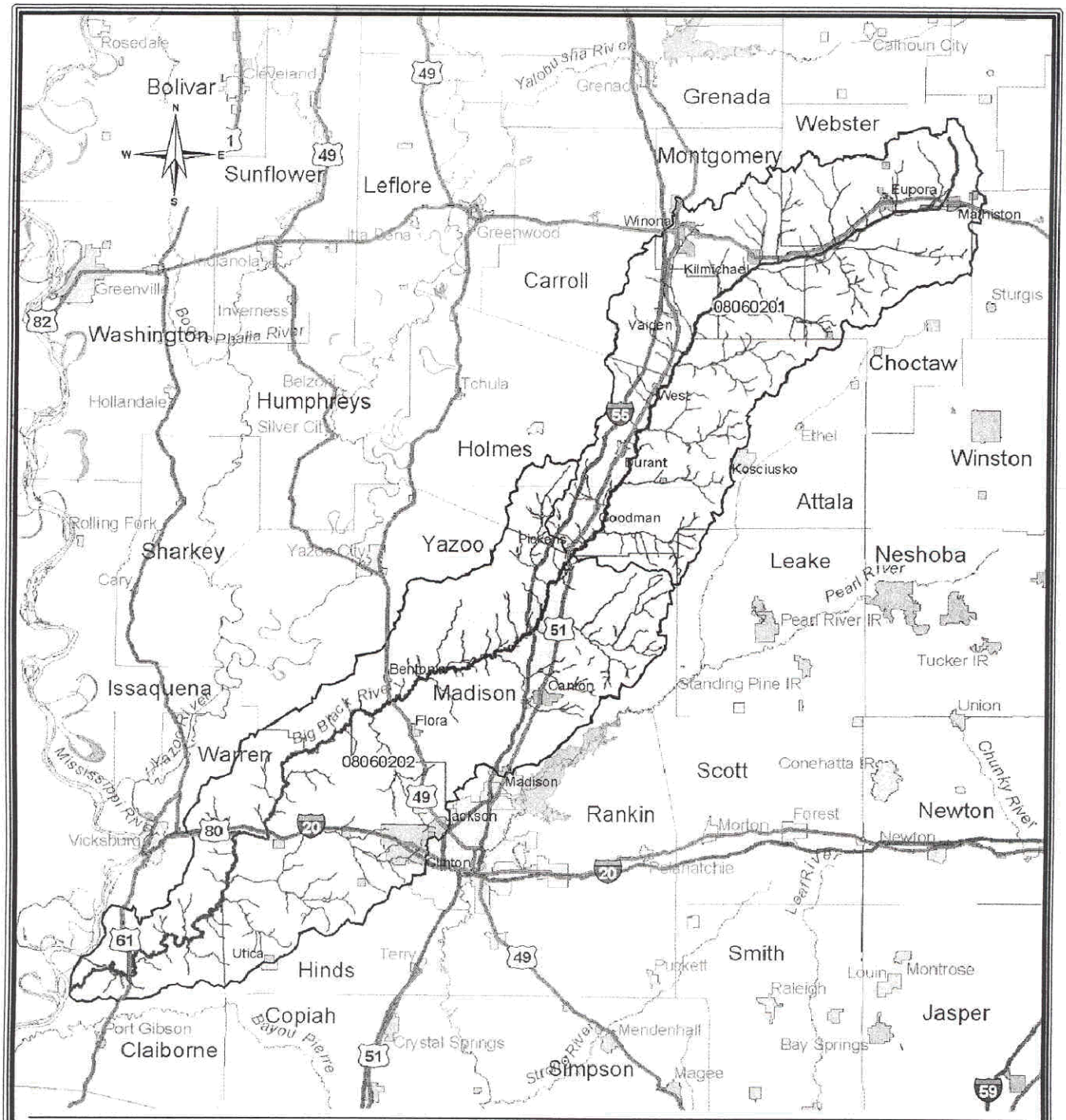


Big Black River Basin

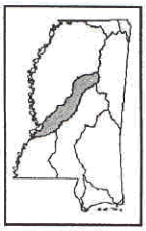
8-Digit HUCs

This map produced by the Department of Environmental Quality (MDEQ), Office of Pollution Control, Surface Water Division, Water Quality Assessment Branch, Data Management Section on 12 January 2004.

