LUXAPALLILA CREEK WATERSHED IMPLEMENTATION PLAN

FINAL
APRIL 6, 2004

LUXAPALLILA CREEK WATERSHED IMPLEMENTATION PLAN

Prepared for

Big Black – Tombigbee
Tennessee River Basins Team

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Goals and Actions for Luxapallila Creek Watershed in Coming Basin Management Cycle

GOAL	WHO	WHAT	WHERE	WHEN	CONTACTS
Protect threatened and endangered species present in Luxapallila Creek watershed	MSU Extension Service	Initiate Phase I of Medallion Farmer program	Lowndes County	2004	Larry Oldham, MSU Extension Service 662-325-2701
	USDA NRCS, MSWCC, MSU Extension Service, MDAC-NRI, USFWS	Continue existing projects related to farmer education, BMP implementation, and habitat restoration and conservation	Throughout watershed	2004 - 2008	Larry Williams, NRCS 601-965-5227 Mark Gilbert, MSWCC 601-354-7645 Larry Oldham, MSU-Extension Service 662-325-2701 Jim Lipe, MDAC-NRI 601-359-1135 Lloyd Inmon, USFWS 601-321-1134
	Mississippi Forestry Commission	Aerial survey to determine silvicultural 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 State Department of Health	Survey locations of failing septic systems	Throughout watershed	2004 - 2005	Eugene Herring, MSDH 601-576-7779
	Mississippi Museum of Natural Science	Mussel population survey	Yellow Creek	2005, 2007	Dr. Bob Jones Mississippi Museum of Natural Science 601-354-7303
	MDEQ	Water quality monitoring	Ambient monitoring station on Luxapallila Creek	2005 – 2008	Henry Folmer, MDEQ 601-664-3910
	Tombigbee River Valley Water Management District	Stream bank stabilization	Luxapallila Creek near Columbus, MS	2004	Richard Bryant, TRVWMD 662-842-2131

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1.0 MISSION STATEMENT

The mission of the Mississippi Department of Environmental Quality (MDEQ) is to safeguard 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. Protecting threatened and endangered species in Luxapallila Creek Watershed by improving environmental and socioeconomic habitat will not only contribute directly to the environmental aspect MDEQ's mission, but also contribute to the economic viability within the watershed.

2.0 LUXAPALLILA CREEK WATERSHED

2.1 Watershed Description

Luxapallila Creek drains approximately 507,300 acres of the Tombigbee River Basin in Lowndes County in northeastern Mississippi and portions of Lamar, Pickens, Fayette, and Marion Counties in northwestern Alabama (Figure 2.1)(MDEQ, unpublished). Approximately 85,100 acres of the watershed is in Mississippi. We estimate that approximately 47,000 people lived in the watershed in 2000 (based on 2000 county census data). Approximately half of these people (28,000) lived in the lower part of the watershed, in Lowndes County, Mississippi, and approximately one-quarter of them (13,000) lived in Columbus, Mississippi. Other Mississippi towns located in the watershed include Steens and New Hope. Major Alabama towns located in the watershed include Vernon, Crossville, Millport, Kennedy, Belk, Fayette, Gu-Win, and Brilliant. 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 (50%) and agriculture (33%) (MDEQ unpublished).

The majority of the watershed is underlain by the Eutaw and Tuscaloosa formations. The topography of the watershed is open hills with 200 – 400 feet of relief in the middle and upper watershed, and flat to gently rolling lowlands in the lower portion of the watershed near Tombigbee River (MDEQ 1998). Soils in the watershed are weathered chalk soils with sand-humus-chert gravel soil. Table 2.1 is a list of the major soils in the watershed and their characteristics (NRCS 1911). Major ecoregions that occur in the watershed include Fall Line Hill, Flatwoods/Alluvial Prairie Margins, and Blackland Prairie. Native vegetation in the watershed is primarily oak-hickory-pine forest with some sweet gum-oak-juniper forest and prairie (MDEQ 1998).

Prior to European settlement, the Choctaw and Chickasaw tribes occupied the lands in the Luxapallila Creek Watershed. European settlement of the area began sometime in the early 1800s. The economy of this area has historically been based on agriculture. Even though agriculture in this area has been declining since the late 1940s, it is still an important economic factor for the area. Forest products and diversified manufacturing are the other two leading components of the economy of the area today (Matt Hicks, The Nature Conservancy).

Table 2.1. Major Soils in Luxapallila Creek Watershed.

Soil Association	Description
Jena-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

Yellow Creek and Luxapallila Creek upstream of Columbus are used for fishing (DeLorme 1998). Gravel mining takes place along Luxapallila Creek (USGS).

Named creeks in the watershed include Luxapallila Creek, Yellow Creek, Magby Creek, Cooper Creek, Mayhew Creek, Mud Creek, McCrary Creek, and Vernon Branch (MDEQ unpublished). The lower end of Luxapallila Creek is backwater from the Tennessee-Tombigbee Waterway. Portions of Luxapallila Creek have been dredged and channelized for flood control, primarily in Alabama. Channel modification and desnagging for flood control has been done on Luxapallila Creek within the city limits of Columbus, Mississippi (US Fish and Wildlife Service 1993, Mike M^{c}Cowan, U.S. Army Engineers Mobile District).

Approximately 39,672 acres of wetlands occur along the primary streams and their tributaries, with large areas of intact and functional wetland systems (Matt Hicks, The Nature Conservancy). Water levels in the creeks and wetlands are maintained by shallow aquifers that underlay the watershed. Deep, confined aquifers are the primary drinking water source in the watershed. Portions of the watershed are recharge areas for the Tuscaloosa-Gordo and Coker, and Eutaw-McShan aquifers (MDEQ 1998, ADEM 2000).

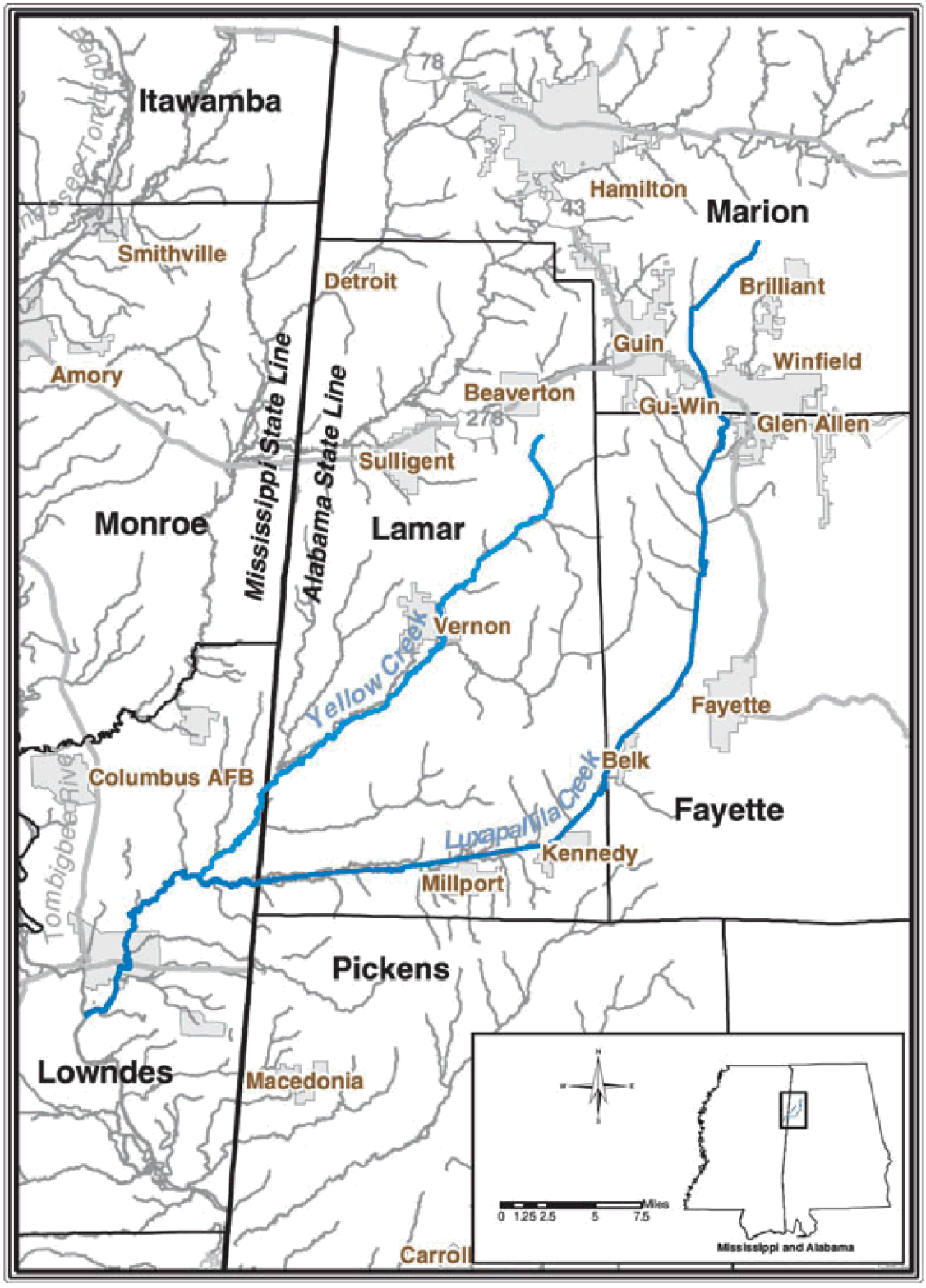

Figure 2.1. Luxapallila Creek Watershed

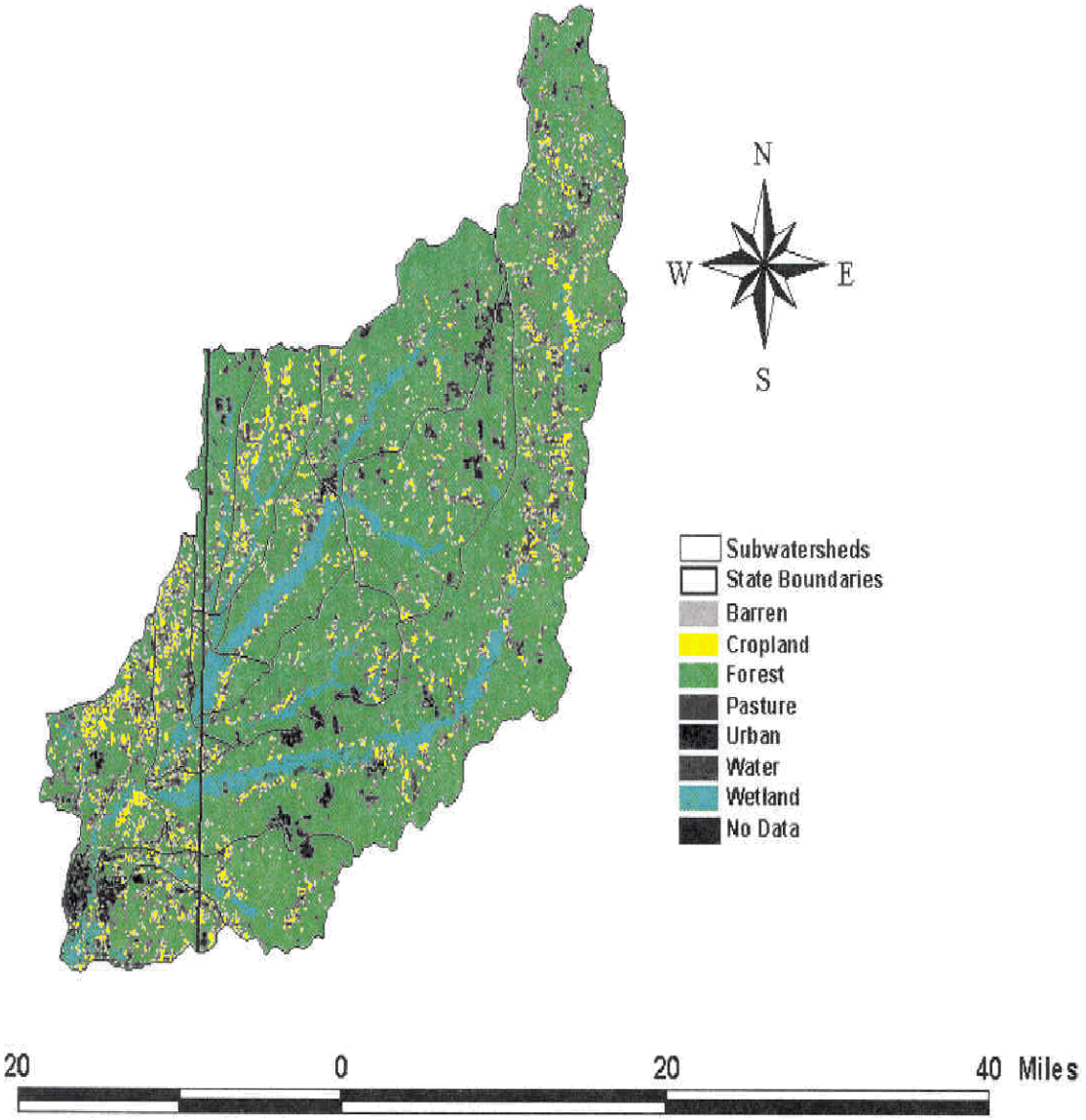

Figure 2.2. Luxapallila Creek Watershed Land Use.

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 indicate that waters with this designated use must meet water quality criteria for Secondary Contact Recreation. Luxapallila Creek is also designated as a Public Water Supply from the Mississippi-Alabama state line downstream to Mississippi Highway 50. Yellow Creek is also designated as a Public Water Supply from the Mississippi-Alabama state line to its confluence with Luxapallila Creek (http://www.deq.state.ms.us/MDEQ.nsf/page/WQAB_tombigbeedesignate?OpenDocument). Table 2.2 lists water quality criteria for secondary contact recreation and public water supplies (MDEQ 2002).

Table 2.2. Mississippi Water Quality Criteria for Luxapallila Creek Watershed.

Parameter	Secondary Contact Recreation	Drinking Water Supply
Dissolved Oxygen	5.0 mg/L daily average, 4.0 mg/L instantaneous	5.0 mg/L daily average, 4.0 mg/L instantaneous
PH	Between 6.0 and 9.0 su	Between 6.0 and 9.0 su
Temperature	32.2 deg C	32.2 deg C
Fecal Coliform	May-October: geometric mean of 200 per 100 ml, 400 per 100 ml less than 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% of the time during a 30 day period	May-October: geometric mean of 200 per 100 ml, 400 per 100 ml less than 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% of the time during a 30 day period
Specific Conductance	1000 uohms/cm	500 uohms/cm
Dissolved Solids	750 mg/L monthly average, 1500 mg/L instantaneous	500 mg/L
Chlorides		230 mg/L
Odor		Daily average threshold odor number 24
Radioactive Substances		1000 picocuries/L
Barium		2.0 mg/L
Fluoride		2.0 mg/L
Lead		0.015 mg/L
Nitrate (as N)		10 mg/L

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 Luxapallila Creek is 57.71.

