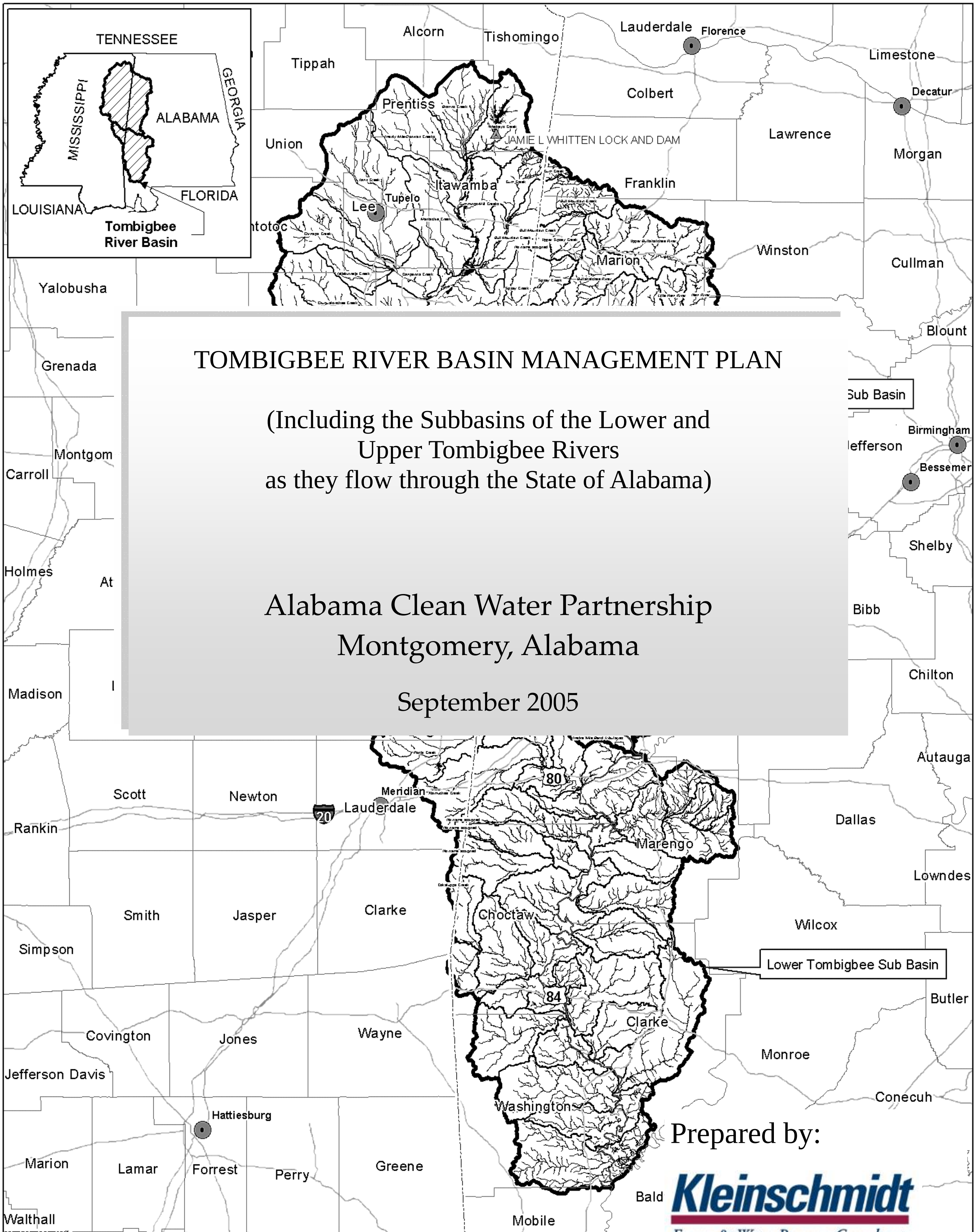

TOMBIGBEE RIVER BASIN MANAGEMENT PLAN

(Including the Subbasins of the Lower and
Upper Tombigbee Rivers
as they flow through the State of Alabama)

Alabama Clean Water Partnership
Montgomery, Alabama

September 2005

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

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(Including the Subbasins of the Lower and Upper Tombigbee Rivers
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ALABAMA CLEAN WATER PARTNERSHIP
MONTGOMERY, ALABAMA

September 8, 2005

Prepared by:

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Alabama Department of Environmental Management through a
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TOMBIGBEE RIVER BASIN MANAGEMENT PLAN

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ACKNOWLEDGEMENTS

On behalf of the Alabama Clean Water Partnership and the Alabama/Tombigbee Steering Committee, Kleinschmidt Associates would like to thank all the organizations and individuals that participated in the process to develop this basin management plan. Their participation at stakeholder and steering committee meetings, input at various points during the planning process, and comments on draft versions of the plan were essential to the successful development of this plan. Moreover, the interest and enthusiasm in the sustainable management of Alabama's waters shown by these participants gives promise to the future implementation of the recommendations in this plan and the long-term protection of water quality in the river basins of the State. A list of many of the dedicated stakeholders is provided below:

Alabama Clean Water Partnership
Alabama Coastal Foundation
Alabama Department of Environmental Management
Alabama Department of Economic Affairs – Office of Water Resources
Alabama Department of Public Health
Alabama Farmers Federation
Alabama Forestry Commission
Alabama Power Corporation
Alabama Pulp and Paper Council
Alabama River Pulp
Alabama Rivers Alliance
Alabama Soil and Water Conservation Committee
Alabama Water Watch
Alabama-Tombigbee Regional Commission
Auburn University
Boise Cascade
Business Council of Alabama
Capital Ideas
Central Alabama Regional
CH2M Hill
City of Montgomery
Coosa Alabama River Improvement Association
Dee River Ranch
Georgia-Pacific
Gulf States Paper
Hand Arendall/Alabama Coastal Foundation
Home Builders Association of Alabama
Legacy Partners in Environmental Education
MS Department of Environmental Quality
Natural Resource Conservation Service
Olin
Planning and Development Council
Plum Creek Watershed Association
Rayonier, Inc
Tenn-Tom Water Development Authority
The Nature Conservancy
The Water Works and Sanitary Sewer Board of the City of Montgomery
Tombigbee Resource Conservation & Development Council
United States Army Corps of Engineers
United States Department of Agriculture
United States Geological Survey
University of South Alabama Foundation
University of West Alabama

EXECUTIVE SUMMARY

PLACEHOLDER

COMMONLY USED ACRONYMS AND ABBREVIATIONS

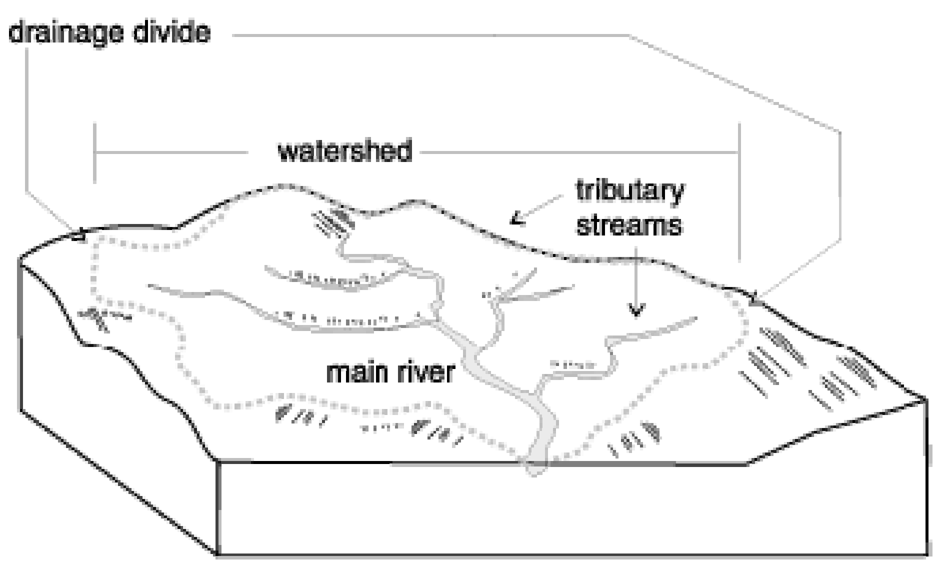
303d	Section 303 of the Clean Water Act
305b	Section 305 of the Clean Water Act
AAGC	Alabama Association of General Contractors
ACES	Alabama Cooperative Extension System
ACOE	United States Army Corps of Engineers
ACWP	Alabama Clean Water Partnership
ADCNR	Alabama Department of Conservation and Natural Resources
ADAI	Alabama Department of Agriculture and Industry
ADECA	Alabama Department of Economic and Community Affairs
ADEM	Alabama Department of Environmental Management
ADIR	Alabama Department of Industrial Relations
ADOT	Alabama Department of Transportation
ADPH	Alabama Department of Public Health
AEC	Alabama Environment Council
AEMC	Alabama Environmental Management Commission
AFA	Alabama Forestry Association
AFC	Alabama Forestry Commission
AFO	Animal Feeding Operations
ALFA	Alabama Farmers Federation
ANHP	Alabama Natural Heritage Program
APC	Alabama Power Company
APPCO	Alabama Pulp and Paper Council
ARA	Alabama Rivers Alliance
ASG	Alabama Sea Grant Extension Program
ASMC	Alabama Surface Mining Commission
AU	Auburn University
AWF	Alabama Wildlife Federation
AWPCA	Alabama Water Pollution Control Act
AWRI	Alabama Water Resources Institute
AWW	Alabama Water Watch
AWWA	Alabama Water Watch Association
BCA	Business Council of Alabama
BMP	Best Management Practices
CAFO	Concentrated Animal Feeding Operation
CBEP	Community Based Environmental Protection
CRP	Conservation Reserve Program (USDA NRCS)
CVA	Clean Vessel Act
CWA	Clean Water Act
CWAP	Clean Water Action Plan
DO	Dissolved Oxygen
DC	District Conservationist
EMAP	Environmental Monitoring Assessment Program
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program (USDA NRCS)
EWP	Emergency Watershed Protection Program
FIP	Forestry Incentives Program
FSA	Farm Services Agency
FWPCA	Federal Water Pollution Control Act
GIS	Geographical Information System
GSA	Geological Survey of Alabama
HBAA	Home Builders Association Alabama
ICFAA	International Center for Fisheries and Allied Aquaculture – Auburn University
IPM	Integrated Pest Management
MDEQ	Mississippi Department of Environmental Quality
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory of the USFWS
OSDS	Onsite Sewage Disposal System
OSM	United States Bureau of Mines – Office of Surface Mining
RC&D	Resource Conservation and Development
SMZ	Streamside Management Zone
SWCC	Soil and Water Conservation Committee
SWCD	Soil and Water Conservation District
SWCS	Soil and Water Conservation Society
SWCP	State Wetland Conservation Plan
SWCS	Soil and Water Conservation Society
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy of Alabama
TSI	Trophic State Index
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers (a.k.a. ACOE)
USDA	United States Department of Agriculture
USDA-FS	United States Department of Agriculture – Forest Service
USDA-NRCS	Natural Resources Conservation Service
USDI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UWA	University of West Alabama
WHIP	Wildlife Habitat incentives Program
WMA	Watershed Management Authority
WRP	Wetlands Reserve Program
WWTP	Waste Water Treatment Plant

1.0 INTRODUCTION

The value of water is no secret to Alabama. In fact, Alabama ranks seventh in the United States for its number of stream miles, with 77,274 miles. It also boasts 337 miles of coastline and approximately 610 miles of estuarine shoreline along the Gulf of Mexico. Alabama has over 3.5 *million* acres of wetlands, both freshwater and tidal. There are also 490,472 acres of lakes, reservoirs and ponds; some of which are associated with 16 hydroelectric dams and 16 navigational dams (5 of which are also power-generating).

Whether it is the Mobile Bay, the Tombigbee River or Luxapallila Creek, many Alabamians live, play and work on the water. We are all dependent on water for food and energy. And, because of our reliance on this resource, we all have a vested interest in protecting it for ourselves and our grandchildren and their grandchildren. The basin management planning process is a very important step to protect Alabama waters. It is an all-inclusive process that encourages all interested parties to participate. It consists of people working together to create guidelines for the management of the State's water resources based on their beliefs and the best scientific information available. The ultimate result of this process is a basin management plan that guides the activities of individuals and organizations to protect and restore Alabama's creeks, rivers, ponds, lakes, estuaries, and bays.

Figure 1. Graphical illustration of a watershed



A basin or watershed is made up of all of the land that drains into a particular body of water like a stream, river or lake. Any body of water and its drainage area make up a distinct hydrologic unit (the "watershed") in which all living things are interconnected by a basic and dynamic element: *water*. All waterbodies, large and small, have distinct watersheds. For the sake of classification, watersheds for large rivers are actually referred to as *river basins* or simply, *basins*. Basins are made up of *subbasins*. Subbasins are made up of *watersheds.* And, watersheds are made up of *sub-watersheds* (tributaries).

What we do on the land where we live has a direct effect on the quality of water in our local streams. Rain carries soil from erosion along with other pollutants over the land and into our creeks, rivers and lakes. We commonly refer to this volume of water as **stormwater** and we refer to this type of pollution as **polluted runoff** or **nonpoint source pollution** because it does not come from any one **point source** or an end of a sewer or discharge pipe. Land uses including forest operations, mining, road construction, urban development, and certain farming practices increase soil erosion, can cause nonpoint source pollution, and negatively impact water quality. Common homeowner practices like, washing the car, applying fertilizers and pesticides, and improperly disposing of pet and households wastes, can also lead to nonpoint source pollution. When unchecked or mismanaged, these activities can lead to serious water quality problems. However, when practicing sound and careful management, plus a little common sense and courtesy for others, we can minimize and control the impact we have on the land and the water.

The prevention of water pollution by managing activities that impact the land and water occurs by regulatory and non-regulatory means. In the United States, the Clean Water Act[1] (CWA) mandates the designation of water quality standards and addresses activities that lead to water pollution. Water quality standards are determined by factoring in the known uses[2] of the water (*e.g.*, swimming, fishing), chemical and biological criteria (*e.g.*, lead, arsenic, bacteria) and a quality protection clause known as, the "anti-degradation policy." Using the standards as benchmarks, the CWA calls for the management of a wide range of water quality issues either by regulation, as is the case with wetland impacts, dredging, and point source pollution (*e.g.*, end-

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[1] 33 U.S.C. 1251 - 1376

[2] Alabama's use classification system contains the following use classifications: Public Water Supply (PWS), Swimming and Other Whole Body Water Contact (S), Shellfish Harvesting (SH), Fish and Wildlife (F&W), Limited Warmwater Fishery, Outstanding Alabama Water (OAW), and Agricultural and Industrial Water Supply (A&I).

of-pipe discharges, sewer outfalls), or voluntary strategies such as, providing technical and financial assistance to industry, farmers, and municipalities. Section 319 of the CWA calls for a voluntary approach to protecting and restoring water quality and it is the main body of the CWA that authorizes programs and strategies such as this basin management plan to manage nonpoint source pollution and to protect watersheds.

Administration of the various water quality protection programs under the CWA, including Section 319, fall into the hands of federal and state environmental agencies. The United States Environmental Protection Agency (EPA) is the federal agency charged with issuing and enforcing rules and regulations under the Clean Water Act. EPA frequently delegates authority to state environmental agencies in order to execute the various provisions of the CWA. Therefore, the State agencies typically occupy the lead role in the implementation of regulatory and non-regulatory programs by working directly with municipalities, industries, businesses and individuals. Table 1 below provides a summary of the primary water quality programs and the governmental agencies responsible for overseeing their implementation.

EPA Region 4 covers the southeastern United States, including Alabama. It coordinates with the Alabama Department of Environmental Management (ADEM), which is the primary agency responsible for executing the water protection mandates of the CWA for the State of Alabama. These responsibilities include, but are not limited to, the development of water quality standards;[3] monitoring and reporting the state and condition of Alabama's waters[4]; creating a list of impaired waters[5]; regulating point sources of pollution (i.e. Section 402 - National Pollution Discharge Elimination System (NPDES)); setting limits to concentrations and volumes of pollutant inputs (Total Maximum Daily Loads (TMDLs)); and providing technical and financial assistance to landowners, municipalities and business to reduce nonpoint source pollution

---

[3] Alabama's surface water quality standards are found in Chapters 335-6-10 and 335-6-11 of the ADEM Administrative Code. The ***Antidegradation Policy*** of the ADEM Water Quality Program is found in the ADEM Administrative Code Rule 335-6-10-04(3) is perhaps the most comprehensive enforcement mechanism because it requires management measures to prevent the decrease (degradation) of the State's waters.

[4] ADEM completed the *Integrated Water Quality Monitoring and Assessment Report* in 2004, also commonly known as the 'State of the State's Waters Report, which is a biannual report to Congress mandated by Section 305(b) of the CWA.

[5] Section 303(d) of the CWA mandates that the states must develop a list of impaired (not attaining water quality standards) waters every even-numbered year.

(Section 319). An excellent summary of these authorities can be found in the State's Nonpoint Source Management Program (NSMP).[6]

Table 1. Summary of Water Quality Regulations and Management Authorities

Program & Authorized Agency	Description
Water Quality Inventory – State of the State's Waters (ADEM)	Documents the quality of all of Alabama's waters
303(d) List of Impaired Waters (ADEM)	Information on waters that are polluted or degraded and do not meet their designated and existing uses.
Water Quality Restoration Planning/Total Maximum Daily Load (ADEM)	Developed for the waters listed under 303(d), these plans limit the amount of a pollutant(s) into impaired waters
Point Source Discharges (ADEM)	Individual and group permits to discharge pollutants into surface waters from municipal wastewater treatment plants, large storm sewer outfalls, construction sites over 5 acres, utilities, industrial discharges, aquaculture operations, certain animal feeding operations (AFO) and surface mining operations.
Stormwater Phase I & Phase II (ADEM)	Permits to limit runoff and pollution from municipal separate storm sewer systems and construction sites
Concentrated Animal Feeding Operations (CAFO)/Animal Feeding Operations(AFO) (ADEM)	AFO that qualify as CAFOs must obtain a NPDES permit from ADEM. Also, AFO in certain, priority watersheds must register with ADEM too.
State Indirect Discharge Permits (ADEM)	Permits for industrial discharges into a publicly-owned wastewater treatment system.
Surface Mining Rules (ADEM)	In addition to NPDES permits, surface mines must submit pollution prevention plans to ADEM.
Freshwater Wetlands (ACOE & ADEM)	Authorized through Section 404 of the Clean Water Act, certain activities that may impact to waterways and wetlands must be permitted.
Ground Water Protection (ADEM)	Regulations for underground storage tanks (UST) and underground injection (UIC)
Water Withdrawals (ADECA-OWR)	ADECA issues 5 to 10 year "Certificates of Use" for water withdrawals/diversions permits; a "Declaration of Beneficial Use" must be filed with ADECA
Drought Management (ADECA-OWR)	The state maintains the Alabama Drought Management Plan which contains the State's strategies for handling a drought.
Onsite Sewage Disposal Systems (ALDPH)	Property owners must obtain a permit from the county health agency before they install an onsite sewage disposal system or septic tank.
Local land use controls (Municipal governments*)	The use of zoning, easements and building codes to minimize the impact of development on water quality.
Water Quality Trading (EPA & ADEM)	EPA has issued the Water Quality Trading Assessment Handbook as guidance to explore this market-based approach
Watershed-based Permitting (EPA & ADEM)	An extension of the NPDES program to cover multiple sources within a watershed under one permit.
* Very few Alabama counties and towns have zoning authority. Those that do are typically associated with the major cities.	

[6] *See* 'Chapter 4 - Management Program Implementation Mechanisms and Authorities' for a summary of the regulatory and non-regulatory mechanisms and legal foundation on many water quality related programs.