The map data are from the Mississippi Automated Resource Information System (MARIS).
Map Projection: Mississippi Transverse Mercator

The Mississippi Department of Environmental Quality makes no warranties, expressed or implied, as to the accuracy, completeness, currentness, reliability, or suitability for any particular purpose, of the data contained on this map.

MDEQ



Mississippi Basins

5 0 5 10 15 20 Miles

Legend

- Perennial Stream
- Major River with Labels
- Interstate
- Highway
- Big Black Basin
- Basin County
- City
- Waterbody
- 8-Digit HUC

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DEVELOPMENT OF GIS LAYERS FOR INDIVIDUAL ONSITE WASTEWATER DISPOSAL SYSTEMS AND OTHER NONPOINT POLLUTION SOURCES

Project Abstract:

The Mississippi State Department of Health (MSDH) is submitting this FY 2003 Grant Proposal to develop GIS layers for Tennessee- Tombigbee and Big Black basin areas within the state to locate individual onsite wastewater disposal systems (IOWDS) and other nonpoint pollution sources. Public health environmentalists located in county health departments will use geographic positioning systems (GPS) to draw polygons including unsewered communities. Within those unsewered areas, further identification and location will be made of both new and existing IOWDS, dairy farms, recreational vehicle campgrounds, and food facilities using IOWDS and/or having NPDES permits. Staff will evaluate unsewered areas for functionality of wastewater systems by visual observation and/or comparison with NRCS soil maps. Following location and evaluation of onsite systems, staff will make recommendations for reducing inputs from identified nonpoint pollution sources. This proposal encompasses a one year project, as indicated by the objectives set forth below.

Objective 1 – During the time frame of the grant project, create GIS layer(s) with delineated polygons encompassing all unsewered communities or significant clusters of unsewered dwellings/businesses in the state; compare with PSC maps for percent coverage of the state.

Objective 2 – During the first six months of the grant project, create GIS layer(s) locate existing IOWDS, dairy farms, recreational vehicle campgrounds, and food facilities using IOWDS and/or having NPDES permits. Make recommendations for reducing inputs from identified nonpoint pollution sources.

Objective 3 – Map new IOWDS statewide over the complete time frame of the grant project.

Objective 4 – During the time frame of the grant project, provide data analysis to include estimated percent failure rates for IOWDS; comparison of GIS layers for IOWDS with NRCS soil maps; and make recommendations for corrections to enhance surface water quality in the basin management areas.

This grant application requests $130,500 in Federal grant money, with $70,0000.00 being supplied as state match. Total cost of this one year project is $200,500.00.

Lead Organization:

Mississippi State Department of Health
Bureau of General Environmental Services
Annex Rm. 102
Greg Burgess, P. E.
Ralph Turnbo, Division Director, Onsite Wastewater
Eugene Herring, Wastewater Program Specialist

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MSDH Financial Officer:

Mitchell Adcock, Director
Bureau of Finance and Accounts
Mississippi State Department of Health

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e-mail mitchell.adcock@msdh.state.ms.us

Proposed Project Location

For the Big Black River Basin, these efforts will be concentrated in the Lower Big Black, which lies within 08060202, and the Bogue Chitto Creek Watershed, which lies within HUC 08060202. For the Tennessee-Tombigbee River Basin, these efforts will be focused in the Noxubee Refuge/Noxubee River area and also the Buttahatchie River area, which lies within HUC 03160103. Included in these targeted areas of interest are the following areas:

Buttahatchie Creek and Tenn Tom Waterway

Gattman	Individual Onsite Wastewater Disposal Systems
Caledonia	Central & Individual Onsite Wastewater Disposal Systems
Columbus AFB	Central & Individual Onsite Wastewater Disposal Systems

Big Black

Bentonia	Central & Individual Onsite Wastewater Disposal Systems
Flora	Central & Individual Onsite Wastewater Disposal Systems
Edwards	Central & Individual Onsite Wastewater Disposal Systems
Pickens	Central & Individual Onsite Wastewater Disposal Systems
Goodman	Individual Onsite Wastewater Disposal Systems
Durant	Central & Individual Onsite Wastewater Disposal Systems
West	Central & Individual Onsite Wastewater Disposal Systems
Vaiden	Central & Individual Onsite Wastewater Disposal Systems
Kilmicheal	Central & Individual Onsite Wastewater Disposal Systems
Sallis	Individual Onsite Wastewater Disposal Systems

Project Objectives:

The general goal of this project is the development of GIS layers of the basin management areas statewide to locate nonpoint pollution sources, e.g. IOWDS.

Objective 1 – During the time frame of the grant project, create GIS layer(s) with delineated polygons encompassing all unsewered communities or significant clusters of unsewered dwellings/businesses in the state; compare with PSC maps for percent coverage of the state.

Objective 2 – During the time frame of the grant project, create GIS layer(s) locate existing IOWDS, dairy farms, recreational vehicle campgrounds, and food facilities using IOWDS and/or having NPDES permits. Make recommendations for reducing inputs from identified nonpoint pollution sources.

Objective 3 – Map new IOWDS statewide over the complete time frame of the grant project.

Objective 4 – During one year of the grant project, provide data analysis to include estimated percent failure rates for IOWDS; comparison of GIS layers for IOWDS with NRCS soil maps; and make recommendations for corrections to enhance surface water quality in the basin management areas.

Project Description:

Nonpoint source water pollution is a significant cause of water quality problems in Mississippi, having an adverse impact on the state's water resources. Individual onsite wastewater disposal systems (IOWDS) are included in the category of "urban runoff", one of the seven major categories of nonpoint source land uses. The Mississippi State Department of Health (MSDH) is delegated authority by state statute to regulate IOWDS, including making recommendations for proper system installation, approving systems upon request, and mandating appropriate repairs when needed. Another major nonpoint source land use is "agricultural", a category which

includes Grade A dairy farms regulated by the MSDH.

According to the 1990 U. S. Census, 42% of individual residences in Mississippi have no access to public sewage disposal and rely instead on IOWDS. While these systems can be very effective, factors at a particular site such as a high seasonal water table in the soil, flood hazard, presence of any impermeable subsurface layer, and low soil permeability can cause this type system to fail. Failed sewage effluent drain field systems become a health hazard when the effluent breaks through the surface of the ground, or contaminates groundwater or surface waters. The discharge from improperly functioning systems, via rainwater runoff or percolation, can be a direct cause of impairment of water bodies.

In recent years, the potential for groundwater and surface water pollution from onsite wastewater disposal systems has emerged as a serious concern. Domestic wastewater is known to contain many elements that are capable of causing illness and even mortality in man, through either direct or indirect contact. More than one hundred different virus types may be found in raw sewage. A number of bacterial pathogens are also present in sewage, the most common of which are members of the genus *Salmonella*, which is responsible for an estimated one to two million human disease cases in the United States, annually. Although little attention has been given to the presence of protozoa in sewage, waterborne outbreaks of parasitic agents are known to have occurred from contaminated surface water. Raw sewage or improperly treated wastewater can be a contributing factor to nearly every listed "cause" of water-body impairment: pathogens, nutrients, organic enrichment, low dissolved oxygen, turbidity, suspended solids, and general biological impairment.