2.2.2 Current Condition

2.2.2.1 Surface Water Quality

A number of rounds of water quality sampling have been conducted on Luxapallila Creek at multiple locations, primarily between Columbus and the state line. A list of water quality parameters measured in Luxapallila Creek Watershed and their period of record is included in Appendix A. Not all of the parameters were measured at all of the stations for the entire listed period of record. A complete listing of these data are also included as Appendix A. In 2001 an assessment of habitat, benthics, and water quality was conducted on Luxapallila Creek near Steen, MS. The data collected during this assessment is also included in Appendix A. A list of reports with information on the condition of Luxapallila Creek and its tributaries is also included in Appendix A. Water quality in the watershed is generally considered to be meeting water quality criteria. The M-BISQ score for Luxapallila Creek (sampled at Gunshot Road) is 70.66. Since this value is greater than the attainment threshold M-BISQ score for the bioregion (57.71) Luxapallila Creek is classified as attaining the designated use of Fish and Wildlife Support.

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

There are a number of endangered species in the watershed. See Table 2.3 for a list of the species and their habitat. All of the mussel species in Table 2.3 are still present in Luxapallila Creek (USFWS 1993). In addition, there are approximately 60 species of "special concern" for

Lowndes County included in the Natural Heritage Inventory (http://www.mdwfp.com/museum/htm/research/inventory.asp). A listing of these species of special concern is included in Appendix B.

Table 2.3. Federally Listed Species in the Luxapallila Creek Watershed.

Species	Status	Habitat
Bale eagle *Haliaectus leucociphalus*	Threatened	Near waterbodies, forest areas, away from human activity and development
Orange-nacre mucket mussel *Lampsilis perovalis*	Threatened	Stable gravel and sandy-gravel substrates in high quality lotic habitats
Alabama moccasinshell mussel *Medionidus acutissimus*	Threatened	Stable gravel and sandy-gravel substrates in high quality lotic habitats
Southern clubshell mussel *Pleurobema decisum*	Endangered	Stable gravel and sandy-gravel substrates in high quality lotic habitats
Ovate clubshell mussel *Pleurobema perovatum*	Endangered	Stable gravel and sandy-gravel substrates in high quality lotic habitats

A number of groups have been involved in surveying aquatic communities in the Luxapallila Creek Watershed. A summary of aquatic communities data collection activities in the watershed is included in Appendix B.

The populations of listed mussel species in the watershed are considered to be in good condition. The Nature Conservancy has identified Luxapallila Creek Watershed as a priority area for freshwater conservation actions (Smith et al. 2002).

2.2.3 TMDLs

Luxapallila Creek from the Mississippi-Alabama state line to Yellow Creek, Yellow Creek, and McCrary Creek were listed as impaired for secondary contact recreation due to pathogens on the 1998 Mississippi 303(d) List. A TMDL was completed for this listing. Based on information collected during the development of the TMDL, MDEQ petitioned EPA Region 4 to have Luxapallila Creek and its tributaries removed from the 303(d) List. In 2002 Luxapallila Creek and its tributaries were de-listed, and were excluded from 2002 303(d) List as an impaired due to pathogens (Mary Katherine Brown, MDEQ).

2.3 Stakeholder Concerns

Luxapallila Creek was selected for implementation of protection activities based on its good water quality and presence of endangered mussel species (MDEQ 2002). In the early 1990s concern about increasing turbidity due to agricultural field erosion prompted a project to implement erosion BMPs in the watershed and monitor their success (MDEQ 1999).

Populations of threatened and endangered mussel species present in the Luxapallila Creek 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 Luxapallila Creek 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 Luxapallila 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 US Fish and Wildlife Service (USFWS) have developed a recovery plan for the Mobile River Basin aquatic ecosystem that addresses the threatened and endangered mussel species in the Luxapallila Creek Watershed (USFWS 2000).

The adverse effects of increased erosion and sediment loading on mussel species are well understood. 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 Luxapallila Creek Watershed is a priority.

Increased nutrient inputs to streams are 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.

Table 2.4 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 2.4 is included as Appendix C. The listing in Appendix C includes a 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 2.4. Detailed Listing of Stakeholder Concerns.

Status	Description
Concern:	Loss/alteration of habitat for endangered mussel populations.
Cause:	Causes include backwater from Tombigbee River impoundment, dredging, channelization, sedimentation, gravel mining, water quality degradation.
Location:	Impairment occurs in Luxapallila Creek.
Extent:	Loss of habitat due to effects of impoundment occur near the confluence with the Tombigbee River. Dredging, channelization and desnagging has occurred near the confluence with the Tombigbee River, in the city of Columbus, MS, and upstream of the Alabama state line. Gravel mining occurs along the Luxapallila near the confluence with Tombigbee River.
Concern:	Loss of mussel fish host species
Cause:	Probable causes include impoundment, water quality degradation, and siltation.
Location:	Impairment could occur in Luxapallila Creek and tributaries
Extent:	Currently unknown.
Concern:	Introduction of exotic species- Asiatic clam (*Corbicula fluminea*), zebra mussel (*Dreissena polymorpha*)
Cause:	Probable cause of introduction of zebra mussel would be barge traffic along Tennessee-Tombigbee Waterway, method of introduction for asiatic clam unknown.
Location:	Asiatic clam present throughout watershed, zebra mussel not known to be present in watershed.
Extent:	Asiatic clam present throughout watershed, zebra mussel not known to be present in watershed.
Concern:	Water quality degradation
Cause:	Possible causes include agricultural run off, point source inputs, silviculture runoff, residential and urban runoff, and head cutting.
Location:	Impairment could occur in Luxapallila Creek and tributaries.
Extent:	No currently known water quality impairment in Luxapallila Creek and its tributaries.

3.0 IMPLEMENTATION PLAN

3.1 Scope

This Watershed Implementation Plan covers only the portion of the watershed that is in Mississippi. All references to the Luxapallila Creek Watershed or Basin in the remainder of this document refer to that portion of the watershed that is in Mississippi. Alabama Department of Environmental Management (ADEM) is using a watershed management approach in their state Nonpoint Source Management Program and will develop a Watershed Implementation Plan for Luxapallila Creek Basin in Alabama in the future. The Mississippi and Alabama plans will incorporate interstate cooperation in dealing with Luxapallila Creek 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 goal for this watershed implementation plan is to protect the currently good quality of the Luxapallila Creek Watershed because it is easier and cheaper to prevent degradation than to try to restore a degraded watershed. Goals related to other existing or potential issues in this watershed will be included in future implementation plans for this watershed.

The goals for this watershed implementation plan are to:

- 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 fish species, and;
- Maintain the currently good water quality in Luxapallila Creek and its tributaries (i.e. continue to achieve state water quality standards).

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

- Reduce sediment loads to streams
  - ♦ Cropland BMPs
  - ♦ Pasture BMPs
  - ♦ Inventory silviculture BMPs
- Reduce nutrient loads to streams
  - ♦ Locate failing septic systems
  - ♦ Cropland BMPs
  - ♦ Pasture BMPs
  - ♦ Inventory silviculture BMPs
  - ♦ Stream bank stabilization
- Manage point source discharges
- 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 values shown for load reductions, number of management practices to be installed, and costs are planning estimates and subject to change.

3.3.1 Locate Failing Septic Systems

3.3.1.1 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. 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.

3.3.1.2 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 County. 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.

3.3.1.3 Schedule

The initiation of the project to map onsite wastewater disposal units will take approximately 12 months, from March 2004 to March 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 Beginning the use of GPS units in the field in six districts and development maps of unsewered communities is scheduled for the first month.
- All nine districts are 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.

3.3.1.4 Budget

The budget for mapping onsite wastewater systems is shown in Table 3.1. The budget shown is for performing these activities for the whole of Basin Group I.

Table 3.1. 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

3.3.2 Cropland BMPs

3.3.2.1 Objectives

Croplands were identified as potentially major sources of sediment and phosphorus in Buttahatchee River Watershed (TVA 2000), and it is reasonable to assume similar conditions exist in the Luxapallila Creek Watershed. Assuming pollutant-loading rates similar to those estimated for the Buttahatchee River Watershed (TVA 2000), installation of cropland BMPs (e.g. filter strips, terracing) may result in the following reductions of pollutant loads:

- Up to approximately 800 tons/year of suspended solids load,
- Up to approximately 1 ton/year of total nitrogen load, and
- Up to approximately 1 ton/year of total phosphorus load.

3.3.2.2 Activities

Cropland BMPs will be implemented on up to 2,000 acres of cropland over the next four years. Potential cropland BMPs to be installed include, but are not limited to, filter strips, cover and green manure crop, field borders, reduced tillage, and terracing. Critical areas for these BMPs are those classified as having low residue (less than 30% residue cover) in the watershed. Enrollment in a conservation or restoration program is another potential activity. Critical areas for conservation or restoration include marginal croplands. Locations of croplands in the watershed are shown in Figure 2.2.

The Mississippi Soil and Water Conservation District for Lowndes County, Mississippi State University Cooperative Extension Service, USDA Farm Services Agency, US Fish and Wildlife 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).

3.3.2.3 Schedule

Best management practices will be installed on 500 acres of cropland each year.

3.3.2.4 Budget

Projected costs for installation of practices on agricultural lands are listed in Table 3.2. Note that these are planning level estimates and subject to change. Potential sources of funding assistance to landowners for these activities include programs of the Mississippi Soil and Water Conservation District for Lowndes County, Natural Resources Conservation Service, US Fish and Wildlife Service, USDA Farm Services Agency, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative.

Table 3.2 Projected Costs of Cropland BMPs.

Activity	Unit cost	Number of units	Total cost
Filter Strip	$176/acre+	2,000 acres	$352,000
Cover Green Manure Crop	$16 - $40/acre+	2,000 acres	$32,000 - $80,000
Terraces	$45 /acre*	2,000 acres	$90,000
Conservation tillage	$19 /acre*	2,000 acres	$38,000
TOTAL			$142,620

*Alabama costs from Table B-11, Freedman et al. 2003
+EQIP 2004 Lowndes County cost list, www.ms.nrc.usda.gov/programs/ms%20countyEQIP%20Information.html

3.3.3 Pasture BMPs

3.3.3.1 Objectives

Pastures were identified as potentially major sources of sediment and phosphorus in Buttahatchee River Watershed (TVA 2000), and it is reasonable to assume that similar conditions exist in the Luxapallila Creek Watershed. Assuming pollutant-loading rates similar to those estimated for the Buttahatchee River Watershed (TVA 2000), installation of pasture BMPs (e.g. stream fencing, livestock watering facilities, forage improvement) has the potential to result in the following reductions of pollutant loads:

- Up to approximately 2,000 tons/year of suspended solids load,
- Up to approximately 2 tons/year of total nitrogen load, and
- Up to approximately 1 ton/year of total phosphorus load.

3.3.3.2 Activities

Approximately 10,000 acres of pasture in the watershed will be improved over the next four years. Locations of pasture are shown in Figure 2.2. Potential pasture BMPs to be implemented include, but are not limited to, stream fencing, livestock water facilities, riparian buffers, stream crossings, pasture and hayland planting, nutrient management, and rotation grazing. Pasturelands may also be enrolled in habitat restoration and conservation programs.

The Mississippi Soil and Water Conservation District for Lowndes County, Mississippi State University Cooperative Extension Service, USDA Farm Services Agency, US Fish and Wildlife 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).

3.3.3.3 Schedule

Approximately 2,500 acres of pasture will be improved each year.

3.3.3.4 Budget

Projected costs for installation of pasture best management practices are listed in Table 3.3. Potential sources of funding assistance to landowners for these activities include programs of Natural Resources Conservation Service, USDA Farm Services Agency, US Fish and Wildlife Service, and the Mississippi Department of Agriculture and Commerce under the Natural Resources Initiative.

Table 3.3 Projected Costs of Pasture BMPs.

Activity	Unit cost	Number of units	Total cost
Forage improvement	$84 - $197/acre*	10,000 acres	$840,000 – $1,970,000
Pasture/hayland planting	$69 – $270/acre*	10,000 acres	$690,000 - $2,700,000
Rotation grazing	$40/acre+	10,000 acres	$400,000
TOTAL			$1,930,000 - $5,070,000

*Alabama costs from Table B-11, Freedman et al. 2003
+http://www.lagr.gc.ca/pfra/land/10.htm

3.3.4 Inventory Silviculture BMPs

3.3.4.1 Objectives

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

3.3.4.2 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 Luxapallila Creek

Watershed. Mississippi Forestry Commission personnel will determine a set of sites harvested within 24 months to be evaluated based primarily 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 sites 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 identified. The Mississippi Forestry Commission will notify landowners of identified water quality threats from silviculture activities. Mississippi State University Extension will assist with any education and training needed to reduce any water quality threats identified.

3.3.4.3 Schedule

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

3.3.4.4 Budget

The budget for the silviculture BMP evaluation is shown in Table 3.4. The budget shown is for performing these activities for the whole of Basin Group I.

Table 3.4 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

3.3.5 Manage Point Source Discharges

3.3.5.1 Objectives

Populations of the threatened and endangered mussel species occurring in the Luxapallila Creek 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 Luxapallila Creek Watershed. The populations of threatened and endangered mussel species present in Luxapallila 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 Luxapallila 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.

3.3.5.2 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. There are 26 NPDES permitted facilities in the watershed. Detailed information about these programs is available elsewhere and is not included in this watershed implementation plan.

3.3.6 Stream Bank Stabilization

3.3.6.1 Objectives

The Tombigbee River Valley Water Management District (TRVWMD) is responsible for maintaining US Army Corps of Engineers flood control projects in the Luxapallila Creek Watershed. This includes bank stabilization. Bank stabilization activities planned by TRVWMD in the Luxapallila Creek Watershed are estimated to have the potential to reduce sediment load by up to approximately 100 tons/yr (assuming one mile of eroding stream bank and an erosion rate of 0.023 t/ft/yr).

3.3.6.2 Activities

The TRVWMD will be installing riprap at eroding stream banks of Luxapallila Creek from Waterworks Road in Columbus downstream to the confluence with Tombigbee River.

3.3.6.3 Schedule

This work is scheduled for spring-summer 2004.

3.3.6.4 Budget

Budget estimates for this work were not available for inclusion in this watershed implementation plan.

4.0 EDUCATION STRATEGY

4.1 Objectives

The overall objective of community education in the Luxapallila Creek 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 Luxapallila Creek 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 Luxapallila Creek Watershed.

4.2 Activities

4.2.1 Mississippi State University Cooperative Extension Service

The Mississippi State University Cooperative Extension Service will be initiating the Medallion Farmer Program in Lowndes County 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.

4.2.2 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 NRCS website or by contacting NRCS or county USDA Service Centers. Education and outreach activities are performed primarily by county conservationists.

4.2.2.1 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 County USDA Service Center.

4.2.2.2 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 County USDA Service Center. 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.

4.2.2.3 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 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.

4.2.2.4 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 .

4.2.3 Mississippi Soil and Water Conservation Commission

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 county districts.

4.2.3.1 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.

4.2.3.2 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.

4.2.3.3 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.

4.2.3.4 Newsletters

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

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

4.2.3.5 Awards

An awards program for outstanding conservation teachers at the elementary and secondary level, 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.

4.2.3.6 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.

4.2.3.7 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 arranged through Gail Spears at the MSWCC office.

4.2.3.8 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). Tours give 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.

4.2.3.9 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, trains teachers and facilitators and is a co-sponsor of this program with USDA/NRCS, MS Farm Bureau, and other sate and federal agencies and organizations.

4.2.3.10 License Tags for Conservation Education

During the 2000 Legislative Session, the Mississippi Legislature passed MSWCC's proposal for a distinctive license, 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 regular license fees.

4.2.3.11 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.

4.2.3.12 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.

4.2.3.13 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. They compete on 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.

4.2.3.14 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. Participants 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 Soil and Water Conservation District.

4.2.4 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.

4.2.5 MDEQ

Nonpoint Source Education/Outreach is a statewide effort that focuses on 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 Mississippian'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.

4.2.5.1 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 2000 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.