Alabama's NSMP sets forth ADEM's vision, goals, objectives and strategies to protect and restore the waters of the State by effectively managing nonpoint source pollution through a community-based, watershed-specific and cooperative approach (ADEM, 2003). The ADEM Office of Communication, Planning, and Outreach is charged with updating and coordinating the implementation of the NSMP. The Program is periodically updated and was last updated in August of 2003. This latest Program update highlights the important elements of a watershed approach to nonpoint source pollution management in Alabama:

> *"In 1997, Alabama began implementation of a watershed management approach as a tool for assessment and prioritization of water quality issues, development of strategies and solutions, and opportunities for targeted, cooperative actions to achieve water quality goals. Among the key elements of the watershed management approach are: stakeholder involvement; watershed monitoring; watershed assessment; prioritization and targeting development of management strategies; development of watershed management plans; and, plan implementation."*
>
> \- ADEM Nonpoint Source Management Program, 2004

More specifically, basin management plans for Alabama's river basins are explicitly stated in the NSMP's Goals:

> *"Goal 4. Develop 10 river basin management plans (8-digit Hydrologic Unit Code Cataloging Unit) that present practical "big-picture" goals, objectives, and milestones to protect impaired or threatened waters. Goal 5. Develop 10 sub-watershed protection plans (11-14 digit Hydrologic Unit Code subwatershed number) to provide reasonable assurance that load allocations for targeted sources and causes of NPS pollution are being addressed and water use classifications and standards can be restored as expeditiously as possible. Goal 6. Support the efforts of the Alabama Clean Water Partnership (CWP) Program."*
>
> \- Chapter 1 of the Alabama Nonpoint Source Management Program August 2003, ADEM Nonpoint Source Unit. Pages 1-5.

Development of this basin management plan for the Tombigbee River Basin constitutes another successful step for the State of Alabama to meet its nonpoint source pollution management goals. The next section will explain the origin of this basin management plan and how it was created. It will also discuss the many people involved in the planning process.

2.0 BASIN MANAGEMENT PLAN FOR THE TOMBIGBEE RIVER

This basin management plan for the Tombigbee River Basin has been developed to advance the mission of the Alabama Clean Water Partnership whose members are committed to *restoring, maintaining, and protecting the waterways of the State of Alabama*. It is the first plan of its kind for this basin, paralleling previous basin planning efforts completed and underway for other basins of the state. Two basic goals have guided its development:

1. ***Educate readers about nonpoint source pollution in the Tombigbee Basin and how it can be effectively managed and,***

2. ***Assist individuals and organizations working on the management of the Tombigbee River Basin with the coordination of their activities.***

This document is one piece of a very large and complex puzzle consisting of related studies and plans that have focused on the management of the Tombigbee River Basin. And, like all puzzle pieces, this piece (the "plan") should tell us enough about the rest of the pieces so that we can fit it into place. The plan was developed to meet the following objectives:

- identify and characterize pollution sources
- describe nonpoint source pollution control measures
- estimate technical and financial assistance needs to implement recommendations
- increase public awareness of watershed issues
- schedule pollution control management measures
- describe plan milestones
- identify monitoring strategies
- estimate pollutant load reductions

The planning process was highlighted by the people that met and discussed issues about Alabama's waters and their watersheds. The discussions focused on how to better understand how we impact our waters and to develop guidelines for ourselves to decrease the impacts we have on them by 1) encouraging the positive, responsible things we are already doing to protect Alabama's waters and 2) informing each other and promoting change of the behaviors and actions that have a negative impact on our environment, especially water quality. In this regard, the basin management plan reflects our knowledge about the waters and state how we might manage them in the future.

This basin management plan contains information and data that describes the river and its basin, explains water quality issues in the watershed, and proposes recommendations for managing these issues. This written document becomes a central source of information about the basin that educates people and enables them to make informed choices about their activities as they relate to impacts in the Tombigbee River Basin. The plan strives to influence the way people act in a way that promotes the stewardship of Alabama's waters.

2.1 Scope of the Tombigbee River Basin Management Plan

This basin management plan applies to the areas associated with the mainstem and all the tributaries of the Tombigbee River including all or parts of 31 counties in Alabama. The final basin management plan for the Tombigbee River Basin will include two (2) subbasin project components: 1) Upper Tombigbee Watershed Management Plan, and 2) Lower Tombigbee Watershed Management Plan. Project coordination and basin planning in the Upper Tombigbee River Basin will include information and input from watershed stakeholders from the State of Mississippi. The plan does not include basin management recommendations for the State of Mississippi because water quality plans exist for the Tombigbee River in that state. However, this plan will mention these documents and discuss issues of *inter*-state coordination of water quality and natural resource management for Alabama and Mississippi.

2.2 Alabama Clean Water Partnership (ACWP)

Because the plan is focused on the way people manage their land and water resources, it must be developed by the people the plan will effect. These people have a great stake in the process and therefore, we call these people *stakeholders*. In Alabama, there is a collaborative setting that brings stakeholders together in a partnership for the management of the State's waters. Some stakeholders attend partnership meetings for individual reasons and others come to represent the interests of businesses and organizations. This working partnership is called the Alabama Clean Water Partnership (ACWP).

The ACWP is a statewide nonprofit organization that incorporated in 2001. Guided by a Board of Directors and a Statewide Coordinator, it is a coalition of public and private individuals, companies, organizations and governing bodies that work together to manage water resources and aquatic ecosystems for Alabama. The purpose of the ACWP is to bring together many diverse groups in order to coordinate their efforts, to share information, to plan management activities and to allocate resources. The ACWP was organized to allow these diverse interests to develop, support, and coordinate efforts that aim to restore, maintain, and protect the waterways of Alabama. ACWP Partners enjoy, 1) improved communication, 2) data and information sharing and consolidation, 3) opportunities for improved coordination, and 4) opportunities for enhanced collaboration.

Major River Basins Represented in the Alabama Clean Water Partnership	
Alabama - Tombigbee	Conecuh-Sepulga
Black Warrior	Coosa
Cahaba	Coastal
Chattahoochee-Chipola	Tallapoosa
Choctawhatchee-Pea-Yellow	Tennessee

Under the auspices of the Alabama Department of Environmental Management, USEPA, and private interests, the ACWP has successfully spearheaded the basin management planning effort for the rivers of Alabama. By adopting the “basin” or “watershed” approach to the management of water quality issues, constituencies are invited to participate on behalf of their respective basins and subbasins. The goal of this process is to address water quality issues at the smallest scale possible because water quality problems – especially nonpoint source pollution problems – are the culmination of innumerable small pollution inputs and, therefore, require a widespread educational response to produce cumulative and positive results.

2.3 Alabama-Tombigbee CWP Steering Committee

The ACWP is made up of 10 basin groups representing 11 major river basins of the State.[7] For each basin, a Steering Committee has been formed consisting of representatives from the general public, agricultural business, major industries, governmental agencies, private organizations and universities. The Alabama/Tombigbee Clean Water Partnership Steering Committee (a.k.a. AlaTom Steering Committee) is one of these committees. Over 70 people

[7] There is currently one steering committee for both the Alabama River and Tombigbee River basins because of limited funding to the ACWP. Each basin would have its own steering committee if funding were available.

representing counties throughout the two basins make up this committee. Its primary purpose is to serve as a coordinating body for stakeholders from the Alabama and Tombigbee River basins. The Committee meets on a quarterly basis in Montgomery. The membership of the Steering Committee is summarized in Table 2.

Table 2. Membership of the Alabama – Tombigbee Steering Committee

Alabama Clean Water Partnership
Alabama Coastal Foundation
Alabama Department of Environmental Management
Alabama Department of Economic Affairs – Office of Water Resources
Alabama Department of Public Health
Alabama Farmers Federation
Alabama Forestry Commission
Alabama Power Corporation
Alabama Pulp and Paper Council
Alabama River Pulp
Alabama Rivers Alliance
Alabama Soil and Water Conservation Committee
Alabama Water Watch
Alabama-Tombigbee Regional Commission
Auburn University
Boise Cascade
Business Council of Alabama
Capital Ideas
Central Alabama Regional
CH2M Hill
City of Montgomery
Coosa Alabama River Improvement Association
Dee River Ranch
Georgia-Pacific
Gulf States Paper
Hand Arendall/Alabama Coastal Foundation
Home Builders Association of Alabama
Legacy Partners in Environmental Education
MS Department of Environmental Quality
Natural Resource Conservation Service
Olin
Planning and Development Council
Plum Creek Watershed Association
Rayonier, Inc
Tenn-Tom Water Development Authority
The Nature Conservancy
The Water Works and Sanitary Sewer Board of the City of Montgomery
Tombigbee Resource Conservation & Development Council
United States Army Corps of Engineers
United States Department of Agriculture
United States Geological Survey
University of South Alabama Foundation
University of West Alabama

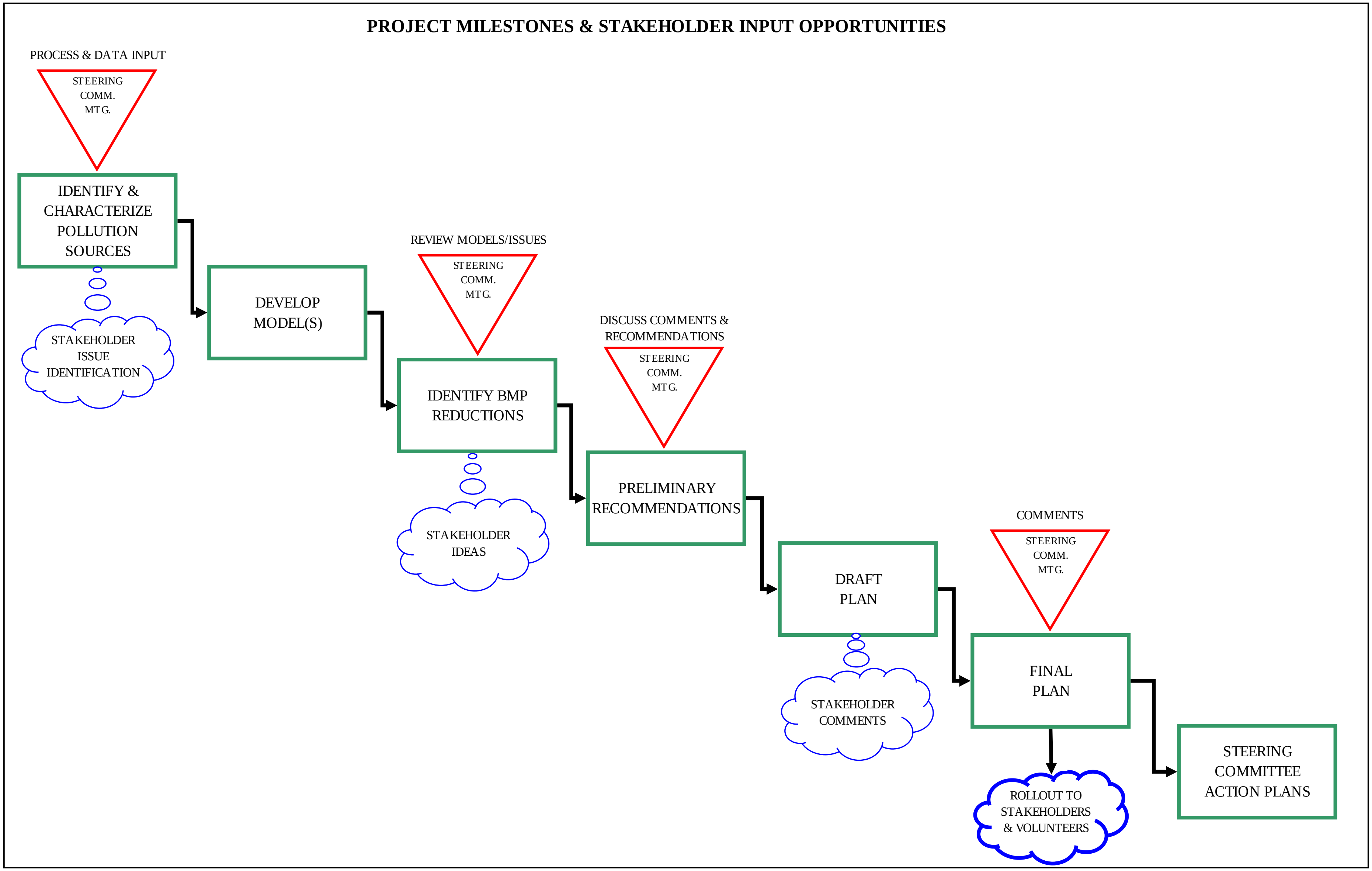
Development of this basin management plan, including the organization of the subbasin stakeholder groups, was directed by the AlaTom Steering Committee. Due to the fact this committee was spearheading basin management planning efforts in the two basins, planning activities in the Alabama and Tombigbee River basins occurred concurrently and on certain occasions, jointly. Therefore, the following descriptions of the stakeholder participation process makes references to these coordinated activities.

2.4 Tombigbee River Subbasin Stakeholder Groups and the Planning Process

A stakeholder outreach and participation component was a crucial element to the basin management planning efforts for the Tombigbee. Its primary purpose was to reach *local* stakeholders that may not have participated in the quarterly meetings of the Ala-Tom Steering Committee in order to gather their input on the basin management plans. Local stakeholders are property owners, local resource managers, and representatives of local businesses, industry, municipal government, and/or civic organizations with an understanding of the basin on a smaller, more intimate, or grassroots perspective. Participation of local stakeholders constitutes a *community-based* approach to developing the plans because it uses their local knowledge of the watershed to identify water quality issues and potential management solutions.

An illustration of how stakeholder participation was integrated with the development of the Tombigbee Basin Management Plan is provided as Figure 2. At defined stages in the plan development timeline (blue-colored symbols), stakeholders were given the opportunity to participate in the basin management planning process. Particular attention and energy was focused on stakeholder comments related to known water quality issues (*i.e.*, water quality issues as defined by the State's 305(b), 303(d) and/or TMDL Process) and any other water quality concerns or issues they had. In terms of scale, basin management issues are discussed from a basin level down to the associated watersheds and sub-watersheds, where applicable.

Figure 2. Stakeholder Input Opportunities for the Basin Management Plan



The stakeholder and public participation program for the basin management planning effort was designed to build on past efforts of the ACWP and the Ala-Tom Steering Committee. Its main objectives are: 1) to support the development of the Tombigbee Basin Management Plan and, 2) to engage a diverse population of stakeholders with interest in participating in the basin management planning process and the Alabama Clean Water Partnership. The creators of the stakeholder and public participation program were the Ala-Tom Steering Committee and the Alabama Pulp and Paper Council (APPCO), and their consultant, Kleinschmidt Associates.

Tombigbee River Stakeholder groups were organized by subbasin or a combination of subbasins, as follows: Upper Tombigbee, Lower Tombigbee/Lower Alabama, Upper and Middle Tombigbee. Even though the size of the project area proved to be a substantial challenge to attracting stakeholders to periodic subbasin meetings to discuss the basin management plans, limited time and funding kept the project team from organizing stakeholder meetings on a smaller scale, *i.e.*, county, watershed, town. Long travel distances within the basin were a practical hurdle for stakeholders to attend stakeholder meetings. For instance, the two basins combined encompass almost a quarter of the area of the entire State of Alabama: Total Area of the Alabama and Tombigbee Basins = 19,779 square miles versus the Total Area of Alabama = 52,423 sq. miles, including over 6,000 sq. miles and 22 counties in Mississippi).

The Ala-Tom Steering Committee and the Basin Facilitator organized several meetings over the course of the planning process. These meetings are listed in Table 3. Participants at these subbasin meetings received presentations on current water quality issues in their basin, subbasin and watersheds and they were asked to respond with questions and to engage in facilitated discussions. In some instances, “around the room” discussions were staged so that everyone in the audience was given an opportunity to introduce themselves, speak about where they live, their interest in participating in the group and most importantly, what concerns they had about the rivers and tributaries of their community. Participants were encouraged to elaborate on problems they perceived in the watershed and to suggest possible remedies for these issues. These sessions allowed for direct input from watershed stakeholders that wished to be a part of the basin management planning process. This stakeholder input is presented in Section 6.1 of this plan.

Table 3. Tombigbee River Subbasin Stakeholder Meetings

Upper Tombigbee Tuesday, January 27, 2004 at 6:00 p.m., Extension Bldg, Carrollton, AL
Lower Alabama/Lower Tombigbee Thursday, January 29, 2004 at 6:00 p.m., ALFA Building, Grove Hill, AL
Nonpoint Source Conference/WATERQUEST **Alabama/Tombigbee Stakeholders Meeting** February 10, 2004, Birmingham, AL
Upper Tombigbee Tuesday, March 16, 2004 at 6:00 p.m., Cooperative Extension Bldg, Carrollton, AL
Middle Tombigbee Thursday, March 18, 2004 at 12:00 p.m., UWA On-Site Wastewater Demonstration Training Center, Livingston, AL
Lower Alabama/Lower Tombigbee Thursday, March 18, 2004 at 6:00 p.m., ALFA Building, Grove Hill, AL

This section concludes the introduction to the plan and the background information pertaining to the ACWP and the basin management planning process. The next chapter will provide an overview of the physical characteristics of the Tombigbee River and its basin.

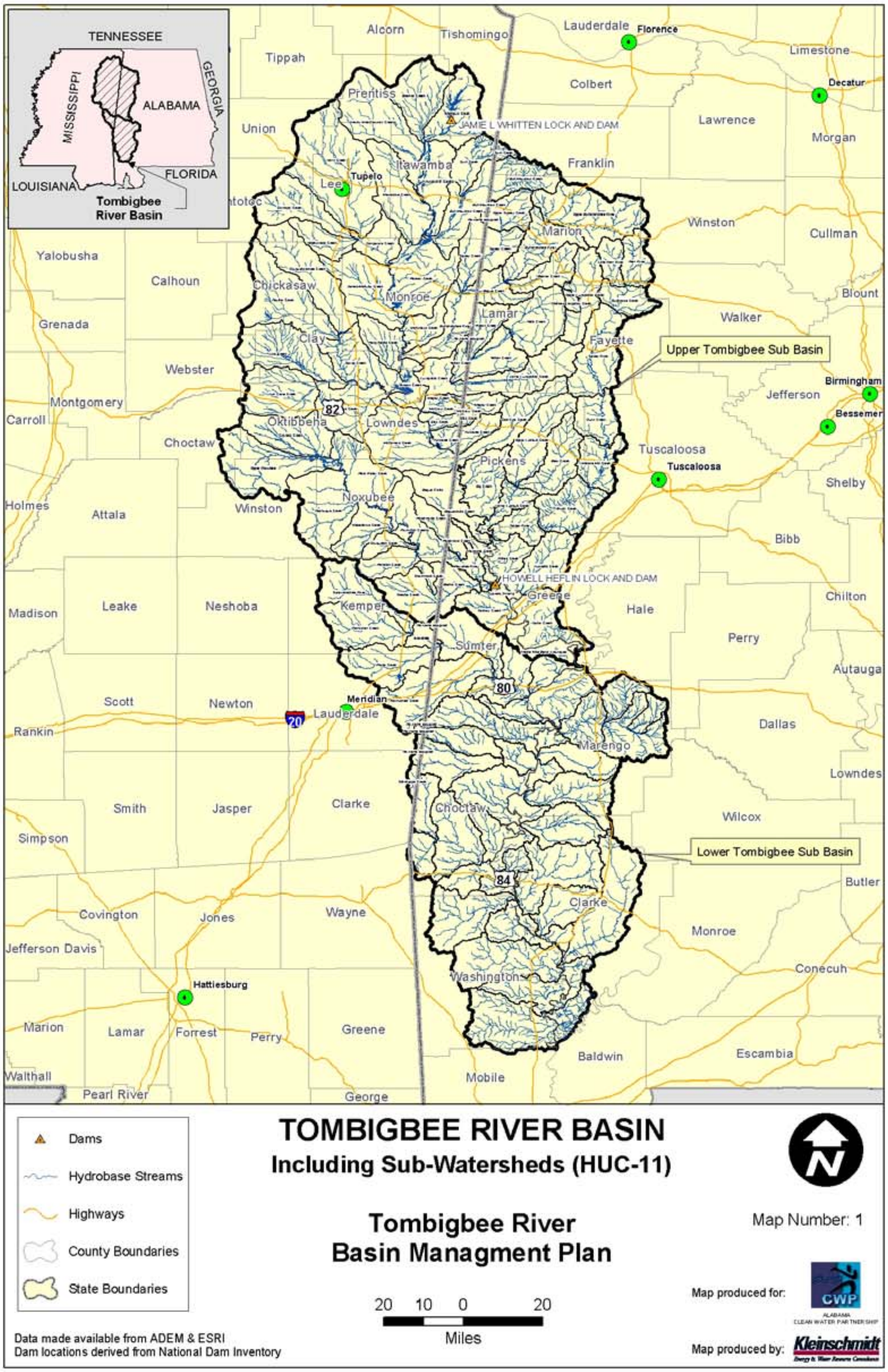
3.0 PHYSICAL GEOGRAPHY OF THE TOMBIGBEE RIVER BASIN

Figure 3. Location of the Mobile River Basin
- Map source: USGS (WRIR 02-4162), 2002

The Tombigbee River occupies the western ridge of the Mobile River Basin, which is the sixth largest river basin in the United States, encompassing 44,000 square miles in portions of Alabama, Georgia, Mississippi and Tennessee. Seven major rivers and their subbasins make up the Mobile River Basin: Alabama, Black Warrior, Cahaba, Coosa, Mobile, Tallapoosa and Tombigbee. According to the United States Geological Survey (USGS), the mean annual flow of the Mobile River is approximately 62,100 cubic feet per second. Of this volume, the Tombigbee River contributes 48 percent and the Alabama River contributes the remaining 52% (Atkins, et al, 2004). Nearly 4 million people live and work in the Mobile River Basin, mostly in the largest cities in Alabama: Birmingham, Mobile, Montgomery and Tuscaloosa (Johnson, et al, 2002). The rivers of the Basin generate most of the power consumed by this population.