This FY 2003 grant application titled "Development of GIS Layers for Individual Onsite Wastewater Disposal Systems and Other Nonpoint Pollution Sources" seeks funding to develop GIS layers of the basin management areas statewide to locate nonpoint pollution sources that include entities regulated by the MSDH, such as IOWDS (both newly installed and existing), dairy farms, recreational vehicle parks, and other facilities such as food facilities utilizing IOWDS. Unsewered areas will be delineated first. Then county health department environmental staff will locate, using GPS, the above-mentioned sources. With assistance from state-level wastewater program specialists, they will evaluate for functionality of the IOWDS in unsewered areas by visual observation and/or comparison with NRCS soil maps. Data collected from the project will create GIS layers for the basin management areas statewide. MSDH staff will make recommendations for reducing inputs from identified nonpoint pollution sources. This information should be helpful to DEQ staff in developing TMDL's for targeted waterbodies and in prioritizing drainage areas.

Using federal grant funds, the MSDH will purchase a GPS unit and handheld computing device (such as Palm Pilot) for each of 80 county health departments. The GPS unit will be connected to the handheld unit allowing a data entry program to be developed for the Palm/GPS combination to simplify data collection. The information collected using the Palm/GPS combination will then be downloaded through the agency LAN system to a central database. Utilizing this format will improve the accuracy of the collected data. The palm devices will allow the elimination of a paper form for gathering data, such as system type and condition, for

each IOWDS site, and will also eliminate the need for contractual monies for data entry personnel each year. Grant funds will also be used for software (including ArcView), plotters, and computer support personnel. There will also be a need for a contract administrator (25% time). MSDH will provide training during the first year to at least 100 district and county health department Environmentalists on use of the palm devices and GPS units.

The first mapping activities of the project will encompass locating every new IOWDS where the MSDH participates in its recommendation/approval, every existing system requested to be approved, and every wastewater complaint investigated. This encompasses approximately 20,000 sites annually. Over the course of four years of the project, approximately 80,000 individual systems or potential building sites statewide would be located and mapped. Far fewer in number, but nonetheless significant, are the locations of approximately 350 dairy farms and 80 recreational vehicle campgrounds.

Health department staff will begin by mapping polygons of unsewered areas as they travel in the county assigned to each. When converted to GIS layers, the MSDH will provide this information in preliminary form to DEQ, with comparison to maps from the Public Service Commission (PSC) in order to begin estimating the percent of the state (or of certain basin management areas) that has the heaviest clustering of unsewered dwellings and the relationships with targeted waterbodies. As the project progresses, information will continue to be added. Following the initial location of unsewered areas, existing IOWDS will be mapped through the remainder of the grant period during the course of travel for regular MSDH environmental health activities.

The year for this project will emphasize data analysis: estimated percent failure rate for the existing IOWDS visually inspected; comparison of all systems and unsewered communities with soil maps published by USDA's Natural Resource Conservation Service (NRCS) to estimate the percent land area with unsewered communities located in soils identified as unsuitable for IOWDS. The MSDH will make recommendations for the most viable corrections of identified problems.

The in-kind match (40% of total project or greater) will consist of salary/fringe for county public health environmentalists for the time to utilize their GPS units to locate sites and to input information relating to the sites. Travel costs at $0.36 per mile for county environmentalists will also be part of the MSDH match.

This project will be sustained in future years by continued utilization of the GPS units, palm computing devices, software and plotters to provide location and data to DEQ on all new IOWDS recommended or approved, existing systems requested for approval, as well as sites of wastewater complaints investigated during the regular course of health department work.