4.2.5.2 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. The next workshop is scheduled for 2005.

4.2.5.3 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.

4.2.5.4 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

MDEQ maintains an ambient water quality monitoring station on Luxapallila Creek near the Mississippi-Alabama state line. In 2005, biological sampling for determination of the river index of biotic integrity will be conducted at the Luxapallila Creek station once a year, and water quality samples will be collected quarterly (Henry Folmar, MDEQ).

Mussel populations in Yellow Creek are routinely monitored by the Mississippi Museum of Natural Science. Every two to three years museum personnel survey mussel populations in Yellow Creek. 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 Yellow Creek 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 Luxapallila Creek near the public boat ramp 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. Luxapallila Creek was last surveyed in 1998. A survey is tentatively scheduled for 2004 (Larry Pugh, Mississippi Department of Wildlife, Fisheries, and Parks).

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 occurring 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:

- 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,
- MBISQ greater than 57.71, and
- 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 for Basin Group I under the Basin Management Cycle. The Luxapallila Creek Implementation Team (See Sections 3.0), beginning in January 2008 will organize the evaluation of this plan. 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 Luxapallila Creek surface waters, 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 protecting Luxapallila Creek watershed quality will be revised based on knowledge that has been gained since 2003. The of the revised watershed implementation plan will be completed in April, one month after the evaluation has been completed.

The draft revised 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 plan. 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.

6.0 REFERENCES

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APPENDIX A

Water Quality Data

Program **SSIS** Project **IBI01** Lat: **33 33 35.1** Lon: **88 19 2.2**

Station Id **TB132** Alias **545** Name **LUXAPALILLA RIVER**

Location **STEENS** County **LOWNDES**

Benthics Sample

Sample Id	**368**	Collection Date	**03-08-01**
Activity Id	**B-368**	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**	**4**	**6**	**0**	**5**	**5**

Benthics

Repnum	Sno	TaxaId	Stag	FinalId	Individuals	Ind Orig	Ind.Rec	TCR
0	1	76	A	Cambaridae	1	1	0	1
0	2	84	L	Ceratopogonidae	1	1	0	1
0	3	94	L	Cheumatopsyche	1	1	0	1
0	4	160	L	Dubiraphia	1	1	0	1
0	5	123	A	Crangonyx	1	1	0	1
0	6	272	L	Isoperla	1	1	0	2
0	7	177	A	Enchytraeidae	1	1	0	1
0	8	499	L	Rheocricotopus	2	2	0	1
0	9	503	L	Rheotanytarsus	3	3	0	1
0	10	518	L	Simuliidae	172	172	0	1
0	11	547	A	Synurella	1	1	0	1
0	12	556	L	Tanytarsus	3	3	0	1
0	13	596	L	Pycnopsyche	1	1	0	1
0	14	781	P	Chironomidae Unid	1	1	0	1
0	15	808	L	Polypedilum obtusum	1	1	0	3
0	16	816	L	Polypedilum flavum	10	10	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

Basin_Name	Station_ID	Program	Project	Sample_ Purpose	Sample_Purpose_De scription	Ecoregion	Waterbody_Name	Location	Location	Location
TOMBIGBEE RIVER	TB470	SSIS	SPS99	SPS			LUXAPALLILA CREEK	Near	COLUMBUS	SE OF COLUMBUS
TOMBIGBEE RIVER	TB470	SSIS	SPS99	SPS			LUXAPALLILA CREEK	Near	COLUMBUS	SE OF COLUMBUS
TOMBIGBEE RIVER	TB470	SSIS	SPS99	SPS			LUXAPALLILA CREEK	Near	COLUMBUS	SE OF COLUMBUS
TOMBIGBEE RIVER	TB470	SSIS	SPS99	SPS			LUXAPALLILA CREEK	Near	COLUMBUS	SE OF COLUMBUS
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TOMBIGBEE RIVER	TB470	SSIS	SPS00	SPS			LUXAPALLILA CREEK	Near	COLUMBUS	SE OF COLUMBUS
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TOMBIGBEE RIVER	02443600	AMBN	AMB00	AMB		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	02443600	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	02443600	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
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TOMBIGBEE RIVER	02443600	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	TB469	SSIS	SPS	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	TB469	SSIS	SPS99	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	TB469	SSIS	SPS99	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	TB469	SSIS	SPS99	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
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TOMBIGBEE RIVER	TB469	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
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TOMBIGBEE RIVER	TB469	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82
TOMBIGBEE RIVER	TB469	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	COLUMBUS	AT OLD HWY 82

Basin_Name	Station_ID	Program	Project	Sample_ Purpose	Sample_Purpose_De scription	Ecoregion	Waterbody_Name	Location	Location	Location
TOMBIGBEE RIVER	02443500	AMBN	AMB99	AMB		65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
TOMBIGBEE RIVER	02443500	AMBN	AMB99	AMB		65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
TOMBIGBEE RIVER	02443500	AMBN	AMB99	AMB		65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
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TOMBIGBEE RIVER	02443500	AMBN	AMB01	AMB		65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
TOMBIGBEE RIVER	02443500	AMBN	AMB01	AMB	MONTHLY STUDY	65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
TOMBIGBEE RIVER	02443500	AMBN	AMB01	AMB	MONTHLY STUDY	65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
TOMBIGBEE RIVER	02443500	AMBN	AMB01	AMB	MONTHLY STUDY	65b	LUXAPALLILA CREEK	Near	COLUMBUS	AT HWY 50
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TOMBIGBEE RIVER	02443000	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS O
TOMBIGBEE RIVER	02443000	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS O
TOMBIGBEE RIVER	02443000	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS O
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TOMBIGBEE RIVER	02443000	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS O
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TOMBIGBEE RIVER	02443000	OLD_	OLD_ST			65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
TOMBIGBEE RIVER	LUXNPS6	SSIS	SPS94	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
TOMBIGBEE RIVER	TB471	SSIS	SPS99	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
TOMBIGBEE RIVER	TB471	SSIS	SPS99	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
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TOMBIGBEE RIVER	TB471	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
TOMBIGBEE RIVER	TB471	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
TOMBIGBEE RIVER	TB471	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI
TOMBIGBEE RIVER	TB471	SSIS	SPS00	SPS		65b	LUXAPALLILA CREEK	At	STEENS	.2 MILES SW OF STEENS OI

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	Location	County	Lat_ Deg	Lat_ Min	Lat_Sec	Lon_ Deg	Lon_ Min	Lon_Sec	Data_Type
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	TB470	ON PICKENSVILLE ROAD	LOWNDES	33	28	39.4	88	24	13.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	02443600	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA
TOMBIGBEE RIVER	TB469	1 MILE NORTH OF FAIRGROUND, .1 MILE WEST OF HWY 69	LOWNDES	33	29	51.2	88	23	31.9	OTHERDATA

Basin_Name	Station_ID	Location	County	Lat_ Deg	Lat_ Min	Lat_Sec	Lon_ Deg	Lon_ Min	Lon_Sec	Data_Type
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443500	8 MILES WEST OF THE AL STATE LINE	LOWNDES	33	30	49.9	88	23	42.1	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA

Basin_Name	Station_ID	Location	County	Lat_ Deg	Lat_ Min	Lat_Sec	Lon_ Deg	Lon_ Min	Lon_Sec	Data_Type
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	LUXNPS6		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	Location	County	Lat_ Deg	Lat_ Min	Lat_Sec	Lon_ Deg	Lon_ Min	Lon_Sec	Data_Type
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	02443000		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	LUXNPS6		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA
TOMBIGBEE RIVER	TB471		LOWNDES	33	33	36.3	88	18	55.5	OTHERDATA

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	Start_Date	Start_Time	00068 Depth Sample, Max (FT)	81903 Depth Bottom (FT)	00010 Temperature, Water (oC)	00020 Temperature, Air (oC)	00060 Flow, Stream mean daily (cfs)	Remarks	00061 Flow, Stream-instantaneous (cfs)	00064 Depth Stream, Mean (FT)	00080 Color, True (units)	00094 Specific Conductance, Field(umhos/cm @25oC)
TOMBIGBEE RIVER	TB470	9/27/99	10:55:00	3.27		21.3	27						56.4
TOMBIGBEE RIVER	TB470	10/12/99	10:15:00	3.3		20.69	21.6						43.9
TOMBIGBEE RIVER	TB470	10/27/99	8:00:00	3		12.8	9						57.7
TOMBIGBEE RIVER	TB470	11/10/99	7:45:00	3.5		14.12					7.78		54
TOMBIGBEE RIVER	TB470	11/23/99	7:45:00	3.25		14.46					6.71		39
TOMBIGBEE RIVER	TB470	12/8/99	7:30:00	3		9.58					6.17		53
TOMBIGBEE RIVER	TB470	12/22/99	8:20:00	3		7.64					6.48		45
TOMBIGBEE RIVER	TB470	12/22/99	8:55:00	0.7		7.72					1.4		38
TOMBIGBEE RIVER	TB470	1/5/00	8:15:00	4.5		9.32					8.91		62
TOMBIGBEE RIVER	TB470	1/19/00	7:45:00	3		10.91					6.26		36
TOMBIGBEE RIVER	TB470	2/2/00	8:20:00	3		4.49					6.54		33
TOMBIGBEE RIVER	TB470	2/16/00	7:40:00	2.5		12.11					5.68		30
TOMBIGBEE RIVER	TB470	3/2/00	8:40:00	3		14.22					5.74		37
TOMBIGBEE RIVER	TB470	3/15/00	12:35:00	3.5		14.48					6.74		28
TOMBIGBEE RIVER	TB470	3/29/00	11:20:00	3.5		14.55					6.65		25
TOMBIGBEE RIVER	TB470	4/12/00	13:15:00	3.5	7.05	16.07							27
TOMBIGBEE RIVER	TB470	4/26/00	12:30:00	3		17.63					6.21		40
TOMBIGBEE RIVER	TB470	5/10/00	12:25:00	2.5		23.4					5.31		44
TOMBIGBEE RIVER	TB470	5/24/00	12:00:00	2.5	5.61	24.71							51
TOMBIGBEE RIVER	TB470	6/7/00	12:50:00	3	6.08	24.42							57
TOMBIGBEE RIVER	TB470	6/21/00	13:00:00	2.5	5.56	28.35							43
TOMBIGBEE RIVER	02443600	2/24/00	11:45:00	1		14.07	17.75						33
TOMBIGBEE RIVER	02443600	5/5/97	11:20:00			17.5							16
TOMBIGBEE RIVER	02443600	7/1/97	11:40:00			24							30
TOMBIGBEE RIVER	02443600	8/4/97	11:30:00			26.3							32
TOMBIGBEE RIVER	02443600	9/9/97	11:30:00			25	30.5						37
TOMBIGBEE RIVER	02443600	10/13/97	11:20:00			23	23.2						35
TOMBIGBEE RIVER	02443600	12/9/97	11:25:00	2.5		6.4	12	735					21
TOMBIGBEE RIVER	02443600	7/14/98	11:30:00	2		25.5	24.5	764					38
TOMBIGBEE RIVER	02443600	12/9/98	9:25:00	1		15.7	8.9						34
TOMBIGBEE RIVER	TB469	9/27/99	11:25:00	0.64		21.65	27.7						34.2
TOMBIGBEE RIVER	TB469	10/12/99	9:50:00	1		20.64	21.9						32
TOMBIGBEE RIVER	TB469	10/27/99	7:30:00	0.61		12.42	8.1						31.6
TOMBIGBEE RIVER	TB469	11/10/99	8:20:00			14.33					0.59		34
TOMBIGBEE RIVER	TB469	11/23/99	8:20:00			14.34					0.45		31
TOMBIGBEE RIVER	TB469	12/8/99	8:00:00			9.18					0.28		36
TOMBIGBEE RIVER	TB469	12/22/99	8:55:00	0.7		7.72					1.4		38
TOMBIGBEE RIVER	TB469	1/5/00	9:30:00	2.5		10.14					5.1		58
TOMBIGBEE RIVER	TB469	1/19/00	8:15:00	1		10.91					2.25		29
TOMBIGBEE RIVER	TB469	2/2/00	8:55:00	1		4.62					2.32		30
TOMBIGBEE RIVER	TB469	2/16/00	8:10:00	1.25		11.95					2.46		26
TOMBIGBEE RIVER	TB469	3/2/00	8:00:00	1.3		14.29					2.6		31
TOMBIGBEE RIVER	TB469	3/15/00	12:00:00	2.5		14.31					5.2		25
TOMBIGBEE RIVER	TB469	3/29/00	11:45:00	3		15.01					5.72		24
TOMBIGBEE RIVER	TB469	4/12/00	12:40:00	2	4.65	16.07							24
TOMBIGBEE RIVER	TB469	4/26/00	11:55:00	1		17.28					2.76		29
TOMBIGBEE RIVER	TB469	5/10/00	11:50:00	1		23.5					1.7		33
TOMBIGBEE RIVER	TB469	5/24/00	11:25:00	0.5	1.17	24.98							34
TOMBIGBEE RIVER	TB469	6/7/00	11:55:00	0.5	1.23	24.58							38
TOMBIGBEE RIVER	TB469	6/21/00	12:20:00	0.5	1.29	27.96							31