The Tombigbee River Basin straddles the border between Alabama and Mississippi. In total, the basin occupies an area of approximately 13,767 square miles between the states of Alabama and Mississippi, 7,693 square miles in Alabama and 6,075 square miles in Mississippi (Figure 3). Its headwaters emerge out of the Fall Line Hills and Black Prairie Belt Districts of the Coastal Plain Physiographic Province adjacent to the Tennessee River Valley in northeastern Mississippi and northern Alabama. The Tombigbee gathers the flow from four major rivers: Buttahatchee, Noxubee, and Sucarnoochee from the west, and the Sipsey from the northeast. The main stem of the river joins with the Black Warrior at Demopolis, Alabama and then continues due south to join the Alabama River, south of Jackson, Alabama and drains into the Mobile River, which flows into the Gulf of Mexico.

Figure 4. Map of the Upper and Lower Tombigbee River Basins



3.1 Basins and Watersheds of the Tombigbee River

The USGS National Water-Quality Assessment (NAWQA) Program uses hydrologic unit codes (HUC) to categorize the watershed lands of the United States.[8] Watersheds are typically divided into units containing one major river basin. There are two hydrologic regions in the state of Alabama, six sub-regions corresponding to the drainage areas of the major river basins, and eleven hydrologic accounting codes (six-digit or HUC 6) corresponding to drainage areas of the major tributaries to these rivers. There are eighteen (18) watersheds in the state, which are further broken down into 8-digit hydrologic cataloging units (HUC 8 = 52 watersheds) and 11-digit cataloging sub-units (HUC 11 = 629 sub-watersheds).

Over the course of this plan's development a new generation of hydrologic codes (HUC 12) was introduced. These new watershed delineations led to the modification of the HUC 11 boundaries so that they are replaced by HUC 10 boundaries. In the original hydrologic unit dataset, there were 654 eleven digit hydrologic units for Alabama. The new HUC 10 dataset contains 317 and the HUC 12 contains 1,426. Hydrologic units were delineated using both paper and digital 7.5 minute topographic quadrangle maps. For modeling purposes, this plan relied on the HUC 11 delineations because the new HUC 12 delineations were not yet adopted. However, a map of the newly adopted HUC 12 watersheds is provided in the map section of this document for educational purposes.

The Tombigbee River Basin includes two (2) subbasin components: Upper and Lower Tombigbee River Subbasins. The Upper Tombigbee River and its subbasin (HUC031601) run mostly in a north-south direction in western central Alabama, reaching north from its confluence with the Black Warrior River near Demopolis, AL well into Mississippi and Lee, Tishomingo, Lowndes, Clay, Monroe, and Itawamba Counties. It consists of six watersheds: Upper Tombigbee (HUC03160101), Buttahatchee (HUC03160103), Luxapallila (HUC03160105), Middle Tombigbee-Lubbub (HUC03160106), Sipsey (HUC03160107), Noxubee (HUC03160108). The Lower Tombigbee River and its subbasin run from the confluence of the

[8] *See* Seaber, P.R., Kapinos, F.P., and Knapp, G.L., 1987, Hydrologic Unit Maps: U.S. Geological Survey Water-Supply Paper 2294, 63 p. "The United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system."

Upper Tombigbee and Black Warrior Rivers in a southerly direction to the confluence with the Alabama River in southeastern Alabama. It consists of three watersheds: Middle Tombigbee-Chickasaw (HUC03160201), Sucarnoochee (HUC03160202), and Lower Tombigbee (HUC03160203).

There are 44 sub-watersheds (11-digit cataloging sub-units) in the Upper Tombigbee River Basin and 42 sub-watersheds in the Lower Tombigbee River Basin. Major tributaries as with these sub-watersheds include Alamuchee Creek, Sucarnoochee River, Chickasaw Bogue Creek, Bashi Creek, Turkey Creek, Bassetts Creek, Lewis Creek, Buttahatchee River, Coal Fire Creek, Sipsey River, and Noxubee River. Map 1 depicts the location of the subbasins and their hydrologic sub-units and Appendix A contains a complete list of tributaries and their watersheds within the Tombigbee River Basin.

- *A Barge on the Tombigbee River*

3.2 Dams and their Impoundments in the Tombigbee River Basin

Figure 5. Map of the Tennessee Tombigbee Waterway

**Courtesy of the Tennessee Tombigbee Waterway Development Authority (www.tenntom.org)*

There are a total of 12 locks and dams on the Tombigbee River. Four of these are located in Alabama (See Table 4 on the following page). Ten of the dams are a part of the 234-mile ***Tennessee-Tombigbee Waterway*** system that connects Pickwick Lake on the Tennessee River with the Tombigbee River. This waterway is managed by the the Tenn-Tom Waterway Development Authority. Belville Lock & Dam and Heflin Lock & Dam were built in the late 1970s. These southernmost dams open the waterway to Demopolis Lake and the Demopolis Lock and Dam where it meets up with the Black Warrior River. The Warrior/Tombigbee navigational project connects the Black Warrior River as far north as the City of Birmingham.

South of Demopolis on the main stem of the lower Tombigbee River, the Coffeeville Lock and Dam constitutes the first impoundment on the Tombigbee and the Black Warrior-Tombigbee project. All of the dams on the Tombigbee River are under the jurisdiction of the Army Corps of Engineers and serve navigational, flood control and recreational purposes.

3.3 Climate

Alabama's climate is humid and subtropical with mild winters and hot, excessively humid summers. The average annual temperature for the Tombigbee River Basin ranges from 60˚F at the northern end at Franklin County to 66˚F towards the southern end near Marengo County. No climatic data station in the basin has an average monthly temperature below freezing (GSA, 2002). Typical annual rainfall of the Tombigbee River Basin is about 60 inches per year, which is above the State's average annual rainfall of 55 inches.

Table 4. U.S. Army Corps of Engineers Dams in the Tombigbee River Basin

Name	Impoundment	Date	Use	Location	River Mile	Total Drainage Area	Surface Area (acres)	Storage Capacity (acre-feet)
Tom Belville Lock and Dam	Aliceville Lake	1979	Navigation and recreation	Pickens County	287.4	5,750	8,300	60,400
John C. Helfin Lock and Dam	Gainesville Lake	1978	Navigation and recreation	Greene County	238.8	7,220	6,400	45,290
Demopolis Lock and Dam	Demopolis Lake	1928	Navigation and recreation	Marengo County	171.2	15,385	1,000	150,000
Coffeeville Lock and Dam	Coffeeville Lake	1960	Navigation and recreation	Choctaw County	74.7	18,417	8,500	190,800
Sources: Pearman and others, 1997; Ruddy and Hitt, 1990; USACOE, 1985.								

3.4 Geology

The land of Alabama rises from the Gulf of Mexico coastline, exposing deeper and older formations all the way back through the Mesozoic rocks of the Tuscaloosa Group in mid-state. The more resistant layers in this sequence crop out as long low ridges, steep on the north and gentle on the south, called *cuestas*.[9] The Tombigbee River basin is located within the physiographic province referred to as the Coastal Plain. This part of Alabama formed in the shallow waters that covered most of the central continent throughout geologic history. Generally, the geology of the Tombigbee River basin consists of Cretaceous chalk and sediments and clastic[10] sediments with porous limestone from the Oligocene, Eocene, Paleocene periods (Robinson, 2003). A listing of the types of rocks and their formation of origin can be found on Table 5 (GSA, 2002).

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[9] A cuesta is a ridge with a gentle slope on one side and a cliff on the other. *Source:* The American Heritage® Dictionary of the English Language, Fourth Edition. Copyright © 2000 by Houghton Mifflin Company.
[10] Clastic is a geological term that describes rock made up of fragments of preexisting rock; fragmental. *Source:* The American Heritage® Dictionary of the English Language, Fourth Edition Copyright © 2000 by Houghton Mifflin Company.

Table 5. The geology of the Tombigbee River basin.

Rock Type	Formation
Sand, Clay, Silt, Mud	Alluvial, coastal, low terrace deposits
Sand, Clay	Providence sand
Sand, Clay	Coker Formation
Sand, Gravel, Clay	Gordo Formation
Sand, Clay	Eutaw Formation
Chalk, Marl, Clay	Demopolis chalk
Limestone, Silt, Sand	Clayton Formation
Clay, Claystone, Sand	Nanafalia Formation
Silt, Clay, Sand	Tuscahoma Formation
Clay, Limestone, Sand	Jackson Group undifferentiated
Sand, Limestone, Marl, Clay	Oligocene Series undifferentiated
Gravelly, Sand, Clay	Miocene Series undifferentiated

According to the USGS, the estimated value of nonfuel mineral production for Alabama was $863 million in 2003 (USGS, 2003). Compared to other states, Alabama ranks 17th in this class of mineral production. The top four nonfuel mineral commodities produced in Alabama in 2003 were cement (portland and masonry), crushed stone, lime, and construction sand and gravel (descending order of value). In the Tombigbee River Basin, several counties contain some of the state's major producing areas for these minerals. A summary of the counties in the Tombigbee River Basin and the minerals produced there is found below in Table 6.

Table 6. Major production of minerals in selected counties in the Tombigbee River Basin (Geological Survey of Alabama/U.S. Geological Survey, 2003).

County	Minerals
Clarke	Construction sand and gravel
Fayette	Construction sand and gravel, common clay
Franklin	Construction sand and gravel, dimension limestone, crushed stone
Greene	Construction sand and gravel
Marengo	Cement plant, crushed stone
Marion	Construction sand and gravel, common clay
Pickens	Construction sand and gravel
Sumter	Common clay
Tuscaloosa	Steel plant, sulfur (oil form), construction sand and gravel, industrial sand and gravel
Walker	Common clay, fire clay
Washington	Sulfur (natural gas), construction sand and gravel, salt

Coal is found in abundance in certain parts of the Tombigbee River Basin Basin. According to the Geological Survey of Alabama, several counties in the Tombigbee Basin are underlain by the Warrior Coal Field, which holds some of the riches coal beds in the State: "The Warrior coal field covers approximately 9,420 square miles of the Appalachian Plateaus and is divided into two major areas, the Warrior coal basin and the Plateau coal region. The Warrior coal basin comprises 5,110 square miles in Jefferson, Blount, Walker, Tuscaloosa, Fayette, Cullman, Winston, Marion, Lamar, Pickens, Hale, Greene and Sumter Counties and contains the bulk of Alabama's economic coal and coalbed methane resources, as well as proven production. The productive section in the Warrior basin is designated by the State Oil and Gas Board as the Pottsville coal interval."

3.5 Soils

The official soil of the state of Alabama is the Bama soil series. A typical Bama soil profile consists of a five inch topsoil of dark brown fine sandy loam; a six inch subsurface of fine sandy loam; and a red clay loam and sandy clay loam subsoil to sixty inches or more. The Bama soil series is in the Ultisols soil order and is classified as fine-loamy, siliceous, subactive, thermic Typic Paleudults. *Ultisols* are old, highly weathered soils developed under woodland vegetation and are generally low in natural fertility. The classification of "fine-loamy" means that the subsoil has between 18-35 percent clay with more than 15 percent sand. The descriptor "siliceous" indicates that the sand and silt-size particles in the upper part of the subsoil is more than 90 percent (by weight) silica minerals or other extremely durable minerals that are resistant to weathering. "Subactive" implies that the clay fraction in the upper part of the subsoil is dominantly low activity clays, and "thermic" refers to an average annual soil temperature of between 59˚ and 72˚F.[11]

Bama soils are found in every county of the Tombigbee River Basin in Alabama except Sumter and Choctaw. They generally parallel major river systems, forming in thick deposits of loamy fluvial or marine sediments. Bama soils are found on high positions of the landscape and are well drained, making them desirable for most agricultural and urban uses. Cotton and corn are the principal cultivated crops[12].

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[11] *Alabama Soils Information.* USDA NRCS Website (http://www.mo15.nrcs.usda.gov/states/al.htm). January 2005.
[12] Ibid.

The Tombigbee River Basin falls within the physiographic province referred to as the Coastal Plain, which consists of five varieties of soils—three in the Upper Coastal Plains and two in the Lower Coastal Plains. Most of the soils in this area are derived from marine and fluvial sediments eroded from the Appalachian and Piedmont plateaus. In the Upper Coastal Plains are the Smithdale, Luverne, and Savannah soils, which have either a loamy or clayey subsoil with a sandy loam or loam surface layer. These soils typically have topography that ranges from level to very steep. Most of the area is in forest, with cultivated narrow ridge tops and broad terraces. Elevations of these areas range from 200 to 1,000 ft. As part of the Lower Coastal Plains, the Dothan and Orangeburg are extensive in the east with Bama and Smithdale in the west. The former have a loamy subsoil and a sandy loam or loamy surface layer, while the latter match in subsoil with a sandy loam surface layer. Most slopes on these soils are less than 15 percent. Timber products and hogs are important in the Lower Coastal Plains, as well as corn, peanuts, soybeans, and horticultural crops. Elevations range from sea level to 500 ft.

Stretching through a section of the Tombigbee River Basin is the Blackland Prairie, which includes Sumter, Oktibbeha, Wilcox, Mayhew, and Vaiden soils. The Blackland Prairie area of central and western Alabama is known as the "Black Belt" because of the dark surface colors of many of the soils. These soils are mostly clayey, acidic and somewhat poorly drained to poorly drained. The elevation of this area is approximately 200 ft, and soybeans are the main crop. Land use for this area is mainly timber production and pasture. Detailed manuscripts and soil maps for every county in Alabama are available online through the USDA NRCS (http://soils.usda.gov/survey/online_surveys/alabama/).

3.6 Hydrogeology

Most of the Tombigbee River Basin is underlain by varying ages of alluvial and terrace deposits of gravel, sand, and clay that make up the Southeastern Coastal Plain aquifer system (Johnson, et al, 2002; Robinson, 2003). The Southeastern Coastal Plain aquifer system is made up of two subcomponents: the Cretaceous and the Tertiary aquifer systems. The older Cretaceous system is the basal aquifer system and the most widespread (Johnson, et al., 2002). This water-bearing system consists of sand beds in the Providence Sand, Ripley and Eutaw Formations and, in part, the Tuscaloosa Group, confined by chalk and/or clay impermeable layers. Locally, these aquifers are referred to as the Chattahoochee River and Black Warrior aquifers. The Black Warrior River aquifer has deposits ranging from about 5 feet to more than 100 feet in depth and is typically shallow.

The Tertiary sedimentary aquifer system is made up of a thick sequence of sand with sandstone and gravel, as well as limestone beds (Johnson, et al., 2002). These sediments range in age from Paleocene to late Eocene and were deposited in marine environments. The upper part of this aquifer system is locally known as the Lisbon aquifer and the lower part is called the Nanafalia-Clayton aquifer.

In the Mobile River Basin, more than 300 million gallons of groundwater are withdrawn per day (Atkins, et al., 2004). Most of this water is used for domestic uses - roughly 50% of Alabama's population relies on groundwater for domestic supplies (*e.g*., drinking water). In the Coastal Plain of the Mobile River Basin, in which the Tombigbee River Basin falls, nearly 60 percent of the water consumed comes from ground water, predominately from the Black Warrior River aquifer (Atkins, et al., 2004). The quality of this ground water used for domestic supply is generally very good and meets Federal and State standards for drinking water, according to the USGS's sampling of shallow and deep monitoring wells. Isolated areas within the basin have revealed that increase land use intensity has a detrimental effect on water supplies (Atkins, et al., 2004).

For the State of Alabama, three agencies, two state and one federal serve as the primary managers of its groundwater resources. The USGS is the principal scientific agency that studies subsurface resources under the mandate of several federal programs. The Alabama Department of Economic and Community Affairs is the principal state agency that, "plans, coordinates, develops and manages Alabama's water resources," including ground and surface water.[13] Along with ADEM, which plays a major role in regulating activities that affect groundwater (e.g. underground storage tanks, underground discharge), these agencies play the central role in monitoring the state of groundwater resources in terms of quantity and quality for all of Alabama.

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[13] ADECA, 2004. Agency Website (http://www.adeca.state.al.us/Office%20of%20Water%20Resources/default.aspx). Accessed December 30, 2004.

3.7 Ecological Components of the Mobile and Tombigbee River Basins

The Tombigbee River Basin is a region of great concern because of the wide array of unique plants and animals that live there. The same point is true for the entire Mobile River Basin, which includes the Tombigbee and has been the focus of important management activities due to its geography and diversity of flora and fauna. Two federal protection actions and several non-governmental conservation activities have occurred in recent years emphasizing the concern for the ecosystems of this area. Of primary importance, in the Fall of 2000, the United States Fish and Wildlife Service approved and adopted the *Mobile River Basin Aquatic Ecosystem Recovery Plan* - a document that sets forth the agency's management strategies for recovering 22 species from the risk of extinction. Further fulfilling its mission to manage the imperiled species of the Mobile Basin, the USFWS, in July 2004, finalized its designation of *critical habitat* for three threatened and eight endangered mussels in the basin.[14] In concert with the recent federal action, The Nature Conservancy has targeted the Mobile River Basin as one of their priority conservation areas in the Southeastern United States (Smith, 2002).

Common to all of these management efforts is the focus of protecting and restoring aquatic ecosystems. Aquatic ecosystems represent all of the creeks, rivers, wetlands, and lakes, and their physical and biological components. Quality of these ecosystems and their capacity to support a diverse collection of living things heavily depends on the quality of the water within these systems. In this regard, the mission to protect the threatened and endangered species of the basin is common to the mission of this basin management plan. Therefore, this section of the plan will provide a brief description of the ecological components on the basin and summarize the recent ecological management activities and their significance the context of this basin management plan.

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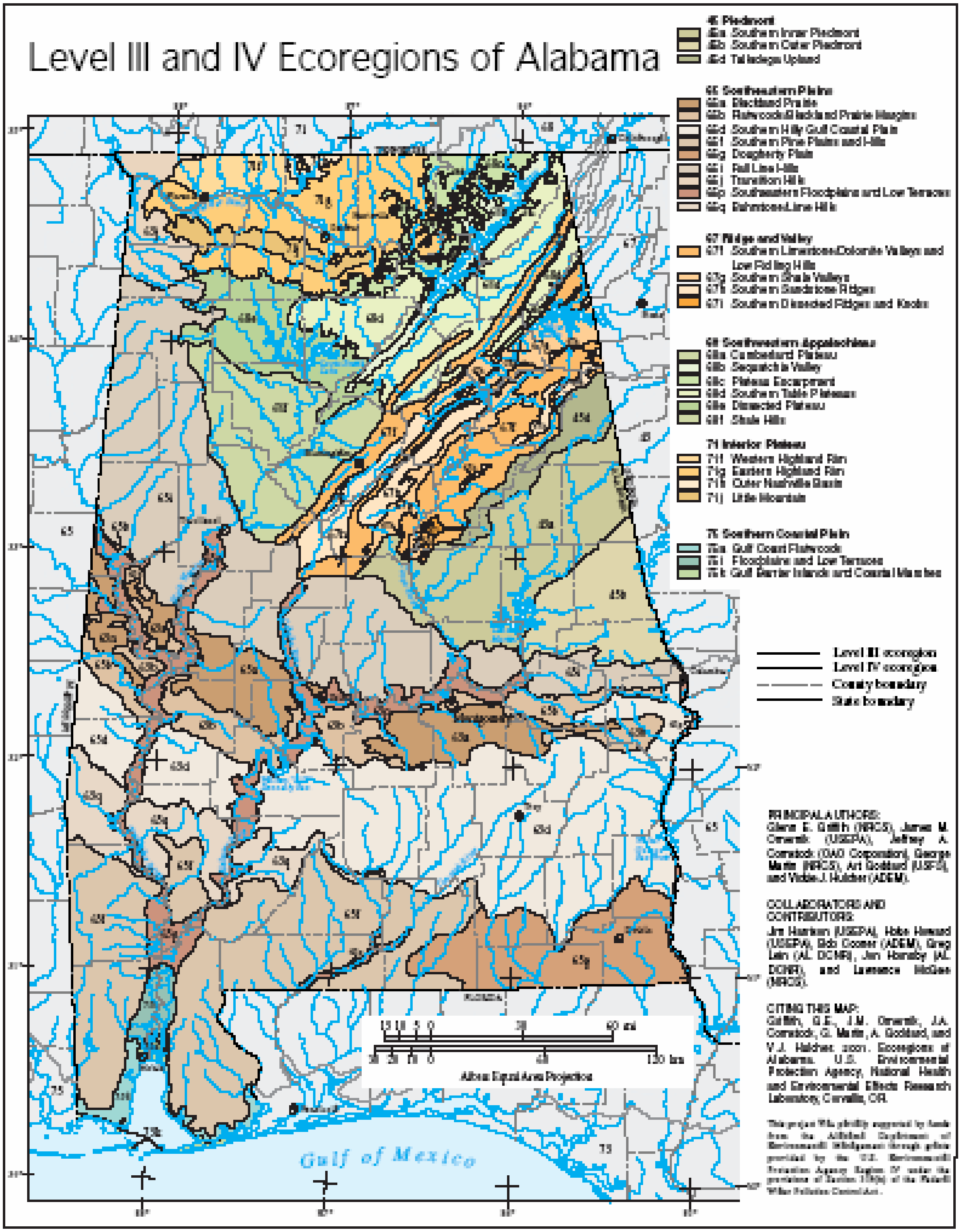
[14] The Mobile River Basin Aquatic Ecosystem Recovery Plan was approved by Sam D. Hamilton, Regional Director, USFWS, on November 17, 2000. This Plan sets forth the USFWS' intent to act on the behalf of the species in question to promote their recovery. The final designation of the critical habitat appeared in the Federal Register (50 CFR Part 17), July 1, 2004.