Milestones:

Month 1

Contract with Grant Administrator (1/4 time)
Develop specifications on Palm devices, GPS units, and software
Solicit bids on equipment

Conduct training sessions for four (4) districts on use of hardware and software
Begin use of Palm/GPS units to capture "way points" for new IOWDS, existing sites requesting approval, and complaint sites in at least two (2) districts

Conduct training sessions for five (5) districts on use of hardware and software
Continue use of Palm/GPS units to capture site locations in at least four (4) additional districts
Begin to draw polygons of unsewered communities in at least one (1) basin management area

Month 2

Continue use of Palm/GPS units to capture site locations in remaining three (3) districts, thus bringing all nine (9) districts on line
Acquire maps as needed from MARIS, Tax Assessors, PSC, and DEQ

Ongoing use of Palm/GPS units to capture all site locations during regular inspectional activities
Create GIS map layers from points collected to date
Make recommendations for reducing non-point pollution from identified sources

Months 3 - 9

Continue to capture locations of wastewater sources throughout the state
Locate dairy farms, recreational vehicle parks, and food facilities on IOWDS
Create GIS map layers from points collected to date
Overlay collected data in basin areas as determined by DEQ
Continue to make recommendations for reducing non-point pollution

Months 9 - 12

Continue to map new and existing IOWDS, and complaints, statewide
Overlay data points on basin maps and provide to DEQ
Provide data analysis to include estimated failure rates for IOWDS

Compare GIS layers for IOWDS with NRCS maps; estimate percent land area with unsewered communities located in soils identified as unsuitable for IOWDS
Make recommendations for corrections to enhance surface water quality in the basin management areas

Evaluation

The evaluation and quality assurance plan includes strategies that are both process and outcome focused. Process evaluation used to monitor and improve the quality, effectiveness, and efficiency of the project include:

Purchase of Hardware and Software

An accounting will be made through the MSDH Property Office of all Palm devices, GPS units, and software. Equipment items will be inventoried. Receipts for purchase of both hardware and software will be documented through the MSDH Bureau of Finance and Accounts.

Environmentalist Training

The agency has a system which monitors all employee training. Reports from this system will document all training received by environmentalists over the project period.

Number of "Way Points" Captured for Sites/Facilities

100% of permitted dairy farms and recreation vehicle parks, and food facilities on IOWDS will be mapped. The universe is currently 314 dairies and 65 RV parks. Food facilities with IOWDS are unknown statewide, and must be determined from each county's files.
100% of proposed sites for new IOWDS will be mapped for a minimum of 3 calendar years. The number of site evaluations in FY 2001 was 13,407. Additional sites will be located during the initial training phases and continue on through the latter data-analysis phase. A target of 90% of existing approval IOWDS sites and wastewater complaint sites will be mapped. For FY2001, there were 1,974 existing approvals and 3,947 wastewater complaint sites.

A plan will be developed for quality assurance and outcome evaluation in both data collection and data analysis, as well as recommendations for corrections to improve surface water quality in the basin management areas affected by IOWDS:

Monitoring by Contract Grant Project Administrator

Contract administrator will visit each public health district on an as-needed basis for quality assurance audits. Grant project administrator will submit reports as required to DEQ.

Quality Assurance in Map Overlays, Data Analysis, and Recommend

MSDH technical and program management staff, together with the project will review all map layers that are developed, as well as all calculations for areas, failure rates, etc. Recommendations will be consistent with the state Law, the Federal Clean Water Act, MSDH Regulations, and Best Manager for IOWDS.

Project Period

The project period is one year from date of contract with DEQ.

Proposed Budget for DEQ Grant Project

Budget Categories	Federal	State Match	Total $$
Personnel			
PHE's (15)		70,000	70,000
Travel	25,000		25,000
Equipment			
Plotter (1)	10,000		37,400
PDA's (23)	4,900		
Computers (15)	15,000		
Printers (15)	7,500		
Commodities			
GPS's(20)	3,000		3,000
Contractual	65,100		65,100
ArcView (4)			
Data Collectors(2)			
Contract Admin			
Software			
Total	130,500	70,000	200,500

PROJECT TITLE:
Bogue Chitto-Lime Kiln Creek Watershed Nonpoint Source Pollution Project

PROJECT ABSTRACT:
This project will be located in the northeastern portion of Hinds County and the southwestern portion of Madison County in Mississippi.
The objectives of this project will be:

To improve water quality and protect high quality waters through the implementation of selected BMPs in targeted areas.