Basin_Name	Station_ID	Start_Date	Start_Time	00068 Depth Sample, Max (FT)	81903 Depth Bottom (FT)	00010 Temperature, Water (oC)	00020 Temperature, Air (oC)	00060 Flow, Stream mean daily (cfs)	Remarks	00061 Flow, Stream-instantaneous (cfs)	00064 Depth Stream, Mean (FT)	00080 Color, True (units)	00094 Specific Conductance, Field(umhos/cm @25oC)
TOMBIGBEE RIVER	02443500	1/11/99	10:45:00	1		3.75	7.5	0		2640			30
TOMBIGBEE RIVER	02443500	2/16/99	11:00:00	3		200		788					27
TOMBIGBEE RIVER	02443500	3/2/99	12:00:00	2		15.5	20	1110					31.1
TOMBIGBEE RIVER	02443500	3/30/99	10:45:00	1.5		14.67	15.19	835					28
TOMBIGBEE RIVER	02443500	5/5/99	10:05:00	1		19.29	18	473					22
TOMBIGBEE RIVER	02443500	6/3/99	11:10:00	1.5		23.53	26.14	570					23
TOMBIGBEE RIVER	02443500	7/1/99	12:00:00	1		25.36	28.83	1210					31
TOMBIGBEE RIVER	02443500	8/11/99	11:00:00	0.5		30.1	28.5	117					36
TOMBIGBEE RIVER	02443500	9/16/99	10:40:00	1.25		23.63	21.47	103					43
TOMBIGBEE RIVER	02443500	10/27/99	11:10:00	2		14.18	14.5	105					34
TOMBIGBEE RIVER	02443500	11/8/99	12:25:00	1		14.37	19.08	154					42
TOMBIGBEE RIVER	02443500	12/14/99	11:45:00	1		12.33	8.71	622					37
TOMBIGBEE RIVER	02443500	1/19/00	12:30:00	1.5		10.77	7	408					35
TOMBIGBEE RIVER	02443500	4/10/00	10:30:00	1.5		14.31	14.24	2270					28
TOMBIGBEE RIVER	02443500	5/3/00	8:05:00	1		19.41	21.87	286					34
TOMBIGBEE RIVER	02443500	6/19/00	17:00:00	1.5		28.55	23.25	169					68
TOMBIGBEE RIVER	02443500	7/13/00	12:30:00	1		32.43	21.19	59					48
TOMBIGBEE RIVER	02443500	11/28/00	11:15:00	1.5			12.11						
TOMBIGBEE RIVER	02443500	12/20/00	14:15:00	1.5			5.94						
TOMBIGBEE RIVER	02443500	4/10/01	13:55:00	0.29		23.59	28.84	1770					32
TOMBIGBEE RIVER	02443500	9/18/01	11:50:00	2.274		23.86	26.84						41
TOMBIGBEE RIVER	02443500	11/6/01	11:35:00	1.46		14.77	15.64						4
TOMBIGBEE RIVER	02443500	12/11/01	11:50:00										
TOMBIGBEE RIVER	02443500	12/4/96	12:15:00			9				1260			20
TOMBIGBEE RIVER	02443500	1/22/97	11:00:00							1300			
TOMBIGBEE RIVER	02443500	2/12/97	9:55:00			12				1370			30
TOMBIGBEE RIVER	02443500	3/5/97	10:40:00			17.5				7190			82
TOMBIGBEE RIVER	02443500	4/3/97	12:15:00			17.5				550			109
TOMBIGBEE RIVER	02443500	5/5/97	11:20:00							12300			
TOMBIGBEE RIVER	02443500	6/9/97	11:10:00			21							28
TOMBIGBEE RIVER	02443500	7/1/97	11:40:00							1100			
TOMBIGBEE RIVER	02443500	11/18/97	11:00:00			6.7		413					28
TOMBIGBEE RIVER	02443500	1/7/98	11:50:00			14.3	18			4370			22
TOMBIGBEE RIVER	02443500	2/26/98	11:10:00	14		13.1		1240					27
TOMBIGBEE RIVER	02443500	3/4/98	10:50:00	1		9.8	12	1330					26
TOMBIGBEE RIVER	02443500	5/27/98	11:20:00			25.6	30	227					36
TOMBIGBEE RIVER	02443500	6/9/98	11:50:00	2		22.1	25	515					31
TOMBIGBEE RIVER	02443500	8/13/98	11:45:00	1		26.2	28.5	586					34
TOMBIGBEE RIVER	02443500	9/30/98	8:00:00	1		24.6	21	126					36
TOMBIGBEE RIVER	02443500	10/26/98	11:30:00	1		17	20.5	120					32
TOMBIGBEE RIVER	02443000	1/5/88	11:30:00			4				195		10	28
TOMBIGBEE RIVER	02443000	3/8/88	10:30:00			12				251		15	51
TOMBIGBEE RIVER	02443000	5/2/88	9:45:00			16				132		20	40
TOMBIGBEE RIVER	02443000	7/5/88	11:00:00			24				62		15	47
TOMBIGBEE RIVER	02443000	9/6/88	11:30:00			21				122		35	41
TOMBIGBEE RIVER	02443000	11/7/88	12:15:00			11				202		80	61
TOMBIGBEE RIVER	02443000	1/10/89	10:30:00			9				1300		10	29
TOMBIGBEE RIVER	02443000	3/7/89	11:30:00			8				3950		10	36
TOMBIGBEE RIVER	02443000	5/1/89	10:30:00			19				181		50	30
TOMBIGBEE RIVER	02443000	5/1/89	11:30:00										

Basin_Name	Station_ID	Start_Date	Start_Time	00068 Depth Sample, Max (FT)	81903 Depth Bottom (FT)	00010 Temperature, Water (oC)	00020 Temperature, Air (oC)	00060 Flow, Stream mean daily (cfs)	Remarks	00061 Flow, Stream-instantaneous (cfs)	00064 Depth Stream, Mean (FT)	00080 Color, True (units)	00094 Specific Conductance, Field(umhos/cm @25oC)
TOMBIGBEE RIVER	02443000	7/10/89	13:45:00			28				356		40	50
TOMBIGBEE RIVER	02443000	9/5/89	11:45:00			24				118		15	40
TOMBIGBEE RIVER	02443000	11/6/89	11:00:00			14				179		30	30
TOMBIGBEE RIVER	02443000	1/8/91	11:30:00			8				542		20	30
TOMBIGBEE RIVER	02443000	3/4/91	12:00:00			6				4350		45	15
TOMBIGBEE RIVER	02443000	5/6/91	11:30:00			13				1110		20	20
TOMBIGBEE RIVER	02443000	7/9/91	10:00:00			22				256		20	40
TOMBIGBEE RIVER	02443000	9/9/91	11:45:00			26				138		10	34
TOMBIGBEE RIVER	02443000	11/5/91	11:30:00			4.4				196		15	40
TOMBIGBEE RIVER	02443000	1/6/92	11:30:00			7				299		119	25
TOMBIGBEE RIVER	02443000	3/3/92	11:00:00			13				480		157	25
TOMBIGBEE RIVER	02443000	5/4/92	10:30:00			20				135		212	40
TOMBIGBEE RIVER	02443000	7/13/92	11:30:00			21				66		125	37
TOMBIGBEE RIVER	02443000	9/14/92	11:00:00			11				147		99	53
TOMBIGBEE RIVER	02443000	11/3/92	11:00:00			12				568		500	45
TOMBIGBEE RIVER	02443000	1/12/93	10:15:00			11				1292		260	20
TOMBIGBEE RIVER	02443000	3/8/93	9:30:00			12.6				432		101	25
TOMBIGBEE RIVER	02443000	5/3/93	10:30:00			27				506		194	25
TOMBIGBEE RIVER	02443000	7/13/93	10:00:00			21				95		130	50
TOMBIGBEE RIVER	02443000	9/13/93	11:30:00			17				170		149	40
TOMBIGBEE RIVER	02443000	11/1/93	11:30:00			8				120		172	85
TOMBIGBEE RIVER	LUXNPS6	5/10/94	13:36:00			20.19							30.2
TOMBIGBEE RIVER	TB471	9/27/99	12:00:00	1.5		20.03	30.4						32
TOMBIGBEE RIVER	TB471	10/12/99	10:45:00	0.8		20.41	25.7						37.5
TOMBIGBEE RIVER	TB471	10/27/99	8:35:00	1.25		11.55	15.7						29.6
TOMBIGBEE RIVER	TB471	11/10/99	7:45:00	3.5		14.12					7.78	7	54
TOMBIGBEE RIVER	TB471	11/10/99	8:20:00			14.33					0.59		34
TOMBIGBEE RIVER	TB471	11/10/99	8:50:00	2		14.09					3.78		32
TOMBIGBEE RIVER	TB471	11/23/99	9:00:00	1.5		15.21					3.73		31
TOMBIGBEE RIVER	TB471	12/8/99	8:40:00	1.5		7.53					3.47	7	33
TOMBIGBEE RIVER	TB471	12/22/99	9:40:00	1.5		6.56					3.99		35
TOMBIGBEE RIVER	TB471	1/5/00	9:50:00	2		11.14					4.11		41
TOMBIGBEE RIVER	TB471	1/19/00	9:25:00	2		11.49					4.28		30
TOMBIGBEE RIVER	TB471	2/2/00	10:25:00	2.5		4.41					5.24		30
TOMBIGBEE RIVER	TB471	2/16/00	9:15:00	2		12.74					4.29		26
TOMBIGBEE RIVER	TB471	3/1/00	11:10:00	2.4		14.7					4.86		29
TOMBIGBEE RIVER	TB471	3/15/00	11:25:00	3		14.08					6.53		25
TOMBIGBEE RIVER	TB471	3/29/00	12:10:00	3.5		14.13					7.01		24
TOMBIGBEE RIVER	TB471	4/12/00	12:00:00	2.5	5.63	16.26	20.3						26
TOMBIGBEE RIVER	TB471	4/26/00	11:00:00	2		16.25					4.48		31
TOMBIGBEE RIVER	TB471	5/10/00	10:55:00	1.5		22.82					3.4		35
TOMBIGBEE RIVER	TB471	5/24/00	10:32:00	1.5	3.29	23.44							31
TOMBIGBEE RIVER	TB471	6/7/00	11:00:00	1.5	3.41	20.71							33
TOMBIGBEE RIVER	TB471	6/21/00	11:20:00	1.5	3.38	25.9							29

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	00299 Dissolved Oxygen, Analysis by probe (mg/l)	00301 Oxygen, Dissolved percent saturation (%Sat)	00310 Biochemical Oxygen Demand, 5 Day (mg/l)	Remarks	00340 Oxygen Demand, Chemical.25N (mg/l)	Remarks	00400 pH, Field (SU)	00410 Alkalinity, Total (Mg/l, as CaCO3)	Remarks	00530 Solids Suspended, Total (mg/l)	Remarks	00610 Nitrogen, Ammonia (mg/l as N)
TOMBIGBEE RIVER	TB470	9.69	108.9			10	K	6.64	12.8		4	K	0.3
TOMBIGBEE RIVER	TB470	8.37	93.1			10	K	6.81	10	K	4		0.46
TOMBIGBEE RIVER	TB470	9.9	92.6			10	K	6.99	11.2		4	K	0.43
TOMBIGBEE RIVER	TB470	9.79	93.5			10	K	6.65	10	K	4		0.11
TOMBIGBEE RIVER	TB470	9.48	91.8			10	K	6.62	11.3		4	K	0.5
TOMBIGBEE RIVER	TB470	10.84	94.6			10	K	6.71	12.1		4	K	0.55
TOMBIGBEE RIVER	TB470	12.23	98.7			24		6.2	10	K	4	K	0.18
TOMBIGBEE RIVER	TB470	11.95	98.7			25		6.66	10	K	4		0.14
TOMBIGBEE RIVER	TB470	10.14	91.3			36		6.9	10	K	14		0.1
TOMBIGBEE RIVER	TB470	10.64	95.6			10	K	6.29	10	K	4		0.17
TOMBIGBEE RIVER	TB470	12.25	94.2			27		6.07	10	K	5		0.12
TOMBIGBEE RIVER	TB470	10.31	95.7			17		6.19	10	K	5		0.16
TOMBIGBEE RIVER	TB470	15.7	149.3			15		6.71	10	K	10		0.1
TOMBIGBEE RIVER	TB470	9.85	96.5			37		6.08	10	K	21		0.16
TOMBIGBEE RIVER	TB470	10.21	98.4			21		6.13	10	K	6		0.23
TOMBIGBEE RIVER	TB470	8.98	90.9			34		6.29	10	K	12		0.12
TOMBIGBEE RIVER	TB470	9.47	99			18		6.79	10	K	4	K	0.14
TOMBIGBEE RIVER	TB470	8.12	92.8			24		6.95	11.6		4	K	0.17
TOMBIGBEE RIVER	TB470	8.07	96.7			10	K	6.85	12		4	K	0.22
TOMBIGBEE RIVER	TB470	8.36	100.1			24		7.05	12		4	K	0.12
TOMBIGBEE RIVER	TB470	8.01	102.8			21		6.76	11.6		4	K	0.21
TOMBIGBEE RIVER	02443600	10.93	106.2			17		6.24	10	K	4		0.1
TOMBIGBEE RIVER	02443600	9.1				40		7.5	10		74		0.12
TOMBIGBEE RIVER	02443600	7.3				27		7.6	10		30		0.14
TOMBIGBEE RIVER	02443600	9.7	118			12		7.2	10		9		0.13
TOMBIGBEE RIVER	02443600	9.2	111			10		7.34	10		3		0.2
TOMBIGBEE RIVER	02443600	9.8	113.9			10		7.53	11		7		0.16
TOMBIGBEE RIVER	02443600	11.9	96.3			10		6.87	10		6		0.1
TOMBIGBEE RIVER	02443600	7.3	89			12		6.86	12		32		0.11
TOMBIGBEE RIVER	02443600	9.9	99.7			22		6.4	10		3		0.1
TOMBIGBEE RIVER	TB469	11.31	129			10	K	7.04	10	K	5		0.29
TOMBIGBEE RIVER	TB469	8.7	96.8			10	K	6.64	10	K	4		0.34
TOMBIGBEE RIVER	TB469	10.54	97.6			10	K	6.87	10	K	4	K	0.44
TOMBIGBEE RIVER	TB469	10.13	97.9			10	K	6.67	10	K	4	K	0.18
TOMBIGBEE RIVER	TB469	10.24	97.6			10	K	6.79	10.5		4	K	0.42
TOMBIGBEE RIVER	TB469	11.65	99			10	K	6.9	10	K	4	K	0.47
TOMBIGBEE RIVER	TB469	11.95	98.7			25		6.66	10	K	4		0.14
TOMBIGBEE RIVER	TB469	11.02	93.4			35		6.88	10	K	14		0.1
TOMBIGBEE RIVER	TB469	10.78	97.3			10	K	6.59	10	K	6		0.18
TOMBIGBEE RIVER	TB469	12.48	96.5			23		6.2	10	K	8		0.12
TOMBIGBEE RIVER	TB469	10.55	97.7			27		6.64	10	K	4	K	0.13
TOMBIGBEE RIVER	TB469	15.85	154.8			18		6.45	10	K	7		0.1
TOMBIGBEE RIVER	TB469	11.64	113.7			12		5.99	10	K	17		0.33
TOMBIGBEE RIVER	TB469	12.02	98.6			22		6.04	10	K	7		0.1
TOMBIGBEE RIVER	TB469	8.91	98.4			23		6.2	10	K	6		0.11
TOMBIGBEE RIVER	TB469	9.3	96.7			13		6.68	10	K	4	K	0.1
TOMBIGBEE RIVER	TB469	7.83	92.1			17		6.86	10	K	4	K	0.17
TOMBIGBEE RIVER	TB469	8.24	99.4			10		6.76	10	K	4	K	0.24
TOMBIGBEE RIVER	TB469	8.27	99.3			28		6.92	10	K	4	K	0.1
TOMBIGBEE RIVER	TB469	7.97	101.8			10	K	7.01	10	K	4		0.18