Figure 6. Ecoregions of Alabama



The Mobile River Basin is a mosaic of different ecosystem types. The U.S. Environmental Protection Agency categorizes areas of ecological resources throughout the United States into "ecoregions." ***Ecoregions***, as defined by the EPA, "denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources" (EPA, 2001). USEPA places the Mobile River and Tombigbee River basins in the 'Southeastern Plains' Ecoregion (Ecoregion Number 65). These ecosystems consist of irregular plains with broad inter-stream areas made up of a mixture of cropland, pasture, woodland, oak-hickory-pine forests and Southern mixed forests. The Southeastern Plains are broken down into nine sub-categories, all but two of which are part of the Tombigbee River Basin. The physical characteristics of these ecoregions are summarized in Table 7, according to sub-category.

Table 7. Physical Characteristics of the Ecoregions of the Tombigbee River Basin — Southeastern Plains Level III Ecoregion (EPA, 2001).

Code	Level IV Ecoregion	Elevation (ft)	Physical Characteristics
65a	Blackland Prairie	120-360	Undulating irregular plains, nearly level to strongly sloping; low gradient streams with chalk, clay, sand, and silt substrates
65b	Flatwoods/Blackland Prairie Margins	100-520	Smooth lowland plains and undulating irregular plains; sluggish, low gradient, clay and sand bottomed streams
65d	Southern Hilly Gulf Coastal Plain	100-780	Dissected irregular plains, northward facing cuestas, low hills with broad tops; some wide floodplains and broad, level to undulating terraces; low to moderate gradient mostly sandy bottomed streams
65f	Southern Pine Plains and Hills	40-520	Southward sloping, dissected irregular plains, some open low hills, mostly broad gently sloping ridgetops with steeper side slopes near drainages; low to moderate gradient sand and clay bottomed streams; some sinkholes in eastern areas
65i	Fall Line Hills	200-1000	Dissected open hills with rounded tops; gently sloping to strongly sloping side-slopes; low to moderate gradient streams with sandy and gravelly substrates
65p	Southeastern Floodplains and Low Terraces	10-330	Major river floodplains and associated low terraces; low gradient streams with sandy and silty substrates, oxbow lakes, ponds, swamps
65q	Buhrstone/Lime Hills	65-550	Rolling to strongly dissected open hills and open low hills, cuestas with a north-facing steep slope; gravel, cobble, and bedrock substrates

The Mobile River Basin is considered ecologically significant because of its wide variety of aquatic and terrestrial ecosystems that support a diversity of associated organisms. In fact, the basin contains some of the most unique assemblages of aquatic organisms in North America. It contains 40 percent of North America's aquatic turtle species (17 species); ranks third in the nation for its variety of fishes (160 species); provides habitat for the richest aquatic snail fauna in the world (120 species) and ranks in the top ten river basins in the world in terms of diversity of freshwater mussels (75 mussels). Of these, 3 species of turtles, 40 species of fish, 33 species of mussels and 110 species of aquatic snails are endemic[15] to the Mobile River Basin (Abell, et. al., 2000; USFWS, 2000).

It is believed that over half of all known, or presumed, aquatic animal extinctions in the United States have been freshwater mussels and snails indigenous to the Mobile River Basin (USFWS, 2000).Throughout the State of Alabama, there are 18 plant and 97 animal species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA). As of 2000, 100 imperiled[16] species were found in the Mobile River Basin alone. Of these, 39 aquatic species were federally listed under the ESA. Most of which survive as isolated populations in *refugia* of limited reaches of streams and rivers (USFWS, 2000).

In 2000, the USFWS approved the *Recovery Plan of the Mobile River Basin Aquatic Ecosystem* ("Recovery Plan") to address the recovery objectives of 22 endemic aquatic species of the Mobile River Basin (USFWS, 2000). The Plan describes the status of the 22 species, characterizes the risks of their imperilment and provides recommendations to promote the recovery of these populations. It is meant to, "provide(s) a basic foundation for discussions and negotiations that must occur at both ecosystem and watershed levels if listed aquatic species are to be protected and recovered." (USFWS, 2000). Several of the major issues discussed in the Plan are summarized below.

The degree of uniqueness of these aquatic species makes them inherently vulnerable to extinction. According to the USFWS, the endangered and threatened aquatic species in the

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[15] *Endemic* species are native to the region and are found no other place on Earth.
[16] 'Imperiled' signifies that the species is endangered, threatened, a species of concern or a candidate for the ESA list.

Mobile River Basin are all extremely vulnerable to similar, basic impacts to the rivers and streams they inhabit. Decreases in the flow and quality of water and alterations to the structure of the streams, are the primary factors that disrupt the habitats of these species. In this regard, sedimentation is considered the greatest factor threatening the aquatic ecosystems across the basin. Sedimentation refers to the deposition of inorganic and organic matter that settle out of the water column. Increased sedimentation caused primarily by disturbances to river bottoms and streambeds, which facilitate soil erosion, alters streambeds, transports pollutants, smothers and kills benthic organisms with limited mobility, like mussels, and eliminates habitat suitable for feeding and reproduction in mobile species (*e.g.*, fish, turtles, snails). Furthermore, sediments carried by water, transport pollutants, particularly nutrients, which degrade water quality and accelerate the eutrophication of water bodies.

Historically, the construction of dams and locks is recognized as the major contributing factor to the extinction and imperilment of the aquatic species in the Basin (USFWS, 2000). Impoundments fragment habitats, change flow regimes, increase sedimentation and limit the movement of species within the ecosystem. Other activities that permanently alter or degrade habitat quality include channelization of streams, in-stream mining, dredging, point source wastewater discharges and nonpoint or diffuse pollution. Lastly, any increases in intensive land-based activities that promote erosion (i.e. deforestation, road and building construction, mining) exacerbate sedimentation in streams and rivers and lead to habitat degradation.

Beyond the physical, chemical and biological impacts to the habitats and species, the USFWS recognized several major obstacles to reaching the species' recovery objectives. These obstacles are: 1) public perception that listed species diminishes property values; 2) a lack of consensus for stream management strategies within the Basin; 3) depressed population numbers equate to high risks for species transplants and near impossibility for population enhancements; 4) technological barriers to artificial propagation and population augmentation (USFWS, 2000). In the Plan, the USFWS sets forth three 'Basic Tenants' to frame its recommendations for recovery of the 22 target species: 1) enforce existing laws and use established mechanisms to protect, restore and manipulate the future management of the ecosystem, 2) focus soil and water stewardship activities on the watershed level and, 3) increase research efforts that focus attention on the imperil aquatic species. These three tenants frame thirty-six recommendations (10 major and 26 minor) that promote activities that will increase the likelihood of protection and recovery of 22 aquatic species covered in the Recovery Plan.

Effective August 02, 2004, the USFWS designated critical habitat for 11 species of freshwater mussels (3 threatened; 8 endangered) in the Mobile River Basin[17]. Nine of these eleven species are currently known to occur in the Tombigbee River basin. Additional imperiled aquatic species reported to occur in the Tombigbee River basin includes the Gulf sturgeon. Table 8 on the following page lists these species and their listing status. 'Critical habitat' has a specific definition within the Endangered Species Act[18] and refers to the geographic area occupied by the species at the time of the listing where the physical and biological features necessary for the conservation of the species exist and there is a need for special management to protect the listed species. The purpose of the designation is to ensure that federal agencies consult with the USFWS prior to conducting any activities that may impact the listed species, i.e. activities within the critical habitat. It does not add an extra regulatory layer to private landowners that play a part in managing listed species found on their property. In the context of this basin management planning effort, the critical habitat highlights segments or reaches of rivers and streams that deserve special management consideration due to the presence of high value habitat and imperiled species.

The designated critical habitat in the Mobile River Basin amounts to 26 river and stream segments ("units") constituting 1,093 miles of river and stream channels. According to the USFWS, these reaches contain the habitat needs of the species of concern. To meet the criteria for the designation, each segment or unit must have the "primary constituent elements."[19] For the 11 mussels species, these elements are the following: 1) geomorphically stable stream and river channels and banks; 2) a flow regime necessary for normal behavior, growth, and survival of all life stages of mussels and their fish hosts in the rive environment; 3) water quality, including temperature, pH, hardness, turbidity, oxygen content and other chemical characteristics necessary for normal behavior, growth and viability of all life stages; 4) sand, gravel, and or

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[17] 50 CRF Part 17. Federal Register, Volume 69, No. 126, Thursday, July 1, 2004. pp. 40084 – 40171. In 1993, the USFWS listed 11 species of freshwater mussels and declared that the assignment of critical habitat was "prudent but not determinable" and therefore, did not complete the designation. A lawsuit in 2000, led to a 2001 court order that mandated the USFWS to complete the critical habitat designation.
[18] Section 3 (Paragraph 5A-C)
[19] 50 CRF Part 17. Federal Register, Volume 69, No. 126, Thursday, July 1, 2004. pp. 40097

cobble substrates with low to moderate amounts of attached filamentous algae, and other physical and chemical characteristics necessary for normal behavior, growth, and viability of all life stages; 5) fish hosts with adequate living, foraging, and spawning areas for them; and, 6) few or no competitive or predacious nonnative species present.[20]

Table 8. Imperiled species with reported occurrences in the Tombigbee River basin.

Common Name	Scientific Name	Federal Designation
Fish		
Gulf Sturgeon	*Acipenser oxyrhynchus desotoi*	Threatened
Freshwater Mussels		
Orange-nacre mucket	*Lampsilis perovalis*	Threatened
Alabama moccasinshell	*Medionidus acutissimus*	Threatened
Southern clubshell	*Pleurobema decisum*	Endangered
Dark pigtoe	*Pleurobema furvum*	Endangered
Ovate clubshell	*Pleurobema perovatum*	Endangered
Inflated heelsplitter	*Potamilus inflatus*	Threatened
Black Clubshell (Curtus'' Pearly Mussel)	*Pleurobema curtum*	Endangered
Southern Combshell (Penitnent Mussel)	*Epioblasmapenita*	Endangered
Stirrupshell	*Quadrula stapes*	Endangered

In the Tombigbee River Basin, a total of 287 miles of stream are considered to have the primary constituent elements that justify critical habitat designation. A summary of the these critical habitat units can be found in the table on the next page. The designation of these stream reaches as critical habitat will not impact private landowner activities unless they require Federal funding or permits.[21] In fact, the only current [Federal] economic activity along the Tombigbee River impacted by the critical habitat designation is the maintenance dredging of the Federal Navigation Channel.

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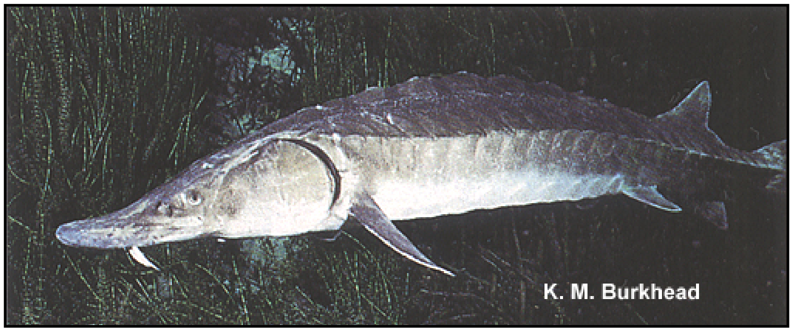
[20] Ibid.
[21] Ibid.

Table 9. Summary of Critical Habitats for 9 Threatened and Endangered Species of Freshwater Mussels within the Tombigbee River Basin

River/Stream	Basin Name	County	Reach Length (miles)	Species Present	Species with Historic Range
East Fork Tombigbee River	Upper Tombigbee	Monroe, Itawaba (MS)	16	Southern clubshell, and Orange-nacre mucket	Alabama moccasinshell and Ovate clubshell
Bull Mountain Creek	Upper Tombigbee	Itawaba (MS)	21	Southern clubshell and Alabama moccasinshell	Orange-nacre mucket and Ovate clubshell
Buttahatchee River and tributary	Upper Tombigbee	Lowndes/ Monroe (MS), Lamar (AL)	68	Southern clubshell, Orange-nacre mucket, Ovate clubshell and Alabama moccasinshell	Unknown
Luxapalila Creek and tributary	Upper Tombigbee	Lowndes (MS), Lamar (AL)	18	Southern clubshell, Orange-nacre mucket, Ovate clubshell and Alabama moccasinshell	Unknown
Coalfire Creek	Upper Tombigbee	Pickens (AL)	20	Orange-nacre mucket and Ovate clubshell	Southern clubshell and Alabama moccasinshell
Lubbub Creek	Upper Tombigbee	Pickens (AL)	19	Southern clubshell, Orange-nacre mucket and Alabama moccasinshell	Ovate clubshell
Sipsey River	Upper Tombigbee	Greene, Pickens, Tuscaloosa (AL)	56	Southern clubshell, Orange-nacre micket, Ovate clubshell and Alabama moccasinshell	Unknown
Trussels Creek	Upper Tombigbee	Greene (AL)	13	Orange-nacre mucket	Ovate clubshell, Alabama moccasinshell and Southern clubshell
Sucarnoochee River	Lower Tombigbee	Sumter (AL)	56	Ovate clubshell	Southern clubshell, Orange-nacre mucket and Alabama moccasinshell
Total River Miles of Critical Habitat			**287**		

The following species profiles have been adapted from the Recovery Plan. These species may be found within the Tombigbee River Basin. The entire Mobile River Basin Aquatic Ecosystem Recovery Plan and its recommendations may be accessed online through the USFWS' Ecological Services Division or directly at the following URL: http://ecos.fws.gov/docs/recovery_plans/2000/001117.pdf.[22]

GULF STURGEON *Acipenser oxyrhynchus desotoi* (Acipenseridae)



The gulf sturgeon is an anadromous fish with a sub-cylindrical body imbedded with bony plates. The snout is greatly extended and blade like with four fleshy chin barbels in front of the mouth, which is oriented on the lower surface of the head. Gulf sturgeon historically occurred in most major river systems from the Mississippi River to the Suwannee River, Florida, and marine waters of the Central and Eastern Gulf of Mexico, south to Florida Bay. In recent years, Gulf sturgeon have been caught or reported in the Tombigbee River basin, however, population estimates are unknown throughout its range.

Sturgeon continue to be caught incidental to other fisheries, habitat continues to be affected by dredging and water quality degradation and, migration and reproduction are impeded by impoundments. The primary recovery objectives are to prevent further reduction of existing wild stock; establish population levels that would allow delisting of the Gulf sturgeon in discrete management units; and establish population levels that could withstand directed fishing pressure within discrete management units.

[22] URL for the Mobile Recovery Plan was active and functioning on February 2, 2005.

ORANGE-NACRE MUCKET *Lampsilis perovalis* (Unionidae)

The orange-nacre mucket is a medium-sized mussel, between 2-3.5 inches in length, with a moderately thick oval shell. Several known populations are locally abundant while others are small and localized. Surviving populations, including those in the east fork of the Tombigbee River, are threatened by urban and agricultural runoff, surface mine drainage, small stream impoundment projects, industrial and sewage treatment plant discharges, and channel degradation caused by sand and gravel mining.

The current distribution indicates that historic and gradual increases in chronic turbidity levels may be an important factor in the decline of the orange-nacre mucket. The U.S. Forest Service has funded mussel surveys in streams under its jurisdiction, and has strengthened stream management zone guidelines on National Forest lands in Alabama. The immediate recovery objective is to prevent the continued decline of this species by locating, protecting, and restoring stream drainages with extant populations (see critical habitat units 1-9).

ALABAMA MOCCASINSHELL *Medionidus acutissimus* (Unionidae)

The Alabama moccasinshell is a small, delicate species, approximately 1 inch in length. The shell is narrowly elliptical and terminates in a sharp point. The periostracum (shell) is yellow to brownish yellow, with broken green rays across the entire surface of the shell. Habitat modification, sedimentation, eutrophication, and water quality degradation are the primary causes associated with the decline of the Alabama moccasinshell. This species is very sensitive to and it is believed that surviving populations are threatened by activities that contribute to increased rates of sedimentation and erosion.

The U.S. Forest Service has funded mussel surveys in streams under its jurisdiction, and has implemented improved stream management zone guidelines on National Forests in Alabama. Surveys of potential habitat are being conducted to locate extant populations. The immediate recovery objective is to prevent the continued decline of this species by locating, protecting, and restoring stream drainages with extant populations. There are several known populations of the Alabama moccasinshell in the Upper Tombigbee River basin. Associated river reaches have been designated as critical habitat areas (see critical habitat areas 1-9)

SOUTHERN CLUBSHELL *Pleurobema decisum* (Unionidae)

The southern clubshell is a medium sized mussel just under 3 inches long, with a thick shell, and heavy hinge plate and teeth. The periostracum (shell) color ranges from yellow to yellow-brown. Except for the Mobile Delta, this species was formerly known from every major stream system in the Mobile River basin, including the Alabama River and tributaries. Known populations of this species can be found in the Upper Tombigbee River basin in the East Fork of the Tombigbee River, the Buttahatchee River, Luxapallila Creek, and the Sipsey River.

Surviving populations are threatened by impoundment and channelization projects, household and agricultural runoff, and channel degradation caused by sand and gravel mining and/or channel maintenance projects. Current conservation actions include conducting surveys of potential habitat throughout the historic range of the southern clubshell in efforts to locate extant populations. Recovery to the point of down listing to threatened is unlikely and the immediate recovery objective is to prevent the extinction of this species by locating, protecting, and restoring stream drainages with extant populations (see critical habitat units 1-9).

DARK PIGTOE *Pleurobema furvum* (Unionidae)

The dark pigtoe is a small to medium-sized mussel, occasionally reaching 2.4 inches in length, and is oval with a reddish-brown coloration. Populations are localized, and numbers of individuals are very low in all known occupied streams. Surviving populations are threatened by impoundment projects, surface mine runoff, and household and agricultural runoff. Surveys of potential habitat throughout the historic range of the dark pigtoe are being conducted and the U.S. Forest Service has implemented improved stream management zone guidelines in the Sipsey Fork and its headwaters in Bankhead National Forest. The immediate recovery objective is to prevent the extinction of this species by locating, protecting, and restoring stream drainages with extant populations.

OVATE CLUB SHELL *Pleurobema perovatum* (Unionidae)

The ovate club shell is a small to medium-sized mussel that rarely exceeds 2 inches in length. The oval shell is yellow to dark brown. Known populations are small and localized and are threatened by channelization, household and agricultural runoff, and channel erosion. Surveys of potential habitat throughout the historic range of the ovate clubshell are being conducted by Federal, State and private biologists in efforts to locate unknown extant populations. The immediate recovery objective is to prevent the extinction of this species by locating, protecting, and restoring stream drainages with extant populations (see critical habitat areas 1-9).