To apply Best Management Practices (BMPs) to agricultural lands in the project area so as to reach the desired outcome of reduced runoff, sedimentation and cattle access to streams.

To properly manage animals and animal waste.

To inform and educate the public about Best Management Practices that benefit water quality.

The project cost is $532,800. Of this amount, $319,680 in 319 funds are requested with the balance of $312,120 to be supplied as match.

LEAD ORGANIZATION:

Mississippi Soil and Water Conservation Commission
Gail Spears, Project Manager
P.O. Box 23005
Jackson, MS 39225-3005

Phone: (601) 354-7645
Fax: (601) 354-6628
e-mail: gspears@mswcc.state.ms.us

COOPERATING AGENCIES:

Hinds County Soil and Water Conservation District; Madison County Soil and Water Conservation District; USDA Natural Resources Conservation Service; Mississippi Department of Environmental Quality, MS Cooperative Extension Service; United States Geological Survey

GRANT ADMINISTRATOR:

Mark E. Gilbert, Environmental Administrator
MS Soil & Water Conservation Commission
P.O. Box 23005
Jackson, MS 39225-3005

Phone: (601) 354-7645
(601) 540-4210 (cell)
Fax: (601) 354-6628
e-mail: mgilbert@mswcc.state.ms.us

PROJECT LOCATION:

Bogue Chitto-Lime Kiln Creek Watershed (08060202-100)
(see attachment 1 for a map depicting the targeted demonstration areas of the project)

PROJECT DESCRIPTION:

The water quality impairment to be addressed by this project is organic enrichment due to reduced levels of dissolved oxygen. The Mississippi Department of Environmental Quality has identified Bogue Chitto Creek and portions of Limekiln and Straight Fence Creeks as being impaired for a length of 14 miles as reported in the Mississippi 1998 Section 303(d) List of Waterbodies. The impairment was detected based on water quality sampling and screening-level biological monitoring. The biological monitoring was conducted in conjunction with a nonpoint source monitoring project that began in 1991. Following assessment of the data collected through this project, Bogue Chitto Creek was placed on the 303(d) List for organic enrichment/low dissolved oxygen and biological impairment. Additional field study was conducted on Bogue Chitto Creek in August, 1999. This study confirmed that the creek was impaired due to organic enrichment/low dissolved oxygen. A TMDL has been developed for the impairment by MDEQ and it has been targeted for implementation by the Big Black – Tombigbee – Tennessee Basins Group management team.

PROJECT OBJECTIVE:

The Primary objective of this project will be to implement selected Best Management Practices (BMPs) on targeted areas in the Bogue Chitto-Lime Kiln Creek Watershed that will result in reduced pollutant loadings from agricultural nonpoint sources. The main water quality problems to be addressed by this project are sediment and animal waste nutrients from agricultural nonpoint sources. Of primary concern is sedimentation and animal waste runoff from animal operations in the watershed. Soils in the watershed are very erosive, with sheet and gully erosion occurring on sloping cropland and pastureland. Erosion is occurring from cropland in the project area at the rate of 12 tons per acre per year and from pasture land at the rate of 5 tons per acre per year. Nutrients and pathogens from animal waste as well as sediment contained in runoff are entering Bogue Chitto Creek and it's tributaries causing degradation of the resource base.

The erosion of the soil resource base removes nutrients, reduces water holding capacity, undermines plant rooting systems, reduces the soil's organic matter content, reduces soil tilth and degrades water quality within the project area.

The current land uses in the Bogue Chitto-Lime Kiln Creek Watershed include 16,250 acres of cropland, 48,750 acres of pasture land, 35,750 acres of timber land, and 9,500 acres of other land. A visual assessment of the watershed was conducted by NRCS and the MSWCC on October 21st and 22nd, 2003 to confirm land uses. Very few, if any, best management practices are scheduled to be installed in the watershed under the Environmental Quality Incentives Program (EQIP).