Basin_Name	Station_ID	00299 Dissolved Oxygen, Analysis by probe (mg/l)	00301 Oxygen, Dissolved percent saturation (%Sat)	00310 Biochemical Oxygen Demand, 5 Day (mg/l)	Remarks	00340 Oxygen Demand, Chemical.25N (mg/l)	Remarks	00400 pH, Field (SU)	00410 Alkalinity, Total (Mg/l, as CaCO3)	Remarks	00530 Solids Suspended, Total (mg/l)	Remarks	00610 Nitrogen, Ammonia (mg/l as N)
TOMBIGBEE RIVER	02443500	13.61	103.1			10	K	5.71	10	K	13		0.18
TOMBIGBEE RIVER	02443500	11.1	98			10	K	3.4	10	K	7		0.14
TOMBIGBEE RIVER	02443500	9.9				10		6.9	10	K	18		0.1
TOMBIGBEE RIVER	02443500	10.3	101.4			19		6.18	10	K	4		0.13
TOMBIGBEE RIVER	02443500	5.46	59.2			12		6.15	10	K	8		0.11
TOMBIGBEE RIVER	02443500	7.77	90.5			23		5.9	10	K	29		0.17
TOMBIGBEE RIVER	02443500	7.66	93.3			19		6.06	11.1		40		0.19
TOMBIGBEE RIVER	02443500	8.8	116.6			13		6.97	10.6		1		0.63
TOMBIGBEE RIVER	02443500	9.95	117.4			10	K	6.5	11.1		4		0.58
TOMBIGBEE RIVER	02443500	10.75	105.2			10	K	6.01	15.8		4	K	0.5
TOMBIGBEE RIVER	02443500	10.04	98.1			10	K				4	K	0.17
TOMBIGBEE RIVER	02443500	10.42	97.4			10		6.19	10	K	9		0.16
TOMBIGBEE RIVER	02443500	11.97	108			17		6.68	10	K	4	K	0.14
TOMBIGBEE RIVER	02443500	10.37	101.3			26		5.83	10	K	18		0.12
TOMBIGBEE RIVER	02443500	9.33	101.4			10	K	6.14	10	K	8		0.1
TOMBIGBEE RIVER	02443500	8.64	107.6			25		6.59	19.8		84		0.59
TOMBIGBEE RIVER	02443500	9.13	125.9			10	K	7.05	11		4	K	0.16
TOMBIGBEE RIVER	02443500					16			10	K	10		0.13
TOMBIGBEE RIVER	02443500					10	K		10	K	6		0.38
TOMBIGBEE RIVER	02443500	6.13	72.8					6.25					
TOMBIGBEE RIVER	02443500	9.46	112.2			10	K	7.85	17.2		4	K	0.1
TOMBIGBEE RIVER	02443500	10.42	102.8			10	K	7.86	12.5		4	K	0.1
TOMBIGBEE RIVER	02443500					10			10	K	5		0.1
TOMBIGBEE RIVER	02443500	10.2				10		6.7	1		14		0.13
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500	13.1				13		7.55	10		2		0.14
TOMBIGBEE RIVER	02443500	8.8				30		5	10		15		0.18
TOMBIGBEE RIVER	02443500	7.8				15		6.2	10		3		0.14
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500	8.7				28		8.2	10		13		0.1
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500	16.4				10		7.02	10		2		0.1
TOMBIGBEE RIVER	02443500	10	97.2			37		6.2	10		93		0.2
TOMBIGBEE RIVER	02443500	10.7	101.8			25		6.46	10		9		0.19
TOMBIGBEE RIVER	02443500	11.8	104.4			10		6.69	10		6		0.2
TOMBIGBEE RIVER	02443500	7.6	93.1			19		6.67	9		14		0.1
TOMBIGBEE RIVER	02443500	9.3	107			22		6.4	6		17		0.14
TOMBIGBEE RIVER	02443500	8	99.2					6.72	10		5		0.1
TOMBIGBEE RIVER	02443500	7.8	93.2			10		7.03	20		2		0.13
TOMBIGBEE RIVER	02443500	10.6	110			10		6.71	10		7		0.24
TOMBIGBEE RIVER	02443000	12.1				23		6.72			13		
TOMBIGBEE RIVER	02443000	9.6				30		6.2			7		
TOMBIGBEE RIVER	02443000	8.7				4		7.64			3		
TOMBIGBEE RIVER	02443000	7.7				10		7.78			8		
TOMBIGBEE RIVER	02443000	8.2				24		7.9			13		
TOMBIGBEE RIVER	02443000	9.5				45		7.65			4		
TOMBIGBEE RIVER	02443000	10.9				28		8.25			8		
TOMBIGBEE RIVER	02443000	10.2				10		6.9			16		
TOMBIGBEE RIVER	02443000	7.4				8		6.4			16		
TOMBIGBEE RIVER	02443000												

Basin_Name	Station_ID	00299 Dissolved Oxygen, Analysis by probe (mg/l)	00301 Oxygen, Dissolved percent saturation (%Sat)	00310 Biochemical Oxygen Demand, 5 Day (mg/l)	Remarks	00340 Oxygen Demand, Chemical,25N (mg/l)	Remarks	00400 pH, Field (SU)	00410 Alkalinity, Total (Mg/l, as CaCO3)	Remarks	00530 Solids Suspended, Total (mg/l)	Remarks	00610 Nitrogen, Ammonia (mg/l as N)
TOMBIGBEE RIVER	02443000	7.1				18		6.6			11		
TOMBIGBEE RIVER	02443000	6.6				1		7.95			42		
TOMBIGBEE RIVER	02443000	8.4				1		8.26			6		
TOMBIGBEE RIVER	02443000	10.6				10		5.91			7		
TOMBIGBEE RIVER	02443000	10.9				10		6.03			15		
TOMBIGBEE RIVER	02443000	9.6				41		6.7			17		
TOMBIGBEE RIVER	02443000	7.1				10		8.85			18		
TOMBIGBEE RIVER	02443000	7.6				10		6.83			4		
TOMBIGBEE RIVER	02443000	15				15		6.8			8		
TOMBIGBEE RIVER	02443000	11.2				10		6.87			7		
TOMBIGBEE RIVER	02443000	8.2				10		7.45			8		
TOMBIGBEE RIVER	02443000	8.7				10		7.8			10		
TOMBIGBEE RIVER	02443000	9.4				10		6.77			9		
TOMBIGBEE RIVER	02443000	13.5				12		7.49			3		
TOMBIGBEE RIVER	02443000	10.5				28		7.9			52		
TOMBIGBEE RIVER	02443000	8				10		6.6			28		
TOMBIGBEE RIVER	02443000	9.6				13		6.95			4		
TOMBIGBEE RIVER	02443000	15.4				10		6.92			12		0.54
TOMBIGBEE RIVER	02443000	8.5				10		7.4			5		
TOMBIGBEE RIVER	02443000	9				10		7.76			2		
TOMBIGBEE RIVER	02443000	15				10		7.7			6		
TOMBIGBEE RIVER	LUXNPS6	7.92	87.3					6.39					
TOMBIGBEE RIVER	TB471	10.76	118.1			10	K	6.98	10	K	4	K	0.6
TOMBIGBEE RIVER	TB471	8.25	90.9			19		6.48	10	K	6		0.58
TOMBIGBEE RIVER	TB471	10.44	95.1			10	K	6.91	10	K	4	K	0.37
TOMBIGBEE RIVER	TB471	9.79	93.5			10	K	6.65	10	K	4		0.11
TOMBIGBEE RIVER	TB471	10.13	97.9			10	K	6.67	10	K	4	K	0.18
TOMBIGBEE RIVER	TB471	9.6	91.8			10	K	6.66	10	K	5		0.13
TOMBIGBEE RIVER	TB471	9.54	90.7			10	K	6.66	14.2		4		0.5
TOMBIGBEE RIVER	TB471	11.53	95.4			10	K	6.89	10	K	4	K	0.15
TOMBIGBEE RIVER	TB471	11.91	95.6			27		6.53	10	K	4	K	0.16
TOMBIGBEE RIVER	TB471	10.14	93.7			27		6.72	10	K	82		0.15
TOMBIGBEE RIVER	TB471	10.33	94.3			10	K	6.51	10	K	4	K	0.17
TOMBIGBEE RIVER	TB471	12.38	95.1			16		6.15	10	K	4	K	0.1
TOMBIGBEE RIVER	TB471	9.93	93.3			10	K	6.48	10	K	4		0.13
TOMBIGBEE RIVER	TB471	10.51	101.1			15		6.6	10	K	7		0.01
TOMBIGBEE RIVER	TB471	10.08	96.4			29		6.14	10	K	18		0.14
TOMBIGBEE RIVER	TB471	9.91	96.2			36		6.09	10	K	4	K	0.1
TOMBIGBEE RIVER	TB471	8.43	86			27		6.3	10	K	6		0.1
TOMBIGBEE RIVER	TB471	8.93	90.8			33		6.78	10	K	4	K	0.1
TOMBIGBEE RIVER	TB471	7.23	83.9			17		6.85	10.2		4	K	0.24
TOMBIGBEE RIVER	TB471	7.69	90.4			10	K	6.7	10	K	6		0.19
TOMBIGBEE RIVER	TB471	8.07	90			35		6.79	10	K	9		0.17
TOMBIGBEE RIVER	TB471	3.83	47.3			18		6.81	10	K	4	K	0.1

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	Remarks	00625 Nitrogen, Total Kjeldahl (mg/l as N)	Remarks	00630 Nitrogen, Nitrate-Nitrite (mg/l as N)	Remarks	00665 Phosphorus, Total (mg/l as P)	Remarks	00680 Carbon, Total Organic (mg/l)	00900 Hardness, Total (mg/l) as CaCO3	00940 Chloride, Total (mg/l)	Remarks	01002 Arsenic, Total (ug/l, as AS)	Remarks
TOMBIGBEE RIVER	TB470		0.93		0.52		0.14		2	14.5	5		5	K
TOMBIGBEE RIVER	TB470		0.46		0.16		0.05		2	12.9	4.1		5	K
TOMBIGBEE RIVER	TB470		0.18		0.26		0.15		2	14.2	6.3			
TOMBIGBEE RIVER	TB470		0.44		0.28		0.08		2		5.2		5	K
TOMBIGBEE RIVER	TB470		0.5		0.09		0.5		3	13.7	4.5			
TOMBIGBEE RIVER	TB470		0.55		0.25		0.05		3	14.4	5.1			
TOMBIGBEE RIVER	TB470		0.49		0.22		0.04		3	13.1	3.9			
TOMBIGBEE RIVER	TB470		0.36		0.12		0.02		3	11.6	3.4			
TOMBIGBEE RIVER	TB470	K	0.37		0.08		0.1		3	17.3	3.1		5	K
TOMBIGBEE RIVER	TB470		0.26		0.14		0.03		2	11.8	3.9			
TOMBIGBEE RIVER	TB470		0.39		0.19		0.04		3	10.9	3.4		5	K
TOMBIGBEE RIVER	TB470		0.51		0.1		0.67		2	10.9	3.5			
TOMBIGBEE RIVER	TB470	K	0.45		0.06		0.05		3	10.6	3.6			
TOMBIGBEE RIVER	TB470		0.64		0.08		0.1		6	10.9	3.2			
TOMBIGBEE RIVER	TB470		0.37		0.17		0.08		4	14.3	4.6			
TOMBIGBEE RIVER	TB470		0.35		0.12		0.06		4	10.3	2.9		5	K
TOMBIGBEE RIVER	TB470		0.44		0.2		0.06		3	12.8	3.5			
TOMBIGBEE RIVER	TB470		0.48		0.28		0.09		3	24.6	3.8			
TOMBIGBEE RIVER	TB470		0.38		0.29		0.05		2	16.1	4.2			
TOMBIGBEE RIVER	TB470		0.33		0.37		0.07		2	16.4	5.1		5	K
TOMBIGBEE RIVER	TB470		0.46		0.23		0.06		2	15.7	3.9			
TOMBIGBEE RIVER	02443600	K	0.48		0.05		0.07		3		3.2			
TOMBIGBEE RIVER	02443600		1.31		0.09		0.09		6		2			
TOMBIGBEE RIVER	02443600		0.71		0.22		0.13		5	14	2		5	
TOMBIGBEE RIVER	02443600		0.38		0.18		0.04		3		3			
TOMBIGBEE RIVER	02443600		0.47		0.15		0.01		2	0	3			
TOMBIGBEE RIVER	02443600		0.29		0.14		0.04		2	11	4		5	
TOMBIGBEE RIVER	02443600		0.32		0.09		0.04		1		3			
TOMBIGBEE RIVER	02443600		0.41		0.22		0.07		3		2			
TOMBIGBEE RIVER	02443600		0.1		0.07		0.03		4		4			
TOMBIGBEE RIVER	TB469		0.29		0.08		0.06		1	12	3		5	K
TOMBIGBEE RIVER	TB469		0.34		0.06		0.02		2	11.2	3.1		5	K
TOMBIGBEE RIVER	TB469		0.1	K	0.05		0.06		2	8.5	3.1			
TOMBIGBEE RIVER	TB469		0.1	K	0.04		0.05		2	10.6	3.4		5	K
TOMBIGBEE RIVER	TB469		0.42		0.04		0.02		3	11.6	3.4			
TOMBIGBEE RIVER	TB469		0.47		0.09		0.03		3	9.6	3.4			
TOMBIGBEE RIVER	TB469		0.36		0.12		0.02		3	11.6	3.4			
TOMBIGBEE RIVER	TB469	K	0.45		0.08		0.05		3	11.1	3.1			
TOMBIGBEE RIVER	TB469		0.18		0.09		0.02		2	10.4	3.1			
TOMBIGBEE RIVER	TB469		0.31		0.15		0.03		3	10.9	3.1		5	K
TOMBIGBEE RIVER	TB469		0.33		0.1		0.09		2	10.7	3			
TOMBIGBEE RIVER	TB469	K	0.45		0.05		0.04		3	11.1	3.1			
TOMBIGBEE RIVER	TB469		0.57		0.06		0.16		6	9.8	3			
TOMBIGBEE RIVER	TB469	K	0.46		0.07		0.11		4	11.1	3.5			
TOMBIGBEE RIVER	TB469		0.39		0.09		0.06		4	10.4	2.5		5	K
TOMBIGBEE RIVER	TB469	K	0.42		0.1		0.04		4	10.4	2.6			
TOMBIGBEE RIVER	TB469		0.4		0.16		0.02		3	13.6	2.8			
TOMBIGBEE RIVER	TB469		0.27		0.22		0.04		2	14.8	2.8			
TOMBIGBEE RIVER	TB469	K	0.12		0.2		0.02		2	13.5	3		5	K
TOMBIGBEE RIVER	TB469		0.4		0.15		0.03		2	12.5	2.9			

Basin_Name	Station_ID	Remarks	00625 Nitrogen, Total Kjeldahl (mg/l as N)	Remarks	00630 Nitrogen, Nitrate-Nitrite (mg/l as N)	Remarks	00665 Phosphorus, Total (mg/l as P)	Remarks	00680 Carbon, Total Organic (mg/l)	00900 Hardness, Total (mg/l) as CaCO3	00940 Chloride, Total (mg/l)	Remarks	01002 Arsenic, Total (ug/l, as AS)	Remarks
TOMBIGBEE RIVER	02443000		0.62		0.33		0.17							
TOMBIGBEE RIVER	02443000		0.84		0.21		0.15							
TOMBIGBEE RIVER	02443000		2.65		0.04		0.5		3					
TOMBIGBEE RIVER	02443000		0.1		0.06		0.05		2.2					
TOMBIGBEE RIVER	02443000		0.54		0.07		0.06		2.1					
TOMBIGBEE RIVER	02443000		0.24		0.05		0.01		2.8					
TOMBIGBEE RIVER	02443000		0.34		0.25		0.32		3.5					
TOMBIGBEE RIVER	02443000		0.1		0.07		0.04		2.6					
TOMBIGBEE RIVER	02443000		0.4		0.04		0.02		2.8					
TOMBIGBEE RIVER	02443000		0.95		0.13		0.04		0.6	9			3	
TOMBIGBEE RIVER	02443000		0.51		0.04		0.04		3.3					
TOMBIGBEE RIVER	02443000		0.46		0.2		0.1		2.2					
TOMBIGBEE RIVER	02443000		0.33		0.19		0.01		2.5				3	
TOMBIGBEE RIVER	02443000		0.31		0.08		0.07		3.3					
TOMBIGBEE RIVER	02443000		0.98		0.05		0.18		6.3					
TOMBIGBEE RIVER	02443000		0.1		0.11		0.14		4.1					
TOMBIGBEE RIVER	02443000		0.1		0.09		0.05		3.8	10			3	
TOMBIGBEE RIVER	02443000				0.11		0.01		2					
TOMBIGBEE RIVER	02443000		0.29		0.25		0.03		1					
TOMBIGBEE RIVER	02443000		0.44		0.19		0.26		4				3	
TOMBIGBEE RIVER	02443000		0.4		0.08		0.01		4					
TOMBIGBEE RIVER	LUXNPS6													
TOMBIGBEE RIVER	TB471		0.6		0.16		0.24		1	10.3	3.3		5	K
TOMBIGBEE RIVER	TB471		0.58		0.11		0.04		3	12	3.1		5	K
TOMBIGBEE RIVER	TB471		0.1	K	0.16		0.08		1	8	3			
TOMBIGBEE RIVER	TB471		0.44		0.28		0.08		2		5.2		5	K
TOMBIGBEE RIVER	TB471		0.1	K	0.04		0.05		2	10.6	3.4		5	K
TOMBIGBEE RIVER	TB471		0.11		0.09		0.05		2	11.3	3.1		5	K
TOMBIGBEE RIVER	TB471		0.5		0.06		0.04		3	10.3	2.9			
TOMBIGBEE RIVER	TB471		0.22		0.05		0.03		3	8.6	3.4			
TOMBIGBEE RIVER	TB471		0.27		0.15		0.02		3	12.7	3.2			
TOMBIGBEE RIVER	TB471		0.86		0.25		0.14		5	12.2	3.7			
TOMBIGBEE RIVER	TB471		0.17		0.14		0.01		2	11.3	3			
TOMBIGBEE RIVER	TB471		0.3		0.15		0.09		2	9.8			5	K
TOMBIGBEE RIVER	TB471		0.32		0.1		0.06		2	9.7	2.8			
TOMBIGBEE RIVER	TB471	K	0.38		0.09		0.04		3	11.1	3.1			
TOMBIGBEE RIVER	TB471		0.43		0.07		0.06		4	9.5	2.9			
TOMBIGBEE RIVER	TB471	K	0.44		0.04		0.06		4	11.2	3.2			
TOMBIGBEE RIVER	TB471		0.33		0.13		0.07		3	11.7	2.7		5	K
TOMBIGBEE RIVER	TB471	K	0.32		0.12		0.04		3	13.3	2.5			
TOMBIGBEE RIVER	TB471		0.32		0.19		0.02		2	14.6	3			
TOMBIGBEE RIVER	TB471		0.25		0.23		0.07		2	12.6	2.7			
TOMBIGBEE RIVER	TB471		0.25		0.21		0.02		2	12	2.9		5	K
TOMBIGBEE RIVER	TB471	K	0.41		0.16		0.03		2	12.5	2.8			