INFLATED HEELSPLITTER *Potamilus inflatus* (Unionidae)

The inflated heelsplitter has an oval, compressed to moderately inflated, thin brown to black shell which may be 5 inches in length. There are known populations of this species in the Tombigbee River. Historic habitat has been impacted by channel modification for navigation and flood control, impoundment, pollution, navigation dredging, and gravel dredging and mining. Several surveys have been conducted throughout its known current range including studies on life history and genetics. The recovery objective is to delist this species.

BLACK CLUBSHELL (CURTUS' PEARLY MUSSEL) *Pleurobema curtum* (Unionidae)

The black clubshell is roughly triangular in shape, and can reach 2 inches in length. Shell color varies from green in young shells to a dark greenish-black in older shells. Water diversion, sand and gravel mining within and adjacent to the river channel, agricultural runoff, and low population levels have been linked to the decline of this species. The State of Mississippi performs an annual assessment and survey of historical and occupied habitats in the East Fork of the Tombigbee River. Results indicate that population numbers are extremely low, with only a few fresh dead shells recovered from the East Fork of the Tombigbee River since construction of the Tennessee-Tombigbee Waterway. The recovery objective is to prevent the extinction of this species by protecting its remaining habitat.

SOUTHERN COMBSHELL (PENITENT MUSSEL) *Epioblasma penita* (Unionidae)

The southern combshell is squarish in and grows to slightly over 2 inches in length. The shell is yellowish, greenish-yellow, or tawny in color, sometimes with darker dots. Intensive surveys performed by the State of Mississippi of the Upper Tombigbee River basin have failed to locate the southern combshell in the East Fork of the Tombigbee River, and are rarely found in the Buttahatchee River. This species can not tolerate impoundments. Surviving populations are threatened by channel degradation initiated by sand and gravel mining within and adjacent to river channels and agricultural runoff.

The recovery objective is to prevent the extinction of this species by protecting its remaining habitat.

STIRRUPSHELL *Quadrula stapes* (Unionidae)

The stirrupshell grows to about 2 inches in length, and is irregularly squarish shell is yellowish-green. Known populations of this species occur in the Lower Sipsey River (where a fresh dead shell was collected in 1986), and the Tombigbee River drainage, Alabama. Most of the species habitat has been impounded by the construction of locks and dams creating impoundments which the stirrupshell cannot tolerate. The recovery objective is to prevent the extinction of this species by protecting its remaining habitat.

In addition to the federal actions to manage these sensitive resources, state agencies, regional organizations and private interests have mobilized efforts on various fronts. Both ADEM and the Mississippi Department of Environmental Quality have recognized the need for focused water quality management because of the sensitive aquatic resources in the basin (see Section 5.0 for a more detailed discussion of this topic). The Nature Conservancy has issued a treatise on the biodiversity of aquatic biota in this area.[23] On the ground, both the Alabama and Mississippi Chapters of The Nature Conservancy are involved in the ACWP on multiple levels. Coming from the northern counties of Mississippi, the *Natural Resources Initiative of North Mississippi*, is a new, informal affiliation of local, state and federal agencies and organizations working to achieve more effective environmental management along in Mississippi and across the stateline.[24]

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[23] Smith, R.K., P.L. Freeman, J.V. Higgins, K.S. Wheaton, T.W. FitzHugh, K.J. Ernstrom, A.A. Das. Freshwater Biodiversity Conservation Assessment of the Southeastern United States. The Nature Conservancy. 2002.

[24] Larry Jarrett of NRI of North Mississippi has attended meetings of the ACWP Upper Tombigbee River Subbasin Stakeholder Group.

4.1 Population in the Tombigbee River Basin

The population within the Tombigbee River basin estimated by the 2000 U.S. Census was 517,813 people. This total estimate includes 199,288 people living in the Alabama portion of the basin and 372,525 people living in Mississippi portion. Tables 10-11 exhibit the population in each county, along with median household income. On average, the median household income in the Tombigbee River basin was $27,939 annually.

U.S. Census population projections for Alabama show that the state's population will steadily increase from 4.47 million in 2000 to over 5.2 million in 2025. The greater proportion of this population increase will occur in the proximity of the major population centers of the state as people move in from out of state and other parts of Alabama. Whereas, the rural areas of Alabama are experiencing losses in population, many of the urban centers, and particularly their suburbs, are witnessing significant population increases.[25] As a result, urban sprawl is a phenomenon now in effect as population growth spurns residential growth outside of historic city centers.

- Tom Bevill Visitor Center

[25] *See* 'Metro areas see growth at edges' by Haya El Nasser and Paul Overberg. USA TODAY, Posted 4/14/2005 6:18 PM, Updated 4/15/2005 10:50 AM (http://www.usatoday.com/news/nation/2005-04-14-fastest-growing-county_x.htm)

Table 10. Population Data and Median Income for the Alabama Counties in the Lower Tombigbee River Basin

County	Total Population	Estimated Population within Watershed	Percent Change since 1990	Median Household Income
Choctaw	15,922	15,471	-0.60%	$24,749
Clarke	27,867	20,937	2.30%	$27,388
Hale	17,185	128	10.89%	$25,807
Marengo	22,539	18,434	-2.36%	$27,025
Sumter	14,798	9,714	-8.51%	$18,911
Washington	18,097	12,989	8.40%	$30,815
Total	**116,408**	**77,673**		**$25,782.50**

* Population estimates were made by calculating the percentage of each county falling within the watershed boundary. The percentage area was used to estimate the proportion of the population within the watershed. These estimates assume an even distribution of people across each county and do not take into consideration population centers. Baldwin, Bullock, Conecuh, and Mobile counties were removed because they represent a very small portion of the watershed.

Table 11. Population Data and Median Income for the Alabama Counties of the Upper Tombigbee River Basin

County	Total Population	Estimated Population within Watershed	Percent Change since 1990	Median Household Income
Fayette	18,495	12,123	2.97%	$28,539
Franklin	31,223	2,997	12.26%	$27,177
Greene	9,974	6,932	-1.76%	$19,819
Lamar	15,904	15,889	1.20%	$28,059
Marion	31,214	28,636	4.64%	$27,475
Pickens	20,949	20,935	1.21%	$26,254
Sumter	14,798	5,075	-8.51%	$18,911
Tuscaloosa	164,875	23,200	9.54%	$34,436
Total	**307,432**	**115,787**		**$26,333.75**

* Population estimates were made by calculating the percentage of each county falling within the watershed boundary. The percentage area was used to estimate the proportion of the population within the watershed. These estimates assume an even distribution of people across each county and do not take into consideration population centers. Bullock, Conecuh, Walker, and Winston counties were removed because they represent a very small portion of the watershed.

4.2 The Economy of the Tombigbee River Basin

The 2000 U.S. Census estimated that 222,845 out of 517,813 people in the Tombigbee River basin were reported as being employed in the 2000 Census. A wide range of industry is represented in the basin. Some of the largest employers in the basin are in the education, health, and social services, as well as manufacturing sectors. Other natural resource-based industries such as agriculture, forestry, fishing, hunting, and mining, account for a significant number of jobs in the basin. Undoubtedly, the land area devoted to these industries make them the most dominant in the basin although they may not provide for the greatest number of jobs. These industries will be discussed in more detail below.

4.2.1 Major Natural-Resource-based Industries

Forestry

Forestry is Alabama's largest industry. Compared to the rest of the Nation, Alabama boasts the second largest commercial forest with over two-thirds of the state (22.9 million acres) forested. In fact, Alabama's forestland covers more acres than the size of Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, and Rhode Island combined. It is estimated that 71% of these forested lands are owned by private, non-industrial land owners. Forestry generates approximately $13 billion for Alabama each year and employs approximately 10% of the State's total work force.

Figure 7. A Stand of Southern Longleaf Pine (Pinus palustris *Miller) - Alabama's State Tree*

The Tombigbee River Basin is approximately 79% percent forested with over 2.5 million acres of forestland. Many of these acres are privately owned and actively managed for a variety of uses. Trees are harvested for lumber, pulp, and poles/pilings (Table 12 on the following page). Statistics from the Alabama Forestry Commission and Alabama Statistical Office provide a more detailed illustration of how important the forest industry actually is in Alabama, and how significant forestry in the Tombigbee River Basin in a broader context.

Table 12. Wood Use Percentage for the Counties of the Lower and Upper Tombigbee River Basins

Wood Use Percentages by County[26]							
Lower Tombigbee Basin				Upper Tombigbee Basin			
County	Lumber	Pulp	Poles & Pilings	County	Lumber	Pulp	Poles & Pilings
Choctaw	57%	41%	2%	Fayette	19%	81%	0%
Clarke	46%	51%	3%	Franklin	37%	63%	0%
Greene	50%	49%	1%	Greene	50%	49%	1%
Hale	86%	14%	0%	Lamar	24%	75%	1%
Marengo	53%	46%	1%	Marion	21%	79%	0%
Monroe	37%	62%	1%	Pickens	48%	51%	1%
Sumter	59%	39%	2%	Sumter	59%	39%	2%
Washington	46%	51%	3%	Tuscaloosa	36%	64%	0%

Several counties within the Tombigbee River Basin top the statewide statistics for forestry productivity. Annual figures for removals and cash receipts for *private, non-farm* timber and *forest industry* timber illustrate this fact. For example, Clarke and Pickens counties are the leading regions for annual removals (Table 13 on the following page) compared to other counties within the basin and statewide. In terms of 2003 cash receipts, *private, non-farm timber* producers in Clarke ($43 million), Marengo ($12 million), and Washington ($14 million) counties lead the state in forestry-related revenues.

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[26] Data derived from the 2002 Forest Resource Report compiled by the Alabama Forestry Commission. Statistics are for the year 2002 only.

Table 13. Summary Forest Statistics for the Tombigbee Basin

Average Annual Removals of Live Trees by County[27]			
Lower Tombigbee Basin		**Upper Tombigbee Basin**	
County	**Million Cubic Feet**	**County**	**Million Cubic Feet**
Choctaw	38.8	Fayette	25.0
Clarke	60.4	Franklin	21.0
Greene	18.5	Greene	18.5
Hale	17.6	Lamar	27.3
Marengo	24.9	Marion	24.8
Monroe	36.4	Pickens	53.4
Sumter	33.1	Sumter	33.1
Washington	33.2	Tuscaloosa	47.4
Note: Data obtained from the 2000 Forest Inventory and Analysis (FIA) statistics.		**Note:** Data obtained from the 2000 Forest Inventory and Analysis (FIA) statistics.	

Agriculture

- Photo credit to USDA

Between the years 2003-2004, the total statewide farm and forestry receipts were over $4.54 billion. The top five farm commodities for cash receipts were (1) poultry (63%), (2) cattle and calves, (3) greenhouse, sod, and nursery products, (4) cotton, and (5) peanuts (Alabama Agricultural Statistics Service, 2004). Together, these five commodities comprise 90% of the total commodity receipts. Forestry dominates in the Tombigbee River Basin but several counties are within the top ten leading producers for hogs: Pickens (#2), Sumter (#4) and Washington (#10). Catfish is also a major commodity produced in the Tombigbee Basin, which is discussed below.

[27] Data obtained from the 2000 Forest Inventory and Analysis (FIA) statistics.

Aquaculture - Catfish

- *Catfish farm pond*

Catfish farming is a major source of income throughout western Central Alabama. Several of the counties located in the Tombigbee River Basin rank within the top ten Alabama counties for annual sales: Greene (#3), Marengo (#5), Pickens (#7), and Sumter (#6). [28] Total annual sales reached a peak for the entire state in 2003, at $85.2 million with 200 operations with a total of 25,400 acres dedicated to the crop. Water surface area increased from 22,100 acres with 260 operations in 2000, to 25,400 acres with 200 operations in 2004. Despite the decrease in total catfish farming operations the total annual sales have increased by over 1,174% between 2000-2003 (Alabama Agricultural Statistics Service, 2004).

4.2.2 The "Black Belt" Region

As described earlier in Section 3.8.1 of this plan, there exists a large swath of Central Alabama known for its dark rich soils and primarily agricultural economy and communities. Alabama's Black Belt includes the counties of Bullock, Choctaw, Dallas, Greene, Hale, Lowndes, Macon, Marengo, Perry, Pickens, Sumter, and Wilcox. This region is characterized sociologically as experiencing severe social and economic hardships. According to the 2000 U.S. Census, the counties contained some of the lowest scoring school systems, high rates of poverty, illiteracy and infant mortality within the State. In addition, the communities in these areas are among the 100 poorest counties in the United States, with poverty rates ranking in the poorest 13 percent of counties nationally.[29] A report issued by Governor Bob Riley's Black Belt Action Commission states: "Often called the state's "Third World," the problems of the Black Belt impacts all of our citizens. If Alabama is to reach its full potential, the challenges of this region

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[28] Number indicates state ranking.
[29] Executive Order Number 22, August 11, 2004. Governor of the State of Alabama Bob Riley. Governor's Commission for Action in Alabama's Black Belt. http://64.124.237.54/EO.asp

must be addressed."[30] The Governor's Commission is focusing on improving the socioeconomic conditions of the Black Belt.

The state of water resources in the Black Belt is generally not well-understood. Other than the State's 303d List of Impaired Waters, there is very little information regarding water quality of this region. Some information on the state of water supply and wastewater management is available through the West Alabama Regional Commission in its *Comprehensive Economic Development Strategy*. Regional planning documents for the basin did not contain water quality-related information. However, the information from the West Alabama plan would suggest that similar conditions would be found in other parts of the Black Belt and should be investigated.

[30] Governor Bob Riley's Black Belt Commission, *Overview of Black Belt Action Commssion, Commission charge, Polling, Statistics and members (pdf file)*. Accessed September 1, 2005 at 3:30 p.m. at http://64.124.237.54/publications.asp

4.3 Communities of the Tombigbee River Basin

There are thirty-seven counties in the Tombigbee River basin—twenty in Mississippi and seventeen in Alabama. Tables 14 and 15 list these counties, the percentage of the subbasin the county and each counties' primary settlements.

Table 14. Communities of the Upper Tombigbee River basin in Alabama

County	% of Watershed in County	Communities
Fayette	11.30%	Fayette, Belk, Bluff, Covin, Newtonville
Franklin	1.70%	Vina, Red Bay, Hodges
Greene	12.56%	Union, Eutaw, Boligee, Forkland, Mantua, Pleasant Ridge, West Greene, Mount Hebron
Lamar	16.57%	Beaverton, Detroit, Sulligent, Vernon, Millport, Henson Springs, Crews, Malloy, Hightogy, Kingville, Crossville, Kennedy, Fernbank, Millport
Marengo	19.89%	Demopolis, Uniontown, Providence, Linden, Myrtlewood, Sweet Water, Jefferson, Faunsdale, Dayton, Consul, Thomaston, Magnolia, Octagon, Shiloh, Surginer, Dixons Mills, Vineland, Hoboken, Putnam, Nanafalia, Half Acre
Marion	18.68%	Hamilton, Weston, Hackleburg, Bear Creek, Brilliant, Guin, Gu-Win, Winfield, Shottsville, Bexar, Pulltight, Rock City,
Pickens	24.36%	Ethelsville, Reform, Gordo, Carrollton, Aliceville, McMullen, Memphis, Pickensville, Coal Fire, Palmetto, Benevola, Cochrane, Dancy, Beaver Town
Sumter	14.84%	Epes, Gainesville, Emelle, Livingston, York, Cuba, Panola, Warsaw, Geiger, Belmont, Coatopa, Ward, Whitfield, Bellamy
Tuscaloosa	5.21%	Moores Bridge, Brownville, Echola, Elrod, Buhl, Fosters, Ralph

Table 15. Municipalities within the Lower Tombigbee River basin in Alabama

County	% of Watershed in County	Municipalities
Baldwin	0.15%	
Choctaw	22.14%	Halsell, Edna, Yantley, Cromwell, Jachin, Pennington, Pushmataha, Lisman, Lavaca, Riderwood, Butler, My. Sterling, Land, Needham, Melvin, Toxey, Wimberly, Gilbertown, Womack Hill, Berrytown, Isney, Bolinger, Silas, Bladon Springs, Culomberg
Clarke	23.29%	Coffeeville, Jackson, Grove Hill, Fulton, Thomasville, Allen, Alma, Campbell, Carlton, Dickenson, Gainestown, Grove Hill, Morven, Salitpa, Walker Springs, Whatley
Hale	0.12%	
Lamar	16.57%	Beaverton, Detroit, Sulligent, Vernon, Millport, Henson Springs, Crews, Malloy, Hightogy, Kingville, Crossville, Kennedy, Fernbank, Millport
Marengo	19.89%	Demopolis, Uniontown, Providence, Linden, Myrtlewood, Sweet Water, Jefferson, Faunsdale, Dayton, Consul, Thomaston, Magnolia, Octagon, Shiloh, Surginer, Dixons Mills, Vineland, Hoboken, Putnam, Nanafalia, Half Acre
Mobile	0.12%	Mount Vernon, Bucks
Sumter	14.84%	Epes, Gainesville, Emelle, Livingston, York, Cuba, Panola, Warsaw, Geiger, Belmont, Coatopa, Ward, Whitfield, Bellamy
Washington	19.33%	Chatom, Millry, McIntosh, Koenton, Frankville, Bigbee, St. Stephens, Yarbo, Jordan, Wagarville, Leroy, Sunflower, Tibbie, Sims Chapel, Malcolm, Fairford

4.4 Regional Authorities

Alabama is divided into twelve regions, each with a planning commission or council established to coordinate region-wide projects, promote cooperation among local governments and to carry out state and federal programs on a regional basis. Each of the regions produces a strategic plan for economic and community development that serves to guide certain activities in these regions.[31] The Alabama Association of Regional Councils (AARC) is the umbrella group that coordinates its twelve member organizations and promotes cooperation among them.

The greater proportion of the Tombigbee River Basin includes two commissions: Alabama-Tombigbee Regional Commission (Region 6) and the West Alabama Regional Commission (Region 2).

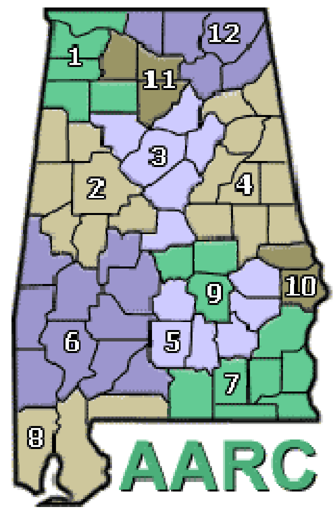

Figure 8. Regional Planning Councils of Alabama (Image credit to AARC, 2005)

4.5 State and Federal Organizations

Numerous federal and state agencies have jurisdiction over natural resources within the Tombigbee River Basin. Many, if not all, of them are involved in the Alabama Clean Water Partnership in some way. Some of the primary state and federal agencies are mentioned here. On the federal level there are, U.S. Environmental Protection Agency/Region IV; several arms of the U.S. Department of Agriculture, including the Natural Resource Conservation Service; U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the U.S. Geological Survey. Of the state agencies, the following are of major importance to this planning effort: Alabama Department of Environmental Management, Alabama Department of Conservation and Natural Resources, Alabama Department of Transportation, Alabama Department of Economic and Community Affairs, Alabama Forestry Commission, Geological Survey of Alabama, and the Alabama Soil and Water Conservation Committee.

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[31] A review of the plans for the regional planning councils corresponding to the Alabama River Basin found that they do not focus on environmental issues to any extent. The websites for each region and their plans can be readily accessed through the AARC website (http://www.alarc.org/).

5.0 WATER QUALITY IN THE TOMBIGBEE RIVER BASIN

One of the key objectives of this basin management plan is to identify water quality concerns in the basin and to develop strategies for managing these concerns. *What is the current state of water quality in the creeks, rivers, lakes, and ponds of the Tombigbee River Basin?* The answer to this question is told by the data that is collected over the years by government agencies, private industry, and citizen volunteers. This section looks at the current understanding of water quality in the Tombigbee River Basin.

Authorized by the Clean Water Act (CWA), the U.S. Environmental Protection Agency Region 4 requires ADEM to complete two periodic water quality inventories and assessments: 1) Section 305(b) of the CWA calls for a bi-annual inventory of the quality of Alabama's waters and, 2) Section 303(d) of the CWA requires Alabama to list, in even-numbered years, all of its polluted and degraded waters that are not achieving their designated uses. The 2004 reporting year marked an evolution of water quality reporting for USEPA and Alabama integrating these two water quality reports into one report entitled, *Alabama's 2004 Integrated Water Quality and Assessment Report*.[32] This *Integrated Report* is the most current and comprehensive inventory and evaluation of water quality data for the waters of Alabama, including the Tombigbee River Bain, and it is vital to the basin management planning effort because it contains data and information that serve as a baseline of our understanding of the conditions of the waters in the Basin.