This project will be implemented in three phases. Phase I will consist of analyzing existing assessment data, identifying target areas within the watershed where stressors are causing the greatest damage and if the application of needed Best Management Practices will yield a beneficial reduction in pollutant loadings. The Natural Resources Conservation Service (NRCS) will be asked to assist in making an assessment of sediment loadings from eroding streambanks in the watershed. Education and outreach activities will also be conducted during this phase to inform landowners in the watershed about the objectives of the project. The Mississippi Soil and water Conservation Commission will cooperate with the MS Department of Environmental Quality, United States Geological Survey, Mississippi Cooperative Extension Service, MS Department of Health, the NRCS and the Hinds and Madison County Soil and Water Conservation Districts in identifying the appropriate Best Management Practices for targeted areas in the watershed and educating landowners as to the need for their participation.

Phase 2 will consist of (based upon the findings of phase 1) the application of Best Management Practices (BMPs) on targeted areas in the watershed that will result in desired pollutant load reductions. The MSWCC will accomplish this through it's water quality cost share program. In this project, records will be kept at both the state level and local level so as to determine the progress being made in carrying the project out and the benefits that are being received as related to the improvement of water quality within the project. During the planning process with participants, the amount of soil loss from the area to be treated with a particular BMP will be determined and recorded. The amount of soil saved as a result of applying the BMP will also be determined and recorded. Since the pesticides or fertilizer/plant nutrients are transported to the waters as attachments to the sediment, this information will indicate the project effectiveness in reducing pollutant loadings. Participants in the project will be required to maintain BMPs for a period of up to ten years after installation.

Additional education and outreach efforts will be conducted during this phase to inform and educate the public about Best Management Practices that benefit water quality. This will be accomplished by the following:
Establishing at least 2 demonstration farms to inform the public about best management systems.
Conduct at least 2 field day/tours during the life of the project.
Prepare and distribute at least 1,000 fact sheets highlighting the benefits derived from the project.
Publish at least 4 articles about the project in newsletters and local newspapers.
Erect at least 20 project roadside signs which designate where water quality practices are in progress or have been completed.

To address the above stated water quality problems Best Management Practices (BMPs) will be installed on agricultural lands in the project area. Potential BMPs to be installed include but are not limited to:
50 acres of critical area planting
15 grade stabilization structures
200 acres of pasture & hayland planting
20 water and sediment control basins
1,850 acres of nutrient management/grazing land improvement
15 livestock watering ponds
85,000 feet of fencing
8 stream crossings
450 acres of tree planting
350 acres of filter strips

Phase 3 will consist of post BMP evaluation to determine the pollutant load reductions achieved by the application of Best Management Practices. The MSWCC will coordinate with the USGS (who will develop a monitoring plan) in conducting these activities.

MILESTONES:

1. Sign grant contract with MS Department of Environmental Quality. (Month 0)
2. Issue policies and procedures for implementing the project to the SWCD office. (Month 1)
3. Meet with the board of SWCD commissioners to get their understanding of their responsibilities and participation. (Month 2)
4. In conjunction with the local SWCD, establish a locally led watershed advisory group to assist with implementation activities. (Month 2-3)
5. Provide training to district staff. (Month 2-3)
6. Assist in establishing an evaluation system in conjunction with the MS Department of Environmental Quality to indicate the benefits of the project. (Month 2-3)
7. Conduct a landowner meeting to inform potential participants about the project. (Month 3)
8. Secure commitments from several landowners and operators who are willing to participate in the project. (Month 3-4)
9. Assist participants in developing a conservation plan and applying best management practices (Month 4-12)
10. Establish at least demonstration farm (Month 4-12)
11. Document pre-existing site conditions. (Month 2-12) (Before and after photo documentation will be conducted).
12. Accelerate conservation planning and application assistance. Special effort will be made to complete conservation plans during this time frame. (Month 13-24)
13. Conduct at least 1 informational field day/tour to inform the public about the project . (Month 13-24)
14. Establish at least 1 demonstration farm. (Month 13-24)
15. As requested, assist DEQ with evaluations. (Month 0-36)
16. Assemble data on the amount of soil saved. (Month 0-36)
17. Erect project roadside signs which designate where water quality practices are in progress or have been completed. (Month 4-36)
18. Provide continued conservation planning and application assistance to participants. (Month 25-36)
19. Review the status of applying best management practices to reach the objectives of the project. (Month 25)
20. Based upon the needs and finding of milestone 18, assistance in planning and/or application will be redirected and/or accelerated. (Month 25-36)
21. Publish at least 4 articles about the project. (Month 0-36)
22. Publicity of the project will be increased; at least 1 field day/tour will be conducted and at least 1,000 fact sheets will be developed and distributed. (Month 25-36)
23. Bi-annual reports will be made to MSDEQ. (Month 0-36)
24. Make Final report to MSDEQ. (Month 36)

CRITERIA FOR EVALUATION

(also see Phase 1 and 3 information under Project Objective)

The following measures and indicators of progress will be utilized to track the success of this project:

NPS Pollutant Load Reduction – the amount of soil saved as a result of the installation of best management practices (BMPs) in this project will be a direct indicator of sediment load reduction to the Bogue Chitto Creek along with it's tributaries. Since pesticides and fertilizer/plant nutrients are transported to the waters as attachments to the sediment, any reduction in sediment loadings will result in a reduction of pesticide and nutrient loadings thereby enhancing the effectiveness and success of the project.

Implementation of NPS Controls – this project will involve the installation of Best Management Systems. Best Management Systems are defined as a combination of BMPs, both structural and vegetative, which are the most practical, effective and economical means of preventing or reducing pollution from nonpoint sources to a level compatible with water quality goals. **The estimated types and numbers of BMPs to be installed as part of Best Management Systems are listed in the project description of this proposal.** The application of best management systems in the project will be the responsibility of the landowners and operators participating in the project as cooperators of the local soil and water conservation district.

Public Education, Awareness, and Action - this project will include the establishment of at least 2 demonstration farms that will be used to inform the public about best management systems. These will be utilized during the 2 field day/tours that will be conducted in the project. Also, at least 1,000 informational fact sheets highlighting the benefits derived from the project will be developed and distributed as well as the publishing of at least 4 articles about the project in newsletters and local newspapers. At least 20 project roadside sign will be erected where water quality practices are installed in the project. Other educational actions will be conducted to measure the success of the project. These include such things as increased public awareness; before and after photo documentation; increased cooperation among agencies, associations, public bodies and educational institutions; and the economic benefits of applying best management practices. The Mississippi Soil and Water Conservation Commission will request information through the local soil and water conservation district that will assist in measuring the success of the project in the demonstration area.

PROJECT PERIOD

The length of this project will be 3 years.

PROJECT BUDGET

BUDGET CATEGORY	FEDERAL FUNDS	NON-FEDERAL FUNDS	TOTAL
Technical Assistance/ Travel	$ 15,000	$ 10,000 *	$ 25,000
Installation of BMPs	$ 289,680	$ 193,120 **	$ 482,800
Contractual	$ 10,000	$ 6,667 **	$ 16,667
Information/Education	$ 5,000	$ 3,333 *	$ 8,333
TOTAL	$ 319,380	$ 213,120	$ 532,800

* Non-federal match for technical assistance/travel and information/education will be provided the local soil and water conservation district commissioners, soil and water conservation district staff and Mississippi Soil and Water Conservation Commission staff time spent on the project.

** Non-federal match for installation of BMPs and contractual will be provided by out of pocket expenses of the landowners and operators participating in the project.