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	01027 Cadmium, Total (ug/l, as CD)	Remarks	01034 Chromium, Total (ug/l as CR)	Remarks	01042 Copper, Total (ug/l as CV)	Remarks	01051 Lead, Total (ug/l as PB)	Remarks	01055 Manganese, Total (ug/l as MN)	01067 Nickel, Total (ug/l as NI)	Remarks	01092 Zinc, Total (ug/l as Zn)	Remarks	01105 Aluminum, Total (ug/l, as AL)
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	132	5	K	10	K	327
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	96	5	K	10	K	139
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	357	5	K	10	K	247
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	110	5	K	10	K	79
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	107	5	K	10	K	132
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	184	5	K	10	K	328
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	15	5	K	10	K	372
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	796	5	K	10	K	204
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		133	5		71		185
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		278	5		10		345
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		110	5		10		87
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		187	5		10		117
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		85	5		26		117
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														

Basin_Name	Station_ID	01027 Cadmium, Total (ug/l, as CD)	Remarks	01034 Chromium, Total (ug/l as CR)	Remarks	01042 Copper, Total (ug/l as CV)	Remarks	01051 Lead, Total (ug/l as PB)	Remarks	01055 Manganese, Total (ug/l as MN)	01067 Nickel, Total (ug/l as NI)	Remarks	01092 Zinc, Total (ug/l as Zn)	Remarks	01105 Aluminum, Total (ug/l, as AL)
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	132	5	K	10	K	327
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	96	5	K	10	K	139
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	357	5	K	10	K	247
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	110	5	K	10	K	79
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	107	5	K	10	K	132
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	184	5	K	10	K	328
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	15	5	K	10	K	372
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1	K	1	K	5	K	5	K	796	5	K	10	K	204
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		133	5		71		185
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		278	5		10		345
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		110	5		10		87
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		187	5		10		117
TOMBIGBEE RIVER	02443500														
TOMBIGBEE RIVER	02443500	1		1		5		5		85	5		26		117
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														

Basin_Name	Station_ID	01027 Cadmium, Total (ug/l, as CD)	Remarks	01034 Chromium, Total (ug/l as CR)	Remarks	01042 Copper, Total (ug/l as CV)	Remarks	01051 Lead, Total (ug/l as PB)	Remarks	01055 Manganese, Total (ug/l as MN)	01067 Nickel, Total (ug/l as NI)	Remarks	01092 Zinc, Total (ug/l as Zn)	Remarks	01105 Aluminum, Total (ug/l, as AL)
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000	1		1		5		3		94	3		10		72
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000	1		1		5		3		197	3		10		47
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000	1		1		5		3		118	3		23		111
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	02443000	0.5		1		1		3		133	3		21		
TOMBIGBEE RIVER	02443000														
TOMBIGBEE RIVER	LUXNPS0														
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	70.2	5	K	10	K	92
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	331	5	K	10	K	153
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	100	5	K	10	K	111
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	90	5	K	10	K	96
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	66	5	K	10	K	89
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	82	5	K	10	K	158
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	147	5	K	10	K	166
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471														
TOMBIGBEE RIVER	TB471	1	K	1	K	5	K	5	K	199	5	K	10	K	116
TOMBIGBEE RIVER	TB471														

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	01106 Aluminum, Dissolved (ug/l, as AL)	Remarks	01147 Selenium, Total (ug/l as SE)	Remarks	31613 Fecal Coliform M-FCAGAR (/100 ml)	31615 Fecal Coliform-Mpn, EC Media(/100ml)	31616 Fecal Coliform, MFC Both, MF(100ml)	Remarks	31621 Fecal Coliform, A-1 mod, MPN	46000 Phenols, Total (mg/l)	Remarks	Total Dissolved, Unspecified Calculation	71900 Mercury, Total (ug/l as HG)
TOMBIGBEE RIVER	TB470			5	K			100	B					0.5
TOMBIGBEE RIVER	TB470			5	K			270					27.4	0.5
TOMBIGBEE RIVER	TB470							70	B				36.9	
TOMBIGBEE RIVER	TB470			5	K			100	B				0.042	0.5
TOMBIGBEE RIVER	TB470							115	B				0.03	
TOMBIGBEE RIVER	TB470							100	B				0.04	
TOMBIGBEE RIVER	TB470							160	B				0.04	
TOMBIGBEE RIVER	TB470							140	B				0.03	
TOMBIGBEE RIVER	TB470			5	K			2400					0.07	0.5
TOMBIGBEE RIVER	TB470							100	B				32	
TOMBIGBEE RIVER	TB470	5	K	5	K			120	B				35	0.5
TOMBIGBEE RIVER	TB470							200	B				20	
TOMBIGBEE RIVER	TB470							73	B				30	
TOMBIGBEE RIVER	TB470							190					23	
TOMBIGBEE RIVER	TB470							31	B				22	
TOMBIGBEE RIVER	TB470			5	K			58	B				21	0.5
TOMBIGBEE RIVER	TB470							12	B				30	
TOMBIGBEE RIVER	TB470							85	B				30	
TOMBIGBEE RIVER	TB470							23	B				33	
TOMBIGBEE RIVER	TB470			5	K			160					38	0.5
TOMBIGBEE RIVER	TB470							200					26	
TOMBIGBEE RIVER	02443600							90	B				20	
TOMBIGBEE RIVER	02443600							1000						
TOMBIGBEE RIVER	02443600			5				490			0.05			0.5
TOMBIGBEE RIVER	02443600							1020					0.02	
TOMBIGBEE RIVER	02443600							540					20	
TOMBIGBEE RIVER	02443600			5				3500					20	0.5
TOMBIGBEE RIVER	02443600							110					10	
TOMBIGBEE RIVER	02443600							7800					30	
TOMBIGBEE RIVER	02443600							310					20	
TOMBIGBEE RIVER	TB469			5	K			60	B				21.9	0.5
TOMBIGBEE RIVER	TB469			5	K			160	B				20.6	0.5
TOMBIGBEE RIVER	TB469							100	B				20.3	
TOMBIGBEE RIVER	TB469			5	K			50	B				0.027	0.5
TOMBIGBEE RIVER	TB469							100	B				0.02	
TOMBIGBEE RIVER	TB469							100	B				0.03	
TOMBIGBEE RIVER	TB469							140	B				0.037	
TOMBIGBEE RIVER	TB469							2500					0.06	
TOMBIGBEE RIVER	TB469							100	B				26	
TOMBIGBEE RIVER	TB469	96.1		5	K			120	B				32	0.5
TOMBIGBEE RIVER	TB469							200	B				23	
TOMBIGBEE RIVER	TB469							110					25	
TOMBIGBEE RIVER	TB469							200					21	
TOMBIGBEE RIVER	TB469							23	B				22	
TOMBIGBEE RIVER	TB469			5	K			23	B				19	0.5
TOMBIGBEE RIVER	TB469							31	B				22	
TOMBIGBEE RIVER	TB469							35	B				22	
TOMBIGBEE RIVER	TB469							73	B				22	
TOMBIGBEE RIVER	TB469			5	K			62	B				25	0.5
TOMBIGBEE RIVER	TB469	63.3						27	B				19	

Basin_Name	Station_ID	01106 Aluminum, Dissolved (ug/l, as AL)	Remarks	01147 Selenium, Total (ug/l as SE)	Remarks	31613 Fecal Coliform M-FCAGAR (/100 ml)	31615 Fecal Coliform-Mpn, EC Media(/100ml)	31616 Fecal Coliform, MFC Both, MF(100ml)	Remarks	31621 Fecal Coliform, A-1 mod, MPN	46000 Phenols, Total (mg/l)	Remarks	Tota Diss Uns Calc
TOMBIGBEE RIVER	02443500			5	K			780			0.05	K	
TOMBIGBEE RIVER	02443500							40	B				
TOMBIGBEE RIVER	02443500							860					
TOMBIGBEE RIVER	02443500			5	K			20	B		0.05	K	
TOMBIGBEE RIVER	02443500							110	B				
TOMBIGBEE RIVER	02443500							350		0			
TOMBIGBEE RIVER	02443500			5	K			1200	B		0.05	K	
TOMBIGBEE RIVER	02443500							1600	B				
TOMBIGBEE RIVER	02443500							10	B				
TOMBIGBEE RIVER	02443500			5	K			30	B		0.05	K	
TOMBIGBEE RIVER	02443500							10	B				
TOMBIGBEE RIVER	02443500							1060					
TOMBIGBEE RIVER	02443500			5	K			77	B		0.05	K	
TOMBIGBEE RIVER	02443500	166		5	K			92	B		0.05	K	
TOMBIGBEE RIVER	02443500			5	K			31	B				
TOMBIGBEE RIVER	02443500							4000					
TOMBIGBEE RIVER	02443500	26.1											
TOMBIGBEE RIVER	02443500			5	K			193			0.05	K	
TOMBIGBEE RIVER	02443500							62					
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500							425					
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500							50					
TOMBIGBEE RIVER	02443500							800					
TOMBIGBEE RIVER	02443500			5				75			0.05		
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500							530					
TOMBIGBEE RIVER	02443500												
TOMBIGBEE RIVER	02443500							60					
TOMBIGBEE RIVER	02443500			5				7300			0.5		
TOMBIGBEE RIVER	02443500							180					
TOMBIGBEE RIVER	02443500							80					
TOMBIGBEE RIVER	02443500			5				1000			0.05		
TOMBIGBEE RIVER	02443500							250					
TOMBIGBEE RIVER	02443500			5				90			0.05		
TOMBIGBEE RIVER	02443500							50					
TOMBIGBEE RIVER	02443500			5				30			0.05		
TOMBIGBEE RIVER	02443000					40							
TOMBIGBEE RIVER	02443000					43							
TOMBIGBEE RIVER	02443000					33							
TOMBIGBEE RIVER	02443000					79							
TOMBIGBEE RIVER	02443000					540							
TOMBIGBEE RIVER	02443000					170							
TOMBIGBEE RIVER	02443000												
TOMBIGBEE RIVER	02443000												
TOMBIGBEE RIVER	02443000					49							
TOMBIGBEE RIVER	02443000						49						

Basin_Name	Station_ID	01106 Aluminum, Dissolved (ug/l, as AL)	Remarks	01147 Selenium, Total (ug/l as SE)	Remarks	31613 Fecal Coliform M-FCAGAR (/100 ml)	31615 Fecal Coliform-Mpn, EC Media(/100ml)	31616 Fecal Coliform, MFC Both, MF(100ml)	Remarks	31621 Fecal Coliform, A-1 mod, MPN	46000 Phenols, Total (mg/l)	Remarks	Total Dissolved, Unspecified Calculation	71900 Mercury, Total (ug/l as HG)
TOMBIGBEE RIVER	02443000						63							
TOMBIGBEE RIVER	02443000						110							
TOMBIGBEE RIVER	02443000						2400							
TOMBIGBEE RIVER	02443000						635							
TOMBIGBEE RIVER	02443000													
TOMBIGBEE RIVER	02443000						445							
TOMBIGBEE RIVER	02443000						79							
TOMBIGBEE RIVER	02443000						79							
TOMBIGBEE RIVER	02443000						490							
TOMBIGBEE RIVER	02443000						220							1
TOMBIGBEE RIVER	02443000						230							
TOMBIGBEE RIVER	02443000							79						
TOMBIGBEE RIVER	02443000						140							1
TOMBIGBEE RIVER	02443000						170							
TOMBIGBEE RIVER	02443000						9200							
TOMBIGBEE RIVER	02443000													
TOMBIGBEE RIVER	02443000						33							1
TOMBIGBEE RIVER	02443000						920							
TOMBIGBEE RIVER	02443000													
TOMBIGBEE RIVER	02443000						70							0.5
TOMBIGBEE RIVER	02443000						46							
TOMBIGBEE RIVER	LUXNPS6												19.3	
TOMBIGBEE RIVER	TB471			5	K			200	B				20.6	0.5
TOMBIGBEE RIVER	TB471			5	K			250					24	0.5
TOMBIGBEE RIVER	TB471							130	B				18.9	
TOMBIGBEE RIVER	TB471			5	K			100	B				0.04	0.5
TOMBIGBEE RIVER	TB471			5	K			50	B				0.02	0.5
TOMBIGBEE RIVER	TB471			5	K			90	B				0.02	0.5
TOMBIGBEE RIVER	TB471							200	B				0.02	
TOMBIGBEE RIVER	TB471							220	B				0.03	
TOMBIGBEE RIVER	TB471							173	B				0.03	
TOMBIGBEE RIVER	TB471							7000	B				0.04	
TOMBIGBEE RIVER	TB471							160	B				26	
TOMBIGBEE RIVER	TB471			5	K			100	B				32	0.5
TOMBIGBEE RIVER	TB471							120	B				22	
TOMBIGBEE RIVER	TB471							200	B				23	
TOMBIGBEE RIVER	TB471							65	B				21	
TOMBIGBEE RIVER	TB471							42	B				22	
TOMBIGBEE RIVER	TB471			5	K			23	B				21	0.5
TOMBIGBEE RIVER	TB471							23	B				24	
TOMBIGBEE RIVER	TB471							46	B				24	
TOMBIGBEE RIVER	TB471							65	B				21	
TOMBIGBEE RIVER	TB471			5	K			320					23	0.5
TOMBIGBEE RIVER	TB471	84.4						85	B				18	