5.1 Water Quality Monitoring and Data Sources

Over a dozen water quality studies and monitoring programs generate data in support of the *Integrated Report* and inform our overall understanding of water quality in the Tombigbee River Basin. Table 16 below lists these water quality monitoring and data collection efforts as well as the type of data they collect. The majority of these efforts are the responsibility of ADEM and constitute the agency's comprehensive approach to monitoring called, ASSESS.[33] Other efforts, such as ADPH's fish consumption advisories, SWCDs' watershed assessments, and the

[32] The 2004 Integrated Report is available through ADEM's website: http://www.adem.state.al.us/WaterDivision/WQuality/305b/WQ305bReport.htm.

[33] ASSESS is an acronym for **A**labama's **S**trategy for **S**ampling **E**nvironmental indicators of **S**urface water quality **S**tatus. The agency strives to maximize resources by prioritizing monitoring needs according to certain objectives and reporting needs, such as those mandated for the 305(b) and 303(d) requirements.

Alabama Water Watch (AWW)'s citizen water quality monitoring data, support ADEM's efforts to evaluate the waters of the State. In addition, agencies such as USGS and the USACOE perform targeted water quality studies that inform the overall state of knowledge regarding water quality in the basin. The *Integrated Report* contains a more detailed description of each of these programs and how they factor into the overall assessment picture. Several of these efforts are displayed on Map 4 and discussed below.

Table 16. Important Sources of Water Quality Data for the Tombigbee River Basin

Agency	Period of Record	Report or Program Title	Information Type
ADEM	2002 – 2003	Alabama's 2004 Integrated Water Quality and Assessment Report (305b & 303d)	Chemical, physical, habitat, biological
ADEM	2003	Nonpoint Source Assessment Program	Chemical, biological, physical
ADEM	2003	Point Source Assessment Program	Chemical, biological, physical
ADEM	2003	Ecoregion Reference Assessment Program	Chemical, physical, habitat, biological
ADEM	2003	Clean Water Act §303(d) Support Assessments	Chemical, physical
ADEM	2003	Fixed Ambient Trend Monitoring Program	Chemical, physical, habitat, biological
ADEM	1997 – 2003	Alabama Monitoring and Assessment Program (ALAMAP)	Chemical, physical, habitat
ADEM	2000	Surface Water Quality Screening Assessment of the Alabama River	Chemical, habitat, biological
ADEM	2002	Alabama's 2002 305 (b) Water Quality Report to Congress	Chemical, physical, habitat, biological
EPA, ADEM, ADPH	2004	Fish Tissue Monitoring Studies and Advisories	Biological, public health
AWW	1999 – 2003	Alabama Water Watch - Citizen Volunteer WQ Monitoring	Chemical and bacteria
GSA	1960s to present	Various studies and reports pertaining to water quality, aquatic fauna, and groundwater.	Chemical, physical, biological
SWCC	1998	Statewide Watershed Assessments (by County)	Sediment loading
USGS	1997 – 2001	Flow and water quality data	Chemical, physical
USGS NAWQA	1997 – 2003	National Water-Quality Assessment Program	Chemical, physical, habitat, biological
MSDEQ	2004	Mississippi's 2004 303d List of Impaired Waters	Chemical, physical, habitat, biological

5.1.1 Nonpoint Source Pollution Assessments

This basin management plan primarily focuses on nonpoint source pollution and how to manage activities in the watersheds of the Upper and Lower Tombigbee River Subbasins so as to minimize its effects. It is an integral step in implementing the Alabama Nonpoint Source (NPS)

Management Program, which focuses on preventing or eliminating water quality impairments related to NPS runoff pollutants and protecting unimpaired waters.[34] Through the use of its Section 319 funds, the NPS Program supports county-by-county, citizen-based nonpoint source screening assessments under the administration of the Soil and Water Conservation Committee. These assessments occur on a 5-year rotational basis. The first assessment for the Upper and Lower Tombigbee River Subbasins was completed in 2001; the second rotational assessment is scheduled for 2006.[35]

5.1.2 Authorized Point Source Discharges – NPDES Permits in the Basin

ADEM manages Alabama's National Pollutant Discharge Elimination System (NPDES) permitting and compliance regulatory programs. In Alabama, no person shall discharge pollutants into waters of the state without first having obtained a valid NPDES permit or coverage under a valid General NPDES Permit. Furthermore, no person, required to apply for a storm water discharge permit by 40 CFR 122.26 (1994), shall discharge pollutants into waters of the state without first having applied for a valid NPDES permit or coverage under a valid General NPDES Permit. New dischargers shall obtain a valid NPDES permit or coverage under a valid General Permit prior to conducting any activity for which application for a storm water discharge permit is required by 40 CFR 122.26 (1994). NPDES permits are issued for mining, industry, construction stormwater and Animal Feeding Operations/Concentrated Animal Feeding Operations.

In the Tombigbee River Basin, as of August 2005, there were several reported NPDES permits. These are summarized by watershed in Table 17 on the next page.

5.1.3 Fish Tissue Monitoring

Initiated in 1991, the ADEM Fish Tissue Monitoring Program is conducted in cooperation with the Alabama Department of Public Health (ADPH), the Alabama Department of Conservation and Natural Resources, and the Tennessee Valley Authority. Fish are good indicators of the health of a waterbody. Some contaminants, if present, can bioaccumulate in fish, entering the food supply through either crustaceans or bottom feeding fish in a given area.

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[34] ADEM, 2004. *Alabama's 2004 Integrated Water Quality and Assessment Report.* Page 129.
[35] Ibid, Page 132.

These species, eaten by larger or more aggressive species, transfer the contaminant from the species consumed to the consumer. In addition to providing valuable information to the cooperating agencies mentioned above, the most important role of this monitoring program is the collection of data that the ADPH can use to inform Alabama citizens who consume their catch of fish. Citizens can use this information to make healthy, informed decisions regarding this important food source.

Table 17. NPDES Permits issued within the Tombigbee River Basin

	Number of Permits Issued as of August 2005				
	CAFO	**Industrial**	**Mining**	**Municipal**	**Construction**
Upper Tombigbee					
Upper Tombigbee HUC03160101	NR	5	1	4	NR
Buttahatchee HUC03160103	7	55	4	NR	16
Luxapallila HUC03160105	1	92	2	3	23
Middle Tombigbee-Lubbub HUC03160106	29	98	3	12	31
Sipsey HUC03160107	9	74	14	5	43
Noxubee HUC03160108	1	14	NR	NR	3
Lower Tombigbee					
Middle Tombigbee-Chickasaw HUC03160201	1	214	NR	10	41
Sucarnoochee HUC03160202	NR	26	1	5	13
Lower Tombigbee HUC03160203	1	79	9	9	34
NR = None reported *Source: ADEM, 2005*					

Fish are analyzed for 23 different materials including contaminants in the water (PCBs, including dioxins), pesticides (endosulfan, hexachlorobenzene, chlordane, lindane, dieldrin, endrin, DDT and its breakdown products and congeners, heptachlors, Mirex, chlorpyriphos, and toxaphene), and heavy metals (arsenic, cadmium, mercury and selenium) to which the fish may have been exposed. Tissue monitoring of fish collected from various waterbodies throughout the state during the fall of 2004 indicates that the quality of water in Alabama generally has continued to improve over the past years, with a single, additional fish consumption advisory issued for 2005.[36]

The public health advisories for fish consumption relevant to the Tombigbee River are limited to the Olin Basin in Washington County near the community of McIntosh, in close proximity to the mainstem of the Tombigbee at river mile 60.5 upstream of the confluence with the Alabama River. The public is warned not to consume largemouth bass and channel catfish because of the presence of mercury and DDT. The Olin Basin is on the National Priority (Superfund) List and has undergone substantial remediation activities for over two decades, which are discussed in Section 5.4.1.

5.1.4 National Water-Quality Assessment Program (NAWQA)

NAWQA is implemented by the United States Geological Survey to assess water quality status and trends of the Nations' ground and surface waters on a regional and national scale (USGS, 2003).[37] Physical, chemical, and biological data are collected from a wide range of environmental settings to assess overall water quality within a study unit. The Mobile River Basin is one of the study units that NAWQA has assessed since 1997. Several recent reports contain data and analyses pertinent to the management of the Tombigbee River Basin. A list of the most pertinent USGS publications and their area of relevance to the Basin is provided in the following table.

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[36] ADPH issues annual fish consumption advisories. *See* 2005 NEWS RELEASE for the ALABAMA DEPARTMENT OF PUBLIC HEALTH, Montgomery, AL 36104. (www.adph.org)

[37] United States Geological Survey, 2003. *Occurrence and Distribution of Nutrients, Suspended Sediment, and Pesticides in the Mobile River Basin, Alabama, Georgia, Mississippi, and Tennessee, 1999-2001, as amended.* By Ann K. McPherson, Richard S. Moreland, and J. Brian Atkins. USGS NAWQA Water-Resources Investigations Report 03-4203. Montgomery, Alabama.

Table 18. Major USGS Publications pertinent to the Tombigbee River Basin

Title	Principal Author	Relevance to Alabama River Basin Management Plan
Water Resources Data, Alabama, Water Year 2003 (AL-03-1)	W.L. Psinakis	Contains data for records of stage, discharge, and water quality of streams; stages and contents of lakes and reservoirs; and water levels in wells, includes 11 surface water stations in the Alabama River Basin.
Occurrence and distribution of nutrients, suspended sediment, and pesticides in the Mobile River Basin, Alabama, Georgia, Mississippi, and Tennessee, 1999-2001 (WRIR 03-4203)	A.K. McPherson	Targeted water quality analysis (January 1999 to December 2001) to measure levels of nitrogen, phosphorus and pesticides at nine sites. Three sites in the Alabama River Basin: Threemile Branch, Pintlalla Creek and Alabama River.
Environmental setting and water-quality issues of the Mobile River Basin, Alabama, Georgia, Mississippi, and Tennessee (WRIR 02-4162)	G.C. Johnson	Overview of the physiographic and hydrologic features of the Mobile River Basin. Characterization of water quality issues throughout the study area including the Alabama River Basin.
Water Quality in the Mobile River Basin, Alabama, Georgia, Mississippi, and Tennessee, 1999-2001 (USGS Circular 1231)	J. Brian Atkins	Summary of other water quality reports completed for the Mobile River Basin. Contains study highlights that are important for local, state and federal water resource managers and stakeholders (*see discussion below*).

NAWQA's publication, *Water Quality in the Mobile River Basin, Alabama, Georgia, Mississippi, and Tennessee, 1999-2001,*[38] contains important observations about the effects of land use on water quality in the Mobile River Basin, and more specifically, the Tombigbee River Basin, based on water quality studies conducted from 1998 to 2001. The study investigated stream chemistry, stream ecology, and ground-water chemistry. More specifically, it considered large rivers and streams, for levels of nutrients, pesticides, organochlorine compounds, volatile organic compounds (VOCs), biological communities and radon, including fish tissue contaminant concentrations. It provides a valuable regional comparison (*i.e.*, Tombigbee versus Alabama River Basin), as well as a comparison of water quality based on impacts from urban versus rural (agricultural) land uses. Table 19 provides a summary of the key conclusions put forth by the NAWQA report.

[38] It may be access online, free-of-charge from USGS Alabama at the following URL: http://al.water.usgs.gov/publications/onlineALpubs.html. (Link active as of June 9, 2005).

Table 19. Major findings related to the water quality of the Mobile River Basin, including the Alabama and Tombigbee Rivers

Major NAWQA Findings related to Surface and Ground Water Quality in the Mobile River Basin
Nonpoint sources are the primary sources of nutrients.
Nutrients were detected frequently in agricultural and urban streams.
Nutrient concentrations varied seasonally in streams.
Concentrations of nitrate and ammonia are elevated in shallow ground water underlying agricultural land.
Pesticide contamination varies with land use.
Pesticides vary seasonally in streams.
Hydrology affects pesticide contamination in major rivers.
Pesticides occur in mixtures and as breakdown products [in water samples].
Pesticide risks to humans and aquatic life remain unclear.
Aquatic biological communities are affected by urban development.

Of the important findings of the NAWQA Study, several are particularly relevant to the Tombigbee and this basin management planning effort. The study concluded that nonpoint sources are the primary sources of nutrients in the Mobile River Basin, with animal wastes and agriculture accounting for approximately 75 of nitrogen and phosphorus. Respective to the Tombigbee, average flow-weighted concentrations of nitrogen and phosphorus were higher than those sampled in the Alabama River. These findings suggest the significant role that row-crop agriculture and fertilizing practices in Mississippi and the western half of Alabama plays an important part with respect to water quality in the Tombigbee River.

On the watershed scale, the study found that water quality varies between urban and rural streams. Generally, rural streams had higher elevations of nutrients than urban streams. In the case of nitrogen, rural streams tended to have higher concentrations of nitrogen in its ammonia form suggesting animal waste and fertilizer was the primary source. Whereas, urban streams revealed higher concentrations of nitrogen in its nitrate form, suggesting waste-treatment discharges and the application of fertilizer on residential land as the primary sources (Atkins, et al, 2004.). The rural stream sampled for this comparison was the Bogue Chitto Creek – a tributary of the Tombigbee - which flows from Mississippi into Alabama in Pickens County.

USGS reports that the flow-weighted concentrations of nutrients within this creek are among the highest in the Nation (Atkins, et al, 2004.).

5.1.5 Alabama Water Watch

An integral part of Alabama’s approach to the management of nonpoint source pollution is the reliance on citizen volunteers to monitor water quality in its basins. Alabama Water Watch (AWW) is a statewide program coordinated out of the Department of Fisheries and Allied Aquacultures and the International Center for Aquaculture and Aquatic Environments at Auburn University. It is dedicated to developing citizen volunteer monitoring of Alabama's surface waters. According to ADEM, 75 citizen groups submitted data during 2004 and one of those groups being new to AWW. Most AWW groups monitored in the Tennessee, Coastal Plains and Mobile River watersheds. Of the 3,930 chemistry data records received from October 2001 through September 2002, monitors in the Coosa, Mobile and Tennessee watersheds submitted 68% of the data (26%, 23% and 19%, respectively). Monitors also submitted a total of 893 bacteriological data records during the report period. Since the inception of the AWW program in late 1992, monitors have sampled 1,400 sites on 575 water bodies and submitted over 21,000 chemistry and over 4,000 data forms.[39] AWW is funded by the USEPA, ADEM, Alabama Cooperative Extension System, and Auburn University.

- Tombigbee River

[39] Ibid, Page 132.

Table 20. Summary of Alabama Water Watch Monitoring Activity in the Tombigbee River Basin, 1994 – 2005.

Group Name	Waterbodies Sampled	Active/ Inactive Sites	Last Date Sampled	# Chemical Samples	# Bacteria Samples	# Biological Samples	Active?
East Mississippi Community College	Wahalak Creek	0/1	11/20/1997	1	0	0	No
Hamilton High School	Williams Creek Camp Creek Buttahatchee River	0/4	8/26/2003	14	0	2	No
Jackson High School	Lewis Creek Bassett Creek	0/2	9/20/1995	17	0	2	No
Livingston University	Alamuchee Creek	0/1	1/25/1994	1	0	0	No
Sumter Co. High School	Alamuchee Creek	0/1	9/29/1994	3	0	2	No
University of West Alabama	Ponkabia Creek Alamuchee Creek White Rock Creek Demopolis Lake Duck Pond Lake Livingston	0/6	5/26/1998	15	0	0	No

In the Tombigbee River Basin, seven volunteer monitoring groups have sampled 16 sites since 1993. The majority of the sampling conducted is chemical although there are data collections for biological and bacteriological indicators. Groups in the Tombigbee Basin sampled and measured for air and water temperature, pH, oxygen, total alkalinity, total hardness, turbidity, and secchi disk. Samples and field data are collected and submitted to AWW by volunteers, which is then made available on-line through Auburn University (http://frontpage.auburn.edu/icaae/index.aspx.).

5.2 Water Quality in the Tombigbee River Basin

ADEM categorizes every waterbody based on the level of available information and its assessment status. This categorization identifies future monitoring needs as well as priorities for pollution management. Table 21 provides a brief description of each category and the table on the following page includes those waterbodies within the Tombigbee River Basin that have been categorized. There are no Category 4 waters listed for the Tombigbee River Basin. However, there are several Category 5 waters and these, by definition, are listed on the State's '303(d) List of Impaired Waters,' which is a major component of its *2004 Integrated Report.* EPA and ADEM have scheduled these waters for the development of a TMDL, or Total Maximum Daily Load, which require ADEM to set limits to the amount of pollutants impacting that water. The

TMDL is the prerequisite water quality restoration component that addresses nonpoint sources of pollution within a watershed and is discussed more thoroughly in the next section.

Table 21. Water Quality Categorization for the State of Alabama

Category	Description
Category 1	Waterbody attains all designated uses. There is data (e.g. chemical, biological and physical) and information that are consistent with the State's 303(d) listing and assessment methodology to support a determination that all water quality standards are attained.
Category 2	There are some data and information available for the waterbody but the information is insufficient to make a determination that the water does or does not support all of its designated uses.
Category 3	No data and information to determine if any designated use is attained. Monitoring on a priority basis needed to obtain data
Category 4	Waterbodies belong in Category 4 if one or more designated uses are impaired or threatened but establishment of a TMDL is not required. Contains three subcategories: **Category 4a -** A TMDL has been completed for the water-pollutant combination **Category 4b** - Other required control measures are expected to result in the attainment of water quality standards in a reasonable period of time **Category 4c –** The impairment is not caused by a pollutant.
Category 5	Category 5 waterbodies constitute those waters in the Section 303(d) list that, "EPA will approve or disapprove under the CWA. Waters should be placed in Category 5 when it is determined, in accordance with the State's assessment and listing methodology, that a pollutant has caused, is suspected of causing, or is projected to cause an impairment or threat." (ADEM, 2003).
Source: *Alabama's 2004 Integrated Water Quality and Assessment Report*, Appendix C-2	

Table 22. Summary of Categorized Waters in the Tombigbee River Basin

	Name	From	To	Basin	Category	Length (miles)	Year	Counties
1	Poplar Creek	Chickasaw Bogue	Its source	Lower Tombigbee	1		2004	Marengo
2	Kinterbish Creek	Tombigbee River	Its source	Lower Tombigbee	1		2004	Choctaw/Sumter
3	Sucarnoochee River	US Highway 11	Five miles upstream from Livingston	Lower Tombigbee	1	11.7	2004	Sumter
4	Sucarnoochee River	Tombigbee River	US Highway 11	Lower Tombigbee	1		2004	Sumter
5	Ulcanish Creek	Tombigbee River	Its source	Lower Tombigbee	1		2004	Clarke
6	James Creek	Bassett Creek	Its source	Lower Tombigbee	1		2004	Clarke
7	Toomsuba Creek	Alamuchee Creek	AT&N Railroad	Lower Tombigbee	2	1.1	2004	Sumter
8	Toomsuba Creek	AT&N Railroad	AL-MS state line	Lower Tombigbee	2	9.3	2004	Sumter
9	Lake Louise	Toomsuba Creek	Its source	Lower Tombigbee	2	2.4	2004	Sumter
10	Tombigbee River	One-half mile downstream of Alabama Highway 114	Three miles upstream of Highway114	Lower Tombigbee	3	3.4	2004	Choctaw/Marengo
11	Tombigbee River	One-half mile downstream from Southern Railway	Five miles upstream from US Highway 43	Lower Tombigbee	3	8.1	2004	Clarke/Washington
12	Bassett Creek	Little Bassett Creek	Its source	Lower Tombigbee	5	12.8	2004	Clarke
13	Tombigbee River	the upper end of Bilbo Island	Olin Basin	Lower Tombigbee	5	3.8	2004	Clarke/Washington
14	Bilbo Creek	Tombigbee River	Its source	Lower Tombigbee	5	29.3	2004	Washington
15	Olin Basin	All of Olin Basin		Lower Tombigbee	5	65 acres	1996	Washington
16	Buttahatchee River	US Highway 278	US Highway 278	Upper Tombigbee	2	8.7	2004	Marion
17	Beaver Creek	US Highway 78	Its source	Upper Tombigbee	2	6.6	2004	Marion
18	Luxapallila Creek	US Highway 78	Its source	Upper Tombigbee	2	9.5	2004	Marion
19	East Branch Luxapallila	Luxapallila Creek	Its source	Upper Tombigbee	2	10.8	2004	Marion
20	Luxapallila Creek	Fayette County Road 37	6 miles upstream from Alabama	Upper Tombigbee	2	8.2	2004	Fayette
21	Purgatory Creek	Wickett Creek	US Highway 278	Upper Tombigbee	5	1.8	1998	Marion
22	Purgatory Creek	US Highway 278	Its source	Upper Tombigbee	5	1.2	1998	Marion
23	Tombigbee River	Belville Dam	AL-MS state line	Upper Tombigbee	5	5.7	1996	Pickens
24	Little Bear Creek	Pickens County Road 8	Its source	Upper Tombigbee	5	3.9	1998	Pickens
25	Factory Creek	Tombigbee River	End of Embayment	Upper Tombigbee	5	1.3	2004	Sumter
26	Sipsey River	Tombigbee River	Tuscaloosa County line	Upper Tombigbee	5	43.1	1998	Greene/Pickens

5.3 Water Use Classifications for the Lower and Upper Tombigbee River Subbasins

The Alabama Department of Environmental Management, Water Division – Water Quality Program assigns use classifications for each of the State's waters. As explained in Alabama's water quality regulations, Chapter 335-6-11 *Water Use Classifications For Interstate and Intrastate Waters*, "Use classifications apply water quality criteria adopted for particular uses based on existing utilization, uses reasonably expected in the future, and those uses not now possible because of correctable pollution but which could be made if the effects of pollution were controlled or eliminated. Of necessity, the assignment of use classifications must take into consideration the physical capability of waters to meet certain uses." A list of waterbodies in the Tombigbee River Basin and their use classifications is provided as Appendix B. Maps of the Classified Waters within the Lower and Upper Tombigbee River Subbasin are provided as Map 10 and 11. Use classifications utilized by the State of Alabama are summarized below:

Use	Abbreviation
Outstanding Alabama Water	OAW
Public Water Supply	PWS
Swimming and Other Whole Body Water-Contact Sports	S
Shellfish Harvesting	SH
Fish and Wildlife	F&W
Limited Warmwater Fishery	LWF
Agricultural and Industrial Water Supply	A&I
Additional information containing the criteria defining water use classifications are available online from ADEM: www.adem.state.us.	

5.4 Priority Water Quality Problems in the Tombigbee River Basin – 303d List of Impaired Waters and TMDLs

ADEM is required to plan for the restoration of all the [Category 5] waters on the 303(d) list. Each impaired waterbody is subject to further investigation and analysis to determine the amount of a pollution that would be allowed to enter it and still meet water quality standards. The process of setting these allowable pollutant limits or, Total Maximum Daily Loads (TMDLs), follows a basic formula that considers the allowable load of a particular pollutant from point sources and nonpoint sources, plus a margin of safety to help ensure environmental protection.[40] TMDLs are developed for an individual waterbody or, a segment of stream or river, as well as on a watershed basis where technological solutions (e.g. wastewater treatment) would not result in the achievement of water quality standards.

Table 23. Impaired Waters of the Tombigbee River Basin according to the 2002 Alabama 303(d) List

Waterbody Name	Support Status	River Basin	County	Uses	Causes	Sources	Size	Draft TMDL Date
Purgatory Creek	Partial	Upper Tombigbee	Marion	Public Water Supply; Fish & Wildlife	pH	Surface mining-abandoned	3.0 miles	2007
Little Bear Creek	Partial	Upper Tombigbee	Pickens	Fish & Wildlife	OE/DO	Urban runoff/Storm sewers	3.9 miles	2002
Tombigbee River	Partial	Upper Tombigbee	Pickens	Fish & Wildlife; Swimming	OE/DO	Dam construction; Flow reg/mod.	5.7 miles	2002
Sipsey River	Partial	Upper Tombigbee	Pickens	Fish & Wildlife	Metals (Fe)	Surface mining-abandoned	43.1 miles	2007
Olin Basin	Non	Lower Tombigbee	Washington	Fish & Wildlife	Pesticides; Metals (Hg)	Contaminated sediments	65 acres	2003

In the Upper Tombigbee River Subbasin, 55.7 miles of streams are on Alabama's approved 2002 303d List of Impaired waters (Table 23). One waterbody, Olin Basin, is listed for the Lower Tombigbee and is the subject of a cleanup under the federal Superfund program. A draft TMDL has been completed for Little Bear Creek and is awaiting EPA approval. A draft TMDL was completed for the list segments of the Tombigbee River; however, additional data collection has been conducted and the draft revised for EPA review.

[40] The amount of pollution that a water body can assimilate considers waste load allocation (WLA) for point sources, the load allocation (LA) for nonpoint sources, and a margin of safety (MOS). The formula for a TMDL is as follows: TMDL = WLA + LA + MOS.

5.4.1 Summary of Draft Decision Document (TMDL) for the Olin Basin

Alabama identified the Olin Basin as being impaired on the 303(d) list in 1994, due to pesticides (DDT) and metals (Hg). Olin Basin was also placed on the Alabama Department of Public Health Fish Consumption Advisory for elevated DDT and mercury concentrations in fish tissue. Discharges of wastewater containing mercury from 1952 to 1974 have contaminated the Olin Basin adjacent to the Tombigbee River.

Based on fish tissue data collected by ADEM, the ADPH included the following comments in their News Release for the 2003 Fish Consumption Advisory:

> "The levels of DDT have fallen below FDA Advisory Levels for largemouth bass and channel catfish in the Olin Basin at river mile 60.5 of the Tombigbee River. However, the mercury levels in these fish remains in excess of the FDA levels. This is private property and entry to the basin for fishing is not permitted. The Olin Basin property is monitored through the CERCLA program. Therefore, ADEM and ADPH no longer need to monitor these waters as part of the Fish Tissue Monitoring Program and the waterbody has been removed from the current ADPH Fish Consumption Advisory".

ADEM, in cooperation with EPA Region 4, has determined that a TMDL for pesticides (DDT) and a TMDL for metals (mercury) in Olin Basin are not necessary due to the following:

- ADEM and EPA Region 4, under the CERCLA Program, are jointly managing the ongoing investigation and mitigation activities to address the DDT and mercury contamination within Olin Basin
- The CERCLA and RCRA programs have the statutory authority (i.e. enforcement mechanisms) to ensure that appropriate remedial measures are being taken by the responsible parties to protect human health and the environment
- The CERCLA and RCRA programs are required by law to meet the goals of the Clean Water Act. These requirements are known as an applicable or relevant and appropriate federal standards and more stringent state standards, more commonly referred to as ARARs
- Available resources (time and tax-dollars) will be saved by allowing the remedial actions to be managed under the appropriate programs, thus eliminating duplicative effort among the regulatory programs

5.4.2 Draft 2004 303d List of Impaired Waters

The draft 2004 303(d) List contains four new segments of impaired streams within the Tombigbee River Basin; three in the Lower Tombigbee Subbasin, and one in the Upper Tombigbee Subbasin. Table 24 below is adapted from the draft 2004 303d List and provides detail about these segments.[41]

Table 24. Waterbodies in the Tombigbee River Basin added to the 2002 303(d) List for 2004.

Waterbody Name	River Basin	Size	County	Causes	Basis for Addition to the List	Source / Date of Data
Tombigbee River	Lower Tombigbee	3.8 miles	Mobile	Mercury	Alabama Fish Consumption Advisory issued by the Alabama Department of Public Health in March 2003 advising "No Consumption" of largemouth bass and channel catfish.	ADPH Fish Consumption Advisory / March 2003
Bassett Creek	Lower Tombigbee	12.8 miles	Clarke	Pathogens (Wastewater Plan)	One of eight fecal coliform measurements was greater than 2000 at two different stations on Bassett Creek.	ADEM / 2001-02
Bilbo Creek	Lower Tombigbee	29.3 miles	Washington	OE/DO	Five of 13 dissolved oxygen measurements were less than 5.0 mg/L.	ADEM / 2001-02
Factory Creek	Upper Tombigbee	1.3 miles	Sumter	OE/DO Nutrients	Four of 7 dissolved oxygen measurements were less than 5.0 mg/L. The average chlorophyll-a concentration was over 3 times the average of the other embayment stations on Lake Demopolis.	ADEM / 2001

[41] ADEM, 2004. *Alabama's 2004 Integrated Water Quality and Assessment Report, Appendix F.*

5.4.3 Management of the Tombigbee River Basin in the State of Mississippi

Nearly half of the Tombigbee River Basin (6,075 out of a total 13,767 square miles) is within the State of Mississippi. Several major tributaries – namely the Buttahatchee River, Luxapallila River, and Noxubee River – and many creeks, flow out of Mississippi and into Alabama as they join the mainstem of the Tombigbee. In this regard, the Tombigbee River is another example of how rivers and their basins do not confine themselves to political jurisdictions, i.e., county lines or state borders. And, due to this fact, the management of the Tombigbee River Basin's water quality is faced with an added element of complexity compared to other basins that fall within one state, requiring states to coordinate with each other. The additional challenges of managing the water quality of the Tombigbee River and its tributaries are manifested in the inherent differences in the way that state governments operate. In this instance, the challenges result from the differences in the approach and implementation of water quality programs between Alabama and Mississippi. Although each one of the states must adhere to the mandates of the Clean Water Act, each state executes its responsibilities differently because of factors such as, funding and personnel levels, political priorities, management cycles, and implementation schedules. Very rarely do two states coordinate the basin management process, though the state of Alabama and Mississippi attempt to coordinate actions whenever possible.

One continuing challenge for basin management across state lines arises when Alabama and Mississippi target waterbodies with impairments. Interstate coordination is the subject of discussion at AlaTom Steering Committee and Tombigbee River Subbasin Stakeholder meetings. One facet of this discussion deals with the fact that there are several streams on Mississippi's 303d list that flow into Alabama but do not appear on Alabama's 303d list. These situations raise the question whether the impairment or water quality concern stops at the state line. The one exception to this example is the Tombigbee River itself; the segment of the river listed by Alabama is the impounded section behind Belville Dam, which straddles the Alabama-Mississippi border. It may be that future water quality evaluations could focus on the potentially impaired waters that run across the state line.

The Mississippi Department of Environmental Quality (MDEQ), Surface Water Division, Watershed Management Branch serves as Mississippi's lead office on water quality. This office leads all basin management activities, including planning, assessment, and implementation. Like its sister agency in Alabama, ADEM, it has set a schedule for assessing water quality in the river basins throughout the State. In the case of the Tombigbee River, MDEQ began planning their basin management in 1998 and will embark on a second round of this activity in 2005 (see Table 25).

Table 25. Tombigbee River Basin Management Schedule of the Watershed Management Branch of the MDEQ

Year	Management Activity
1998	Planning
1999	Planning / Data Gathering
2000	Data Gathering
2001	Data Evaluation / TMDL Development
2002	TMDL Development and Evaluation / Management Plan Development
2003	Management Plan Development / Management Plan Implementation
2004	Management Plan Implementation
2005	Start 2nd Cycle

MDEQ promotes a team-based approach to basin management in Mississippi. The Big Black-Tombigbee-Tennessee Basins Group (Basin Team) is the management group that spearheads management activities for the Tombigbee. By October 2002, it completed the prioritization process and TMDLs for several waterbodies. During this process, the Basin Team examined five TMDLs and two [non-TMDL] protection issues in the Tombigbee-Tennessee River Basins.[42] By 2004, some of the Basin Teams activities had developed to the point of implementation of enhanced monitoring within the basin and TMDL implementation that led to the revision of the 2004 ‘303d List of Impaired Water Bodies.’

Similar to Alabama, Mississippi completed its statewide water quality report (i.e., 305b Report) and draft 303d List of Impaired Waters in 2004. Mississippi’s draft 2004 303d List of Impaired Waters contains 52 segments that have been monitored and an impairment has been identified (Section A Waters); 25 segments that have been evaluated and an impairment has been identified (Section B Waters); 13 segments for which a TMDL has been developed (Section C

[42] In Mississippi, this basin was the first to complete the 5-year management cycle. In 2002, the MSDEQ published an informative update of basin management activities entitled, *Big Black – Tombigbee – Tennessee River Basins Prioritization and Implementation Process*. This document presents current information about planning and management activities.

Waters); and 61 segments for which information was updated from the 2002 list (Section D Waters).[43] Of the 13 segments within the Tombigbee River Basin, five segments have an approved TMDL (see Table 26).

Table 26. Stream Segments within the Tombigbee River Basin that the MDEQ has an Approved Total Maximum Daily Load (TMDL) – Section D of the 2004 303d List[44]

Waterbody	Pollutant	Pollutant Source(s)	Reference
Bull Mountain Creek	fecal coliform bacteria	wildlife populations, agricultural animal populations, human sources, and urban development	Phase One Fecal Coliform TMDL for Bull Mountain Creek: Tombigbee River Basin. Itawaba County Mississippi. June 2003. 18 pp.
Cedar Creek	fecal coliform bacteria	wildlife populations, livestock populations, and urban development. MDEQ assumed there is a 40% failure rate of septic tanks in the drainage area	Phase One Fecal Coliform TMDL for Cedar Creek: Tombigbee River Basin. Monroe County Mississippi. April 12, 2002. 10 pp.
James Creek	sediment	Wet weather sources of sediment.	Total Maximum Daily Load: James Creek Biological Impairment Die to Sediment. Tombigbee River Basin. Monroe County Mississippi. July 2003. 18 pp.
Joes Creek	organic enrichment, ammonia toxicity, and low dissolved oxygen	Low water velocity, water withdrawals (Catfish farming), and point sources.	Phase 1 TMDL For Organic Enrichment / Low Dissolved Oxygen and Ammonia Toxicity: Joes Creek: Tombigbee River Basin. Noxubee County Mississippi. July 3, 2002. 36 pp.
Noxubee River	fecal coliform bacteria	Wildlife, agricultural animal populations, human sources, and urban development, failing septic systems and other direct inputs	Mississippi Department of Environmental Quality (MDEQ) (2003a). Phase One Fecal Coliform TMDL for Noxubee River: Tombigbee River Basin. Noxubee County Mississippi. April 2003. 24 pp.

[43] Mississippi Department of Environmental Quality Surface Water Division of the Office of Pollution Control, 2004. *Mississippi 2004 Section 303(d) List of Impaired Water Bodies, Public Notice Draft, February 18, 2004.* Jackson, MS (www.deq.state.ms.us/MDEQ.nsf/page/WMB_Tombigbee_River_Basin?OpenDocument). Impaired waters bodies are considered "monitored" (Section A) if their impairment (or lack of) was determined by a formal monitoring effort (*e.g.*, M-BISQ). Impaired water bodies are considered "evaluated" (Section B) if their impairment was determined from information other than water quality testing, such as anecdotal information related to known water quality problems or land use issues thought to cause a problem.

[44] A TMDL for fecal coliform has been developed for the Buttahatchee River in Mississippi was approved by EPA in 1999.

The results of the prioritization process for the Tombigbee-Tennessee River Basins by MDEQ and its partner agencies has promising implications for inter-state coordination and enhanced management of the Tombigbee River Basin. This basin management plan recognizes these efforts as a foundation for further cooperation between basin stakeholders on both sides of the stateline. For example, the ACWP was considered a local partner in Mississippi's Basin Team process and was given opportunities to provide input on issues with inter-state ramifications. (Similarly, the ACWP reached out to MDEQ in order to continue collaborative efforts.)[45] Furthermore, several priority waterbodies and watersheds have been identified and continue to be the focus of joint management activities.

The Basin Team established several priorities for the Tombigbee River Basin. In addition to the impaired waters targeted for TMDL development, two resource protection priorities were named because of ecological concerns. The Noxubee River and Luxapallila Creek are of great concern and priority because they are known for their great diversity of aquatic flora and fauna. The Noxubee River flows through the Noxubee Wildlife Refuge in eastern Mississippi (Noxubee, Oktibbeha and Winston Counties) before flowing into Alabama in northern Sumter County. The Luxapallila Creek is a major tributary of the Buttahatchee River and is habitat for 37 different species of freshwater mussels. As discussed above in Section 3, this creek is considered Critical Habitat for several threatened and endangered mussels and because of this fact several groups have gathered to foster inter-state management of these resources.

The Mississippi Nonpoint Source Pollution Program has sponsored a project by The Nature Conservancy, Mississippi Chapter, Northeast Mississippi Conservation Program entitled, Development And Implementation Of A Comprehensive Conservation Plan For The Buttahatchee River Watershed, that strives to: "facilitate protection and restoration of the ecological integrity and biodiversity of the Buttahatchee River watershed in Mississippi and Alabama. The objective to meet this purpose is to develop a scientifically sound conservation area plan (CAP) that identifies conservation targets, threats (stress and source of stress) to those

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[45] The MSDEQ Basins Coordinator for the Big Black-Tombigbee-Tennessee River Basins, Mary Katherine Brown, is a regular participant at the Alabama-Tombigbee Steering Committee meetings as well as ACWP subbasin stakeholder meetings for the Upper Tombigbee Subbasin. The ACWP Statewide Coordinator has also participated in MSDEQ Basin Team meetings.

targets, strategies to abate the threats and develop a monitoring program to measure the progress of conservation efforts. Strategies to restore, improve or conserve the integrity of the Buttahatchee River system will likely involve:

- Creation of a watershed-wide coalition of partners and stakeholders,
- Conducting education and outreach on the ecological significance of the Buttahatchee River, the importance of maintaining and improving the natural characteristics of the watershed, and ways to facilitate environmental and economic benefits, and;
- Implementation of Best Management Practices (BMPs)."[46]

This effort will be open to interested parties from Alabama and Mississippi. It is an example of a real opportunity for interstate cooperation and basin management. This particular project focuses attention on the diverse ecological and precious water resources of the Tombigbee River Basin.

5.5 Summary of Water Quality Concerns

The data sources discussed in this section represent the best available information regarding water quality for the Tombigbee River Basin. These data tell us that there are streams with water quality problems that must be addressed (*i.e.,* 303d List, TMDLs) and that there are some streams where very little is know about their quality. General observations made by state and federal sources (e.g., ADEM Integrated Report, USGS NAWQA) suggest that sedimentation of streams is a major issue in the Tombigbee River Basin and throughout Alabama. Related to the sedimentation issue is that of nutrient (phosphorus, nitrogen) inputs, which occurs in rural and urban settings. The presence of other pollutants like heavy metals and bacteria in stream within the basin point to industrial mining and domestic wastewater sources, respectively. Overall, these sources confirm that nonpoint source pollution from a wide range of land uses is a major concern for water quality in the basin. In part, because many of these sources are not monitored like regulated point sources, there is a lack of data quantifying how much nonpoint source pollutant loadings are attributable to each source.

[46] Matthew Miller, The Nature Conservancy Tombigbee River Watershed Project. Personal communication (via email) received on July 26, 2005 at 1:47 p.m. EDT.

6.0 BASIN MANAGEMENT CONCERNS AND ISSUES

The basin management concerns and issues for the Tombigbee River Basin, and the recommendations for addressing these concerns and issues, comprise the "action-oriented" parts of the plan. The concerns, issues and recommendations provide a road map for future action in the river basin. Implementation of these items is intended to fulfill the objectives of this plan and basin stakeholders.

A multi-faceted approach was taken to identify the water quality concerns and issues in the basin. A major element of this approach included the issues and concerns identified by the river basin stakeholders. Stakeholder input collected at several meetings regarding needs and concerns was complemented by an analysis of existing information summarized by ADEM in the 2001 *Surface Water Quality Screening Assessment of the Escatawpa River, Mobile Bay and Upper and Lower Tombigbee River Basins*. This comprehensive report contains analyses of 1998 Soil and Water Conservation District (SWCD) data, which relied on field surveys to ***estimate*** watershed attributes (*e.g.*, land use, use density) and nonpoint source pollution potential. This 1998 SWCD data is the most recent data available that describes the basin with regard to land uses and potential nonpoint source pollution. The SWCD data has three components that were used to help identify basin concerns for the purposes of developing this plan:

- *Nonpoint source pollution impairment potential for subwatersheds*, as determined by the SWCDs (1998).
- *Resource concerns in the subwatersheds*, as determined by the local Soil and Water Conservation Districts (1998).
- *Sediment loading estimates for the subwatersheds*, as provided by the local Soil and Water Conservation Districts (1998) and published by the Alabama Soil and Water Conservation Committee (www.swcc.state.al.us/watershedmenu.htm).

Information from the *Screening Assessment* was utilized to establish what the basin management concerns and issues are for the Tombigbee River Basin. It is very important to note that the 1998 is older data and does not reflect current conditions in the basin. Furthermore, not every watershed was assessed. For example, 50 out of the 85 watersheds in the Tombigbee River Basin were not assessed for forestry land use and practices during the 1998 data collection.

In light of the fact that there is limited empirical and GIS data available to estimate land use and water quality in the Tombigbee River Basin, an analysis of land use and nonpoint source pollution is also limited. It should be understood that these data were utilized to guide the basin management planning process and they are not meant to quantify pollution loads throughout the basin. In other words, these data and the watershed modeling conducted for this plan represent **potential impacts** and not **measured impacts.**

6.1 Stakeholder Concerns.

During the week of March 15, 2004, four subbasin stakeholder meetings were organized by the Basin Facilitator and her sponsoring organization, the Alabama Pulp and Paper Council. Following an introductory and educational component to familiarize participants to the basin management planning process, a facilitated discussion of water quality issues was held to gather direct input from participants about local watershed issues and concerns. Summaries from these stakeholder meetings consist of concerns and issues raised by participants. These stakeholder meeting summaries are provided on the following pages.

Upper Tombigbee Watershed, Tuesday, March 16, 2004 at 6:00 p.m. at the Cooperative Extension Building, Carrollton, Alabama

Concerns and Issues:

- Need for planning efforts to generate projects utilizing NRCS cost-share programs, such as EQIP (environmental quality improvement program), WHIP (wildlife habitat improvement program), and WRP (wetland reserve program)
- Need BMP demonstration projects in the watershed
- Coordination with Mississippi an issue for water quality management and for habitat protection and management, such as the establishment of critical habitat by the USFWS. The approaches used by the two states need to be coordinated.
- Need updates on the status of river basin and watershed management plans from the Mississippi part of the basin, as well as 305(b) and 303(d) programs for the basin in Mississippi
- Night watershed meetings are a challenge for farmers and landowners, particularly during planting season.
- Need continued coordination on the watershed efforts between Alabama and Mississippi.

Middle Tombigbee Watershed, Thursday, March 18, 2004 at 12:00 p.m. at the University of West Alabama On-Site Wastewater Demonstration Training Center, Livingston, Alabama

Concerns and Issues

- Need septic system data to assess the failure of septic systems in the watershed, incidence of failures, poor septic system siting and installation, need for enhanced public health enforcement, and degree of pathogenic bacteria pollution from failing septic systems
- Septic data and failure assessments can be analyzed using data from the Alabama Department of Public Health, County Health Departments, and using the SWCC watershed data
- Need BMP demonstration projects in the watershed, targeting landowner coordination of projects.

Lower Alabama/Lower Tombigbee Meeting, Thursday, March 18, 2004 at 6:00 p.m., ALFA Building, Grove Hill, AL

Concerns and Issues

- Forestry and Nonpoint Source Pollution
  - Explore ways to enhance outreach efforts to non-company/"mom and pop" logging operations to increase knowledge and understanding of sustainable forestry practices.
    - For example, a stakeholder pointed out that Alabama River Woodland does not own woodlands; they pay logging companies and forest land owners for timber. They follow the SFI management principles and practices. They also follow a "3-strikes-and-you-are-out" Policy for timber harvesters whose practices are not consistent with SFI.

- Road construction and maintenance in the watershed is an issue. Specific items or areas of concern were mentioned and are listed below:
    - County and State Road Crews should be trained and supervised. Perhaps County Engineers could be trained in modern water quality BMPs for road work. As an incentive they may receive continuing education credits (CEUs).
    - Currently, it appears that the road crews do not adhere to BMPs for road work.
    - There is a need for BMP enforcement – is there a mechanism that could be used and improved?
    - Any system needs incentives for compliance.

- Mining and excavation operation impact water bodies.
    - It is perceived that the contractors (the people that dig) are the source of the problem.
    - Need for BMP training, implementation and monitoring/enforcement for this industry.

- *Water Festivals* have been and are a great educational outlet and activity for local students and teachers.

- Illegal dumping of solid waste from watercraft on the Alabama and Tombigbee Rivers is a widespread problem.

- Road crossings and boat ramps lead to stream and rive bank erosion and they also tend to be areas where litter is dumped or left. Improper disposal of deer and game carcasses is considered a problem in the basin and could be addressed through hunter education.

- Investigate technology transfer of BMP technology from one industry (forestry) to another (transportation).

- Road construction BMPs are needed – What program can be implemented?

- Who has jurisdiction over dumping of trash and waste from watercraft? *Answer:* U.S. Coast Guard, ADEM, state and municipal law enforcement authorities.

- Who has jurisdiction over river traffic? *Answer:* U.S. Coast Guard, ACOE, ADEM, state and municipal law enforcement authorities.

6.2 Nonpoint Source Pollution Impairment Potential for Subwatersheds.

Subwatershed impairment potential was determined by the local Soil and Water Conservation Districts (1998) and augmented with current construction stormwater authorizations by ADEM (2003). Impairment potential is a rating that provides an estimation of the potential for current and future nonpoint pollution from various sources *without proper management*. **This estimation of pollution potential is an approximation made by the Soil and Water Conservation Districts in order to assess each watershed.**[47] Proper management, in this context, means that appropriate best management practices (BMPs) are implemented and maintained. The nonpoint source pollution impairment potential for each subwatershed in the Tombigbee River Basin is provided in **Appendix C**.

NPS pollution impairment potential was estimated for seven rural land uses (SWCD, 1998):

- Row crops (rated by percent of land use devoted to cropland and the percent of cropland acres where pesticides are applied)
- Pasture runoff (rated by percent of land use devoted to pasture land)
- Animal husbandry (rated by the number of animal units per acre)
- Aquaculture (rated by the percent of land use devoted to aquaculture)
- Forestry practices (rated by the sum of the percent of forestry acres that are clear cut, the percent of forestry acres that are selectively harvested annually, and the percent of forestry acres that need remediation and management)
- Mining (rated by the percent of land use devoted to mining)
- Sedimentation (rated by the tons per acre per year of sedimentation in the subwatershed).

The findings for the Tombigbee River Basin, shown in **Figure 9**, show *potential* pollution impairments from forestry practices as the great *potential* source in the Tombigbee River Basin, due to the fact that forestry is the predominant land use in the basin (79% of the

[47] The SWCD attempted to collect data from many industries and user associations working in the basin. In 1998, the Alabama Forestry Commission input regarding forestry in the Tombigbee River Basin was not included. Therefore, a considerable amount of data regarding forestry in the basin was never included, limiting the accuracy of the data overall.

Tombigbee River Basin is forestland). The impairment scores shown in **Figure 9-11** were derived by weighting the impairment potential ratings reported in ADEM (2003) by 3 for "high" (H) ratings and by 2 for "medium" (M) ratings for the subwatersheds.

Thirty-six percent of the total potential impairment in the Tombigbee River Basin was attributed to general sedimentation processes, with pasture runoff a distant second, and forestry practices and row crops the third and fourth ranked sources of potential nonpoint impairment (**Figure 9)**. **These rankings, with respect to forestry practices, need to be interpreted with caution. Data were not reported on forestry practices for 50 of the 85 subwatersheds in the Tombigbee River Basin**. Reports that were made were estimates based on local knowledge rather than official data provided by the Alabama Forestry Commission. This is particularly important given that land use in the basin is largely forested land (79%), with pastureland at 12% and cropland at 4%. Forested land in the Upper Tombigbee Basin is 72% of the total land use, while it is 84% of the land use in the Lower Tombigbee Basin.

In the Upper Tombigbee River basin, general sedimentation was the primary source of nonpoint pollution impairment (**Figure 10**), with pasture runoff a distant second source. Sedimentation processes and forestry practices accounted for over half of the *potential* nonpoint source impairment in the Lower Tombigbee River Basin (**Figure 11**). Again, these measures of nonpoint source impairment are not actual estimates of pollutant loads.

Figure 9. Nonpoint source pollution potential in the Tombigbee River Basin. Percentages reflect the proportion of the total impairment score for the Tombigbee River Basin that is attributed to each rural land use impairment source. Source of data: ADEM (2003).

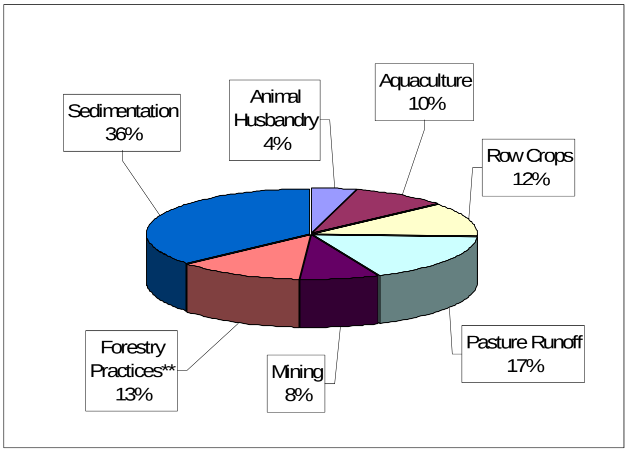


Figure 11. Nonpoint source pollution potential in the Lower Tombigbee River Basin. Percentages reflect the proportion of the total impairment score for the Lower Basin that is attributed to each rural land use impairment source.

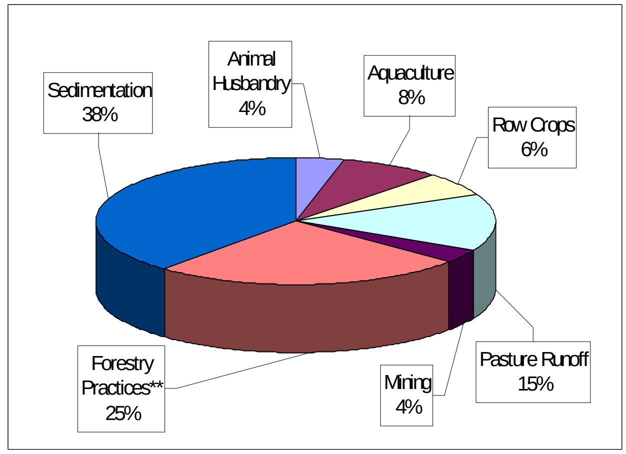
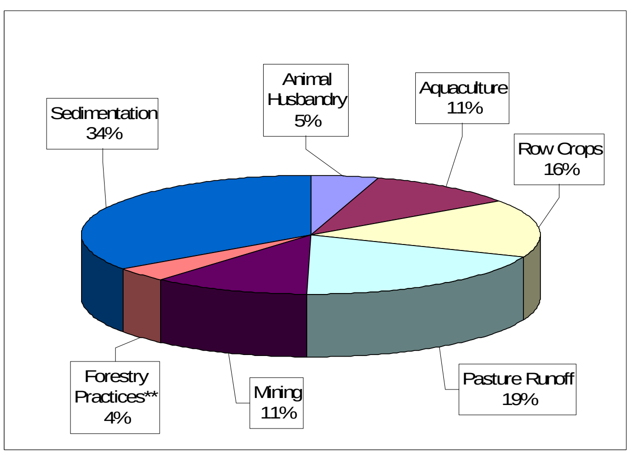


Figure 10. Nonpoint source pollution potential in the Upper Tombigbee River Basin. Percentages reflect the proportion of the total impairment score for the Upper Basin that is attributed to each rural land use impairment source.



The five subwatersheds with the greatest NPS pollution impairment potential for each of the seven rural land use sources are shown in **Table 27**. The following subwatersheds were among the top five for multiple NPS impairment sources:

- Lower Sucarnoochee River (3 NPS impairment sources)
- Upper Buttahatchee River (3 NPS impairment sources)
- Trussells Creek (2 NPS impairment sources)
- Upper Chickasaw Bogue (2 NPS impairment sources)
- Santa Bogue Creek (2 NPS impairment sources)

Table 27. **Nonpoint source pollution potential in the Tombigbee River Basin and its two subbasins. Percentages reflect the proportion of the total NPS impairment score for the basin attributable to each of the seven rural land use impairment sources. The top five subwatersheds were ordered within similar rating groups by subwatershed size.[1]**

ANIMAL HUSBANDRY	***Percent***
Tombigbee River Basin	4%
Upper Tombigbee River Basin	5%
Lower Tombigbee River Basin	4%
Top 5 Subwatersheds:	***Rating:***
Bear Creek	H
Twelve Mile Bend Tributaries	H
Lower Sucarnoochee River	M
Bull Mountain Creek	M
Powell Creek	M

AQUACULTURE	***Percent***
Tombigbee River Basin	10%
Upper Tombigbee River Basin	11%
Lower Tombigbee River Basin	8%
Top 5 Subwatersheds:	***Rating:***
Trussells Creek	H
Taylor Creek	H
Upper Chickasaw Bogue	H
Lower Sucarnoochee River	H
Lower Chickasaw Bogue	H

ROW CROPS	***Percent***
Tombigbee River Basin	12%
Upper Tombigbee River Basin	16%
Lower Tombigbee River Basin	6%
Top 5 Subwatersheds:	***Rating:***
Factory Creek[2]	H
Bodka Creek	H
Fenache Creek	H
Woodward Creek	H
Upper Buttahatchee River	H

PASTURE RUNOFF	***Percent***
Tombigbee River Basin	17%
Upper Tombigbee River Basin	19%
Lower Tombigbee River Basin	15%
Top 5 Subwatersheds:	***Rating:***
Trussells Creek	H
Taylor Creek	H
Upper Chickasaw Bogue	H
Lower Sucarnoochee River	H
Double Creek	H

MINING	***Percent***
Tombigbee River Basin	8%
Upper Tombigbee River Basin	11%
Lower Tombigbee River Basin	4%
Top 5 Subwatersheds:	***Rating:***
Upper Buttahatchee River	H
Buttahatchee River	H
Upper Luxapallila Creek	H
New River	H
Spring Creek	H

FORESTRY PRACTICES**	***Percent***
Tombigbee River Basin	13%
Upper Tombigbee River Basin	4%
Lower Tombigbee River Basin	26%
Top 5 Subwatersheds:	***Rating:***
Bilbo Creek	H
West Bassett Creek	H
Satilpa Creek	H
Santa Bogue Creek	H
Kinterbish Creek	H

SEDIMENTATION	***Percent***
Tombigbee River Basin	36%
Upper Tombigbee River Basin	35%
Lower Tombigbee River Basin	39%
Top 5 Subwatersheds:	***Rating:***
East Bassett Creek	H
Upper Buttahatchee River	H
Santa Bogue Creek	H
Sipsey River[3]	H
Lower Okatuppa Creek	H

Red: Both an ADEM Priority and a High NPS Potential Subwatershed
Blue: ADEM Priority Subwatershed
Green: High NPS Potential Subwatershed
Purple: 2004 303(d) Subwatershed

[1] Source of data: ADEM (2003). NPS impairment ratings of "H" were weighted by a factor of 3, while "M" ratings were weighted by a factor of 2. Ratings of "L" were not included in the score.

[2] Has a 303(d) impaired waters designation and is also a High NPS Potential subwatershed and an ADEM Priority Subwatershed.

[3] Has a 303(d) impaired waters designation and is also an ADEM Priority Subwatershed.

** 50 of the 85 subwatersheds did not assess Forestry Practices.

6.3 Resource Concerns for Subwatersheds:

The local Soil and Water Conservation Districts provided data to ADEM (2003) on resource concerns in the subwatersheds of the Tombigbee River Basin. These resource concerns, identified by District staff with stakeholder input, fell into 16 categories. They are summarized in **Table 28**. The most common resource concern across the subwatersheds of the Tombigbee River Basin was livestock access to streams, where it was cited as a significant concern in 74 percent of the subwatersheds. This resource concern was followed closely by livestock overgrazing of pastures, which was cited in 61 percent of the subwatersheds. Road and road bank erosion and sediment runoff from roads were cited in 56 and 54 percent of the subwatersheds. Bacteria contamination of surface waters was cited in 31 percent of the subwatersheds. These resource concern areas were also the top five issues in both the Upper and Lower Tombigbee basins. Resource concerns in each of the subwatersheds are provided in **Appendix D.**

Table 28. Resource concerns in the Tombigbee River Basin and its two basin segments. Percentages reflect the number of subwatersheds in the basin in which the resource concern was considered significant (Source of data: ADEM (2003).

Resource Concerns in the Subwatershed	**Tombigbee River Basin**	**Upper Tombigbee River Basin**	**Lower Tombigbee River Basin**
Excessive erosion on cropland	18%	29%	7%
Gully erosion on agricultural land	20%	26%	14%
Road and roadbank erosion	56%	64%	49%
Poor soil condition (cropland)	5%	7%	2%
Excessive animal waste applied to land	8%	14%	2%
Excessive pesticides applied to land	4%	7%	0%
Excessive sediment from cropland	16%	29%	5%
Excessive sediment from roads/road banks	54%	79%	30%
Excessive sediment from urban development	11%	14%	7%
Inadequate management of animal wastes	14%	24%	5%
Nutrients in surface waters	16%	24%	9%
Pesticides in surface waters	6%	7%	5%
Bacteria and other organisms in surface waters	31%	48%	14%
Low dissolved oxygen in surface waters	5%	2%	7%
Livestock are overgrazing pastures	61%	83%	40%
Livestock Commonly have access to streams	74%	86%	63%

6.4 Sediment Loading Estimates

Wind and water drive the erosion of soil from the land. The amount of soil loss, or sediment load, varies according to the land uses within a watershed. Once in a river or stream, the sediment load remains suspended in the water and is deposited in the channel or a river delta. Deposition of the sediments, or sedimentation, can alter a river or stream over time. Changes in configuration of stream can than impact how much and in what way future sedimentation occurs. That is the primary way in which stream change course over time and can change their banks. In certain streams during certain periods, the sediment load can be attributed to these natural, instream processes. However, these are natural processes of sedimentation are heavily influenced by land use, climate, slope of the surrounding land, and management activities targeted to decrease erosion.

Data on sediment loading estimates (in units of tons per year) were taken from the Alabama Soil and Water Conservation Committee database that is published on the web. This information was provided by the local Soil and Water Conservation Districts. Estimates were provided for 9 sediment erosion sources:

- Cropland
- Mined land
- Critical areas
- Stream banks
- Sand and gravel pits
- Developing urban land[48]
- Gullies
- Dirt roads and road banks
- Woodlands

Sediment loading in the Tombigbee River Basin is estimated to come largely from gully erosion (30 percent), followed by forested land (assumed to be harvested) (21 percent), developing urban land (14 percent), and stream banks (12 percent). Sediment loading percentages for the Tombigbee River Basin and its two basin segments are shown in **Figure 12** through 14.

[48] Developing urban land is rural land that is being converted through development to concentrated residential or urban land.

Figure 12. Sediment loading estimates for the Tombigbee River Basin. Percentages reflect the proportion of the total sediment loading for the Tombigbee River Basin that is attributed to each source of sediment erosion. Source of data: ADEM (2003).

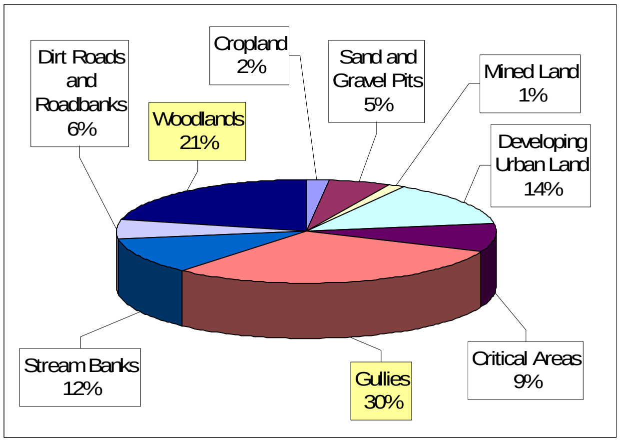


Figure 13. Sediment loading estimates for the Upper Tombigbee River Basin. Percentages reflect the proportion of the total sediment loading for the Upper Tombigbee River Basin that is attributed to each source of sediment erosion.

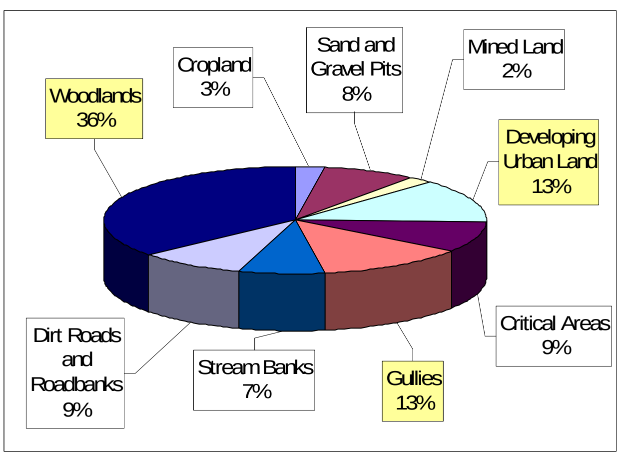