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

Basin_Name	Station_ID	Remarks	82079 Turbidity, Lab (NTU)	Remarks
TOMBIGBEE RIVER	TB470	K	7	
TOMBIGBEE RIVER	TB470	K	10	
TOMBIGBEE RIVER	TB470		7	
TOMBIGBEE RIVER	TB470	K	7	
TOMBIGBEE RIVER	TB470		8	
TOMBIGBEE RIVER	TB470		6	
TOMBIGBEE RIVER	TB470		10	
TOMBIGBEE RIVER	TB470		10	
TOMBIGBEE RIVER	TB470	K	27	
TOMBIGBEE RIVER	TB470		11	
TOMBIGBEE RIVER	TB470	K	15	
TOMBIGBEE RIVER	TB470		12	
TOMBIGBEE RIVER	TB470		14	
TOMBIGBEE RIVER	TB470		30	
TOMBIGBEE RIVER	TB470		13	
TOMBIGBEE RIVER	TB470	K	19	
TOMBIGBEE RIVER	TB470		12	
TOMBIGBEE RIVER	TB470		9	
TOMBIGBEE RIVER	TB470		9	
TOMBIGBEE RIVER	TB470	K	7	
TOMBIGBEE RIVER	TB470		8	
TOMBIGBEE RIVER	02443600		14	
TOMBIGBEE RIVER	02443600		164	
TOMBIGBEE RIVER	02443600		61	
TOMBIGBEE RIVER	02443600		24	
TOMBIGBEE RIVER	02443600		11	
TOMBIGBEE RIVER	02443600		12	
TOMBIGBEE RIVER	02443600		13	
TOMBIGBEE RIVER	02443600		37	
TOMBIGBEE RIVER	02443600		9	
TOMBIGBEE RIVER	TB469	K	8	
TOMBIGBEE RIVER	TB469	K	11	
TOMBIGBEE RIVER	TB469		7	
TOMBIGBEE RIVER	TB469	K	7	
TOMBIGBEE RIVER	TB469		7	
TOMBIGBEE RIVER	TB469		6	
TOMBIGBEE RIVER	TB469		10	
TOMBIGBEE RIVER	TB469		26	
TOMBIGBEE RIVER	TB469		12	
TOMBIGBEE RIVER	TB469	K	14	
TOMBIGBEE RIVER	TB469		11	
TOMBIGBEE RIVER	TB469		14	
TOMBIGBEE RIVER	TB469		31	
TOMBIGBEE RIVER	TB469		14	
TOMBIGBEE RIVER	TB469	K	18	
TOMBIGBEE RIVER	TB469		12	
TOMBIGBEE RIVER	TB469		10	
TOMBIGBEE RIVER	TB469		9	
TOMBIGBEE RIVER	TB469	K	8	
TOMBIGBEE RIVER	TB469		10	

Basin_Name	Station_ID	Remarks	82079 Turbidity, Lab (NTU)	Remarks
TOMBIGBEE RIVER	02443500	K	37	
TOMBIGBEE RIVER	02443500		12	
TOMBIGBEE RIVER	02443500		18	
TOMBIGBEE RIVER	02443500	K	11.4	
TOMBIGBEE RIVER	02443500		13	
TOMBIGBEE RIVER	02443500		32.5	
TOMBIGBEE RIVER	02443500	K	41	
TOMBIGBEE RIVER	02443500		10	
TOMBIGBEE RIVER	02443500		8	
TOMBIGBEE RIVER	02443500	K	7	
TOMBIGBEE RIVER	02443500		10	
TOMBIGBEE RIVER	02443500		17	
TOMBIGBEE RIVER	02443500	K	13	
TOMBIGBEE RIVER	02443500	K	25	
TOMBIGBEE RIVER	02443500	K	11	
TOMBIGBEE RIVER	02443500		58	
TOMBIGBEE RIVER	02443500		5	
TOMBIGBEE RIVER	02443500	K		
TOMBIGBEE RIVER	02443500			
TOMBIGBEE RIVER	02443500			
TOMBIGBEE RIVER	02443500			
TOMBIGBEE RIVER	02443500		8.56	
TOMBIGBEE RIVER	02443500		15	
TOMBIGBEE RIVER	02443500		3.9	
TOMBIGBEE RIVER	02443500			
TOMBIGBEE RIVER	02443500		17	
TOMBIGBEE RIVER	02443500		55	
TOMBIGBEE RIVER	02443500		13	
TOMBIGBEE RIVER	02443500			
TOMBIGBEE RIVER	02443500		32	
TOMBIGBEE RIVER	02443500			
TOMBIGBEE RIVER	02443500		12	
TOMBIGBEE RIVER	02443500		81.2	
TOMBIGBEE RIVER	02443500		13	
TOMBIGBEE RIVER	02443500		17	
TOMBIGBEE RIVER	02443500		13	
TOMBIGBEE RIVER	02443500		34	
TOMBIGBEE RIVER	02443500		21	
TOMBIGBEE RIVER	02443500		8	
TOMBIGBEE RIVER	02443500		9	
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			

Basin_Name	Station_ID	Remarks	82079 Turbidity, Lab (NTU)	Remarks
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000			
TOMBIGBEE RIVER	02443000		48	
TOMBIGBEE RIVER	02443000		29	
TOMBIGBEE RIVER	02443000		27	
TOMBIGBEE RIVER	02443000		16	
TOMBIGBEE RIVER	02443000		18.3	
TOMBIGBEE RIVER	02443000		12.5	
TOMBIGBEE RIVER	02443000		18.7	
TOMBIGBEE RIVER	02443000		19.8	
TOMBIGBEE RIVER	02443000		10	
TOMBIGBEE RIVER	02443000		9	
TOMBIGBEE RIVER	02443000		77.3	
TOMBIGBEE RIVER	02443000		38.9	
TOMBIGBEE RIVER	02443000		10.9	
TOMBIGBEE RIVER	02443000		24.6	
TOMBIGBEE RIVER	02443000		13	
TOMBIGBEE RIVER	02443000		15.8	
TOMBIGBEE RIVER	02443000		20.1	
TOMBIGBEE RIVER	LUXNPS6			
TOMBIGBEE RIVER	TB471	K	9	
TOMBIGBEE RIVER	TB471	K	19	
TOMBIGBEE RIVER	TB471		8	
TOMBIGBEE RIVER	TB471	K		
TOMBIGBEE RIVER	TB471	K	7	
TOMBIGBEE RIVER	TB471	K	6	
TOMBIGBEE RIVER	TB471		7	
TOMBIGBEE RIVER	TB471			
TOMBIGBEE RIVER	TB471		10	
TOMBIGBEE RIVER	TB471		110	
TOMBIGBEE RIVER	TB471		10	
TOMBIGBEE RIVER	TB471	K	11	
TOMBIGBEE RIVER	TB471		12	
TOMBIGBEE RIVER	TB471		15	
TOMBIGBEE RIVER	TB471		21	
TOMBIGBEE RIVER	TB471		13	
TOMBIGBEE RIVER	TB471	K	18	
TOMBIGBEE RIVER	TB471		13	
TOMBIGBEE RIVER	TB471		11	
TOMBIGBEE RIVER	TB471		15	
TOMBIGBEE RIVER	TB471	K	15	
TOMBIGBEE RIVER	TB471		17	

K = <, less than
L = >, greater than
J = Estimated
B = Ec, Estimated Count

APPENDIX B

Natural Heritage Inventory and Aquatic Community Surveys

Table B.1. 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. Dams and impoundments impede this small fish's movements. High levels of siltation within streambeds constitute poor habitats for the species (Shepard 1996)

Table B.1 (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.
Stizastedion 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
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	

Table B.1 (Continued)

Species	Common Name	Habitat
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	
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	

APPENDIX C

Stressors

Description of stressors (Mississippi)

Status	Description
Stressor:	Backwater from Tombigbee impoundment
Justification:	Mussels and their host fish species in Luxapallila Creek are adapted to riverine conditions, they cannot survive in impoundments. Adverse affects to mussels include suffocation by accumulation of sediments, lowered food and oxygen availability as a result of reduced flow, and loss of host fish species. Impoundments act as barriers to stream species, isolating populations (USFWS 1993).
Location:	Luxapallila Creek at confluence with Tombigbee River.
Magnitude:	Estimate approximately 2 miles from atlas (DeLorme 1998).
Stressor:	Dredging, channelization, and de-snagging
Justification:	Dredging can result in removal of mussels or removal of habitat for the mussels or their host fish species. Channelization and de-snagging can also result in removal of habitat for mussels or their host fish species. All three activities can also alter channel erosion patterns, and increase turbidity and sedimentation which may adversely affect mussels or their host fish species either directly or as a result of causing changes in aquatic community structure (USFWS 1993).
Location:	Channel modification on Luxapallila River within Columbus, Mississippi city limits; dredging from the confluence with Tombigbee River, upstream.
Magnitude:	Approximately 3.5 miles of channel modification, and 2.1 miles of dredging
Stressor:	Sand and gravel mining
Justification:	Sand and gravel mining in the Luxapallila River watershed occurs in floodplains. Floodplain gravel mining can affect stream geomorphology, causing changes in erosion and sedimentation patterns in the stream (USFWS 2000) which may adversely affect mussels or their host fish species either directly or as a result of causing changes in aquatic community structure. Floodplain gravel mining may also affect streams by modifying groundwater hydrology.
Location:	Gravel mining along lower Luxapallila River around Columbus; sand mining along Mayhew Creek near Border Springs Road.
Magnitude:	Four gravel mines, one sand mine
Stressor:	Agricultural runoff
Justification:	Runoff from croplands can contribute sediment, nutrients, and toxics (pesticides) to streams, all of which have the potential to adversely affect mussels or their host fish species. Although water quality standards are assumed to be protective of all species, there is little toxicity information available for listed species in the watershed (USFWS 2000).
Location:	Anyplace where agricultural land uses occur along Luxapallila Creek or its tributaries (see Figure 2.2).
Magnitude:	This data has not been compiled
Stressor:	Point source dischargers
Justification:	Although water quality standards are assumed to be protective of all species, there is little toxicity information available for listed species in the watershed (USFWS 2000).
Location:	McCrary Creek, Vernon Branch, Luxapallila Creek, Magby Creek, Howard Creek, especially where populations of listed species of their hosts are adjacent to discharges.
Magnitude:	Approximately 26 NPDES point source dischargers in Luxapallila Creek watershed.
Stressor:	Silviculture runoff
Justification:	Runoff from silviculture operations has the potential to contribute increased sediment to streams, increasing turbidity and sedimentation, which can adversely affect mussels and their host fish species either directly or as a result of changes in the aquatic community.
Location:	Anyplace where silviculture activities take place along Luxapallila Creek or its tributaries (see Figure 2.2).
Magnitude:	This data has not been compiled.

Status	Description
Stressor:	Residential and urban area runoff
Justification:	Runoff from residential and urban areas has the potential to carry sediment, nutrients, pesticides, oil and grease, and other potential toxics (e.g. lead, mercury) to streams. All of these inputs have the potential to adversely affect mussels or their host fish species either directly or as the result of changes in the aquatic community. Although water quality standards are assumed to be protective of all species, there is little toxicity information available for listed species in the watershed (USFWS 2000).
Location:	Any place where urban and residential land uses occur along the Luxapallila Creek or its tributaries (see Figure 2-2).
Magnitude:	This data has not been compiled.
Stressor:	Spread of exotic species
Justification:	Studies of the effects of introduction of Asiatic clam into streams suggest that this species may actively compete with native species for space and nutrients (Clark 1988) 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.
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.
Magnitude:	Asiatic clams are present in low numbers and do not appear to be adversely affecting native mussels.
Stressor	Toxic releases
Justification	Toxic releases to streams from hazardous waste sites in the watershed were reported in 2001. A number of hazardous waste sites are located in the watershed, concentrated around Columbus.
Location	Hazardous waste sites are located throughout the watershed (see Figure 8.2). Toxic releases were report to McCrary Creek and a tributary of Luxapallila Creek near Columbus during 2001(EnviroMapper, maps.ep.gov/enviromapper)
Magnitude	There are approximately 25 hazardous waste sites in the watershed. Three sites reported toxic releases to streams in 2001 (Enviromapper, maps.epa.gov/enviromapper)

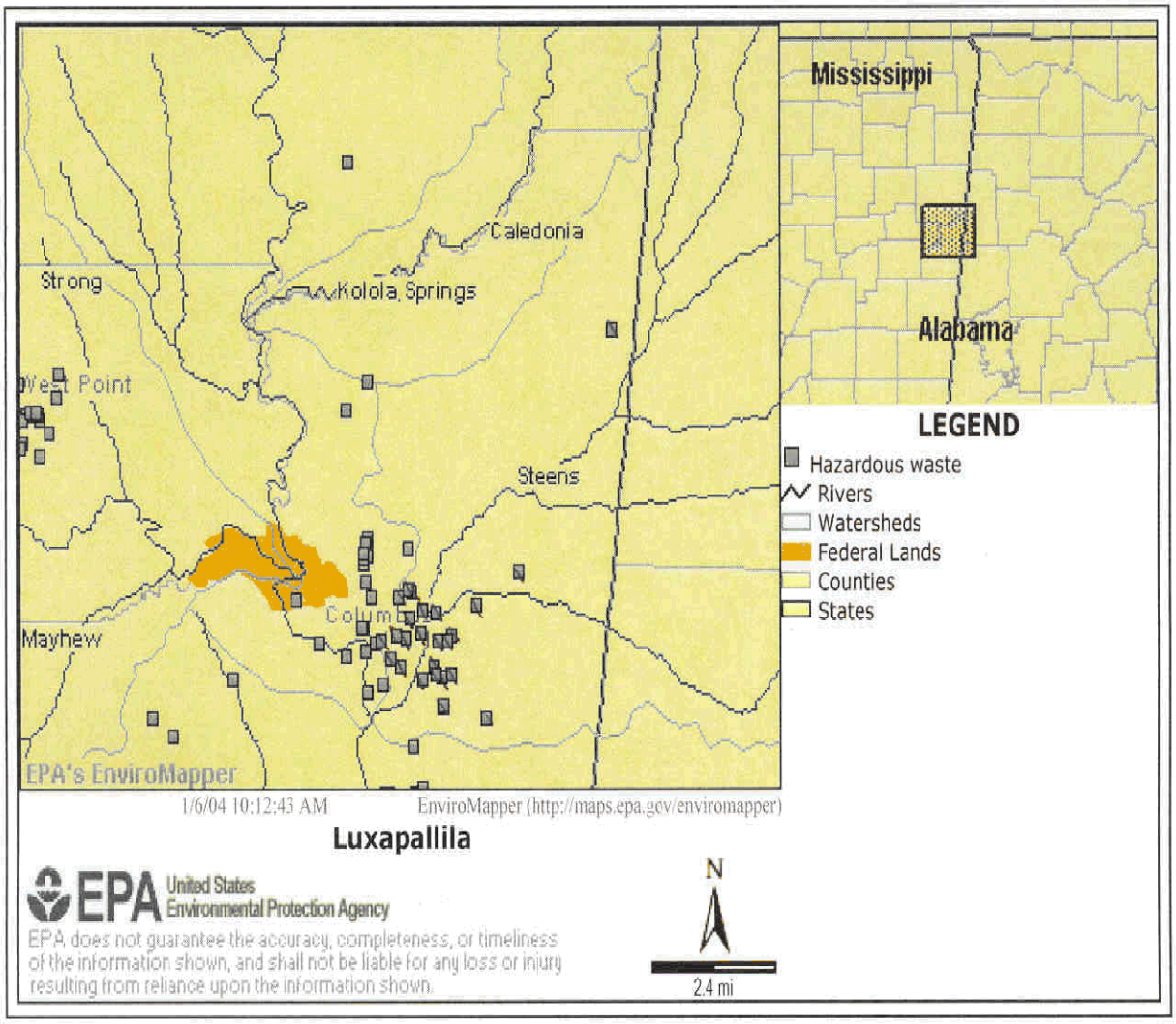


Figure C.1. Hazardous waste sites in Luxapallila Creek watershed (maps.epa.gov/environmapper).

APPENDIX D

History of Luxapallila Creek Watershed Implementation Plan

7.0 HISTORY OF THE LUXAPALLILA CREEK 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 river basins in Mississippi were combined into five basin groups (Figure 3.2). Luxapallila Creek is located in basin group I, which consists of the Big Black, Tombigbee, and Tennessee River Basins in Mississippi. A Basin Team manages each basin group. 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, Luxapallila Creek watershed was selected for implementation of protection activities. Luxapallila Creek watershed was determined to not have any water quality issues and was therefore deemed worthy of protection especially since a number of endangered and threatened species occur there. 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 (where applicable). Luxapallila Creek was ranked as a high priority.

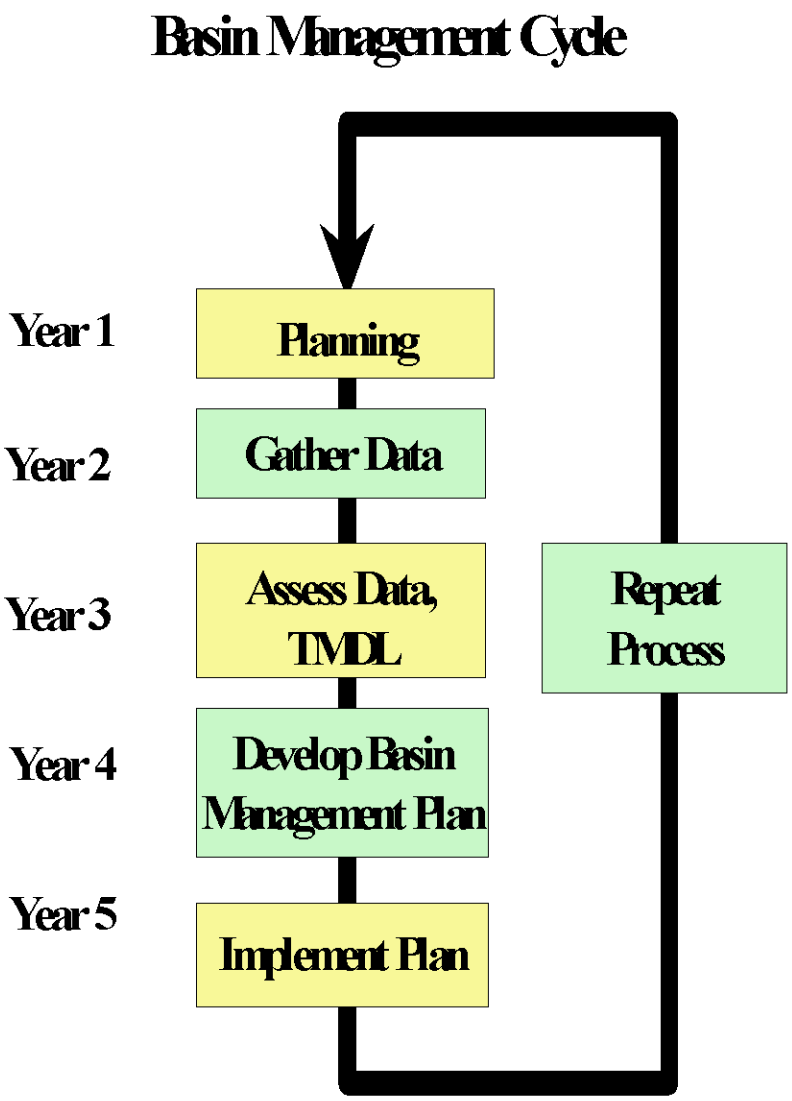
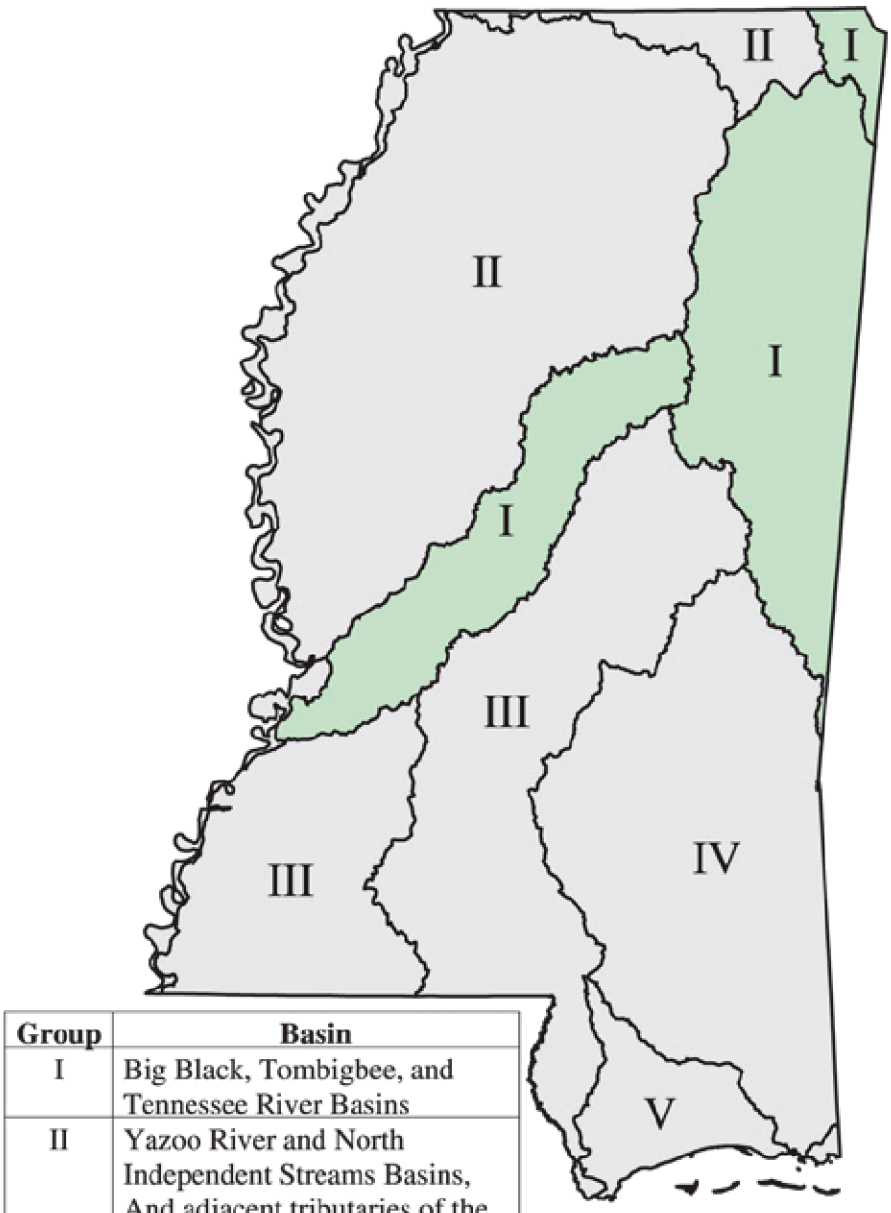


Figure 3.1. Basin management cycle



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

In August 2003 the Basin 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. Luxapallila Creek was one of the water bodies selected for implementation. At the workshop agencies also committed to participating in addressing the issues in the Luxapallila Creek watershed (Table 3.2).

Table 3.2. Members of the Luxapallila Creek 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 NPS Section
8.	MDEQ Surface Water Division
9.	Alabama-Tombigbee River Basins Clean Water Partnership
10.	Mississippi Forestry Commission
11.	The Nature Conservancy
12.	U.S. Army Corps of Engineers, Mobile District
13.	MSU Cooperative Extension Service
14.	U.S. Geological Survey
15.	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: Luxapallila 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 2.4, 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, pg. 3-4, 3-8, 3-10
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
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

Required Watershed Elements	Location
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
g. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.	Same as above
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 319 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

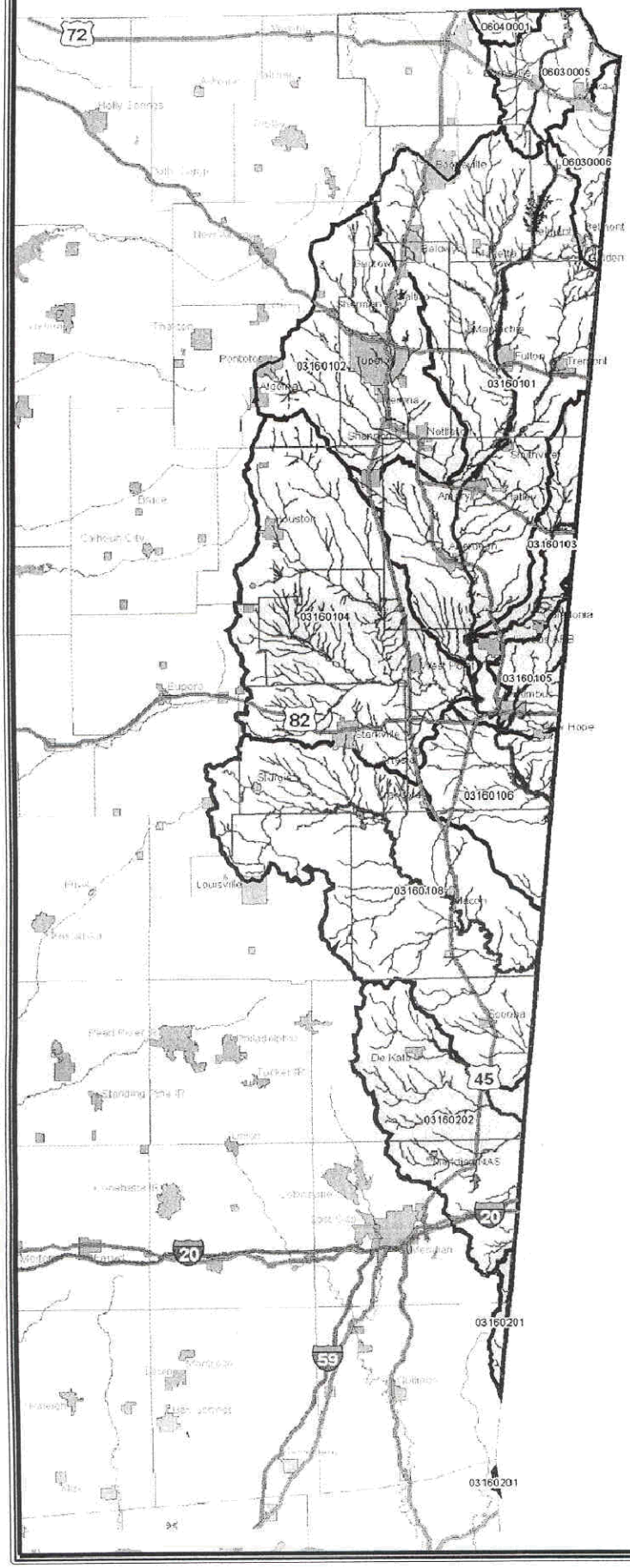
Mississippi Forestry Commission Grant Proposal Budget

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.



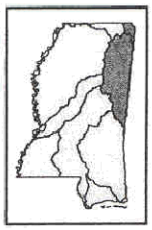
Tennessee and Tombigbee Basins

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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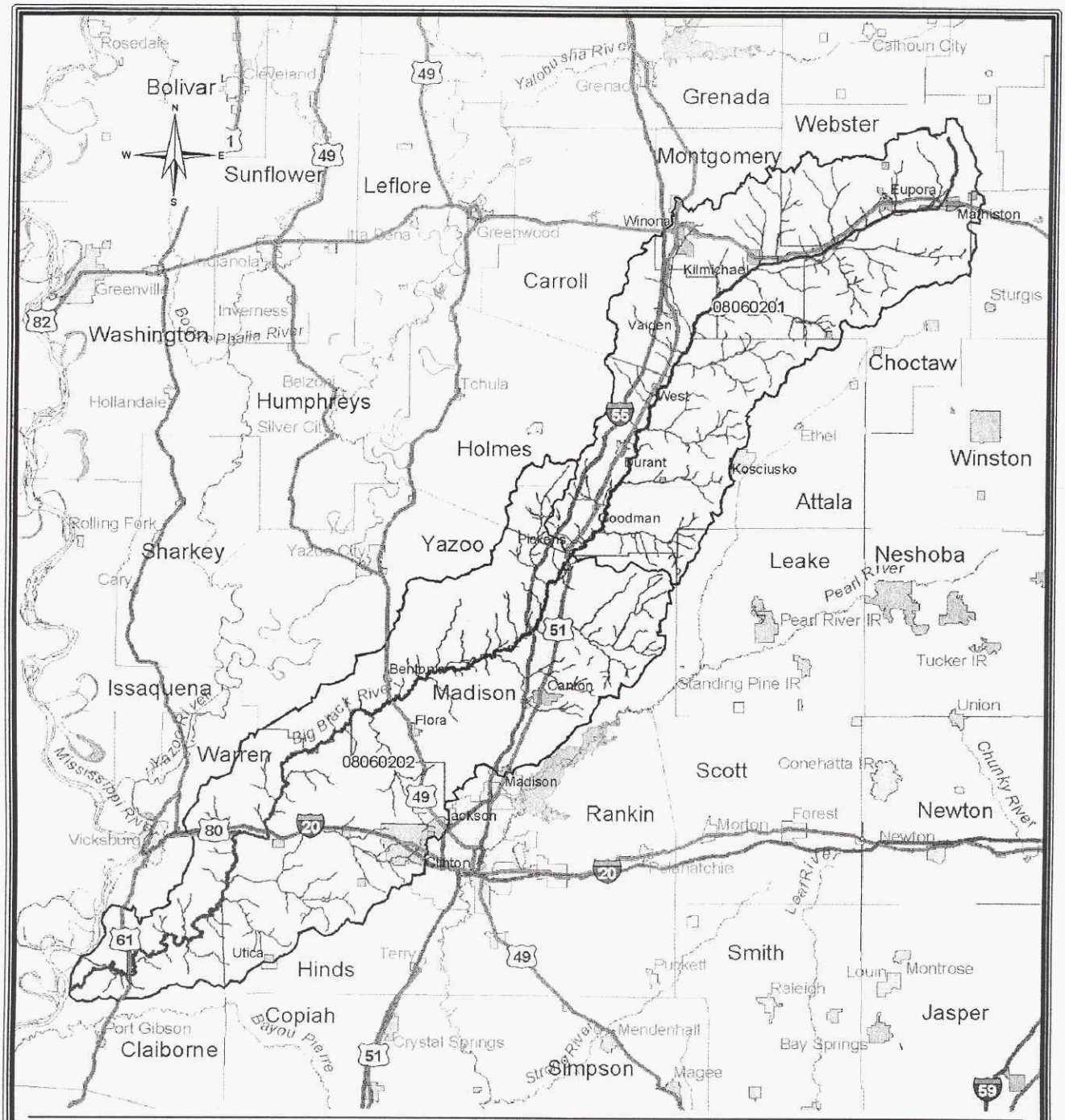


Big Black River Basin

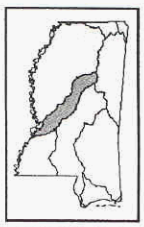
8-Digit HUCs

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

570 E. Woodrow Wilson Ave.
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MSDH Financial Officer:

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

Voice 576-7542
FAX 576-7655
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 Managen 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

3-9-04

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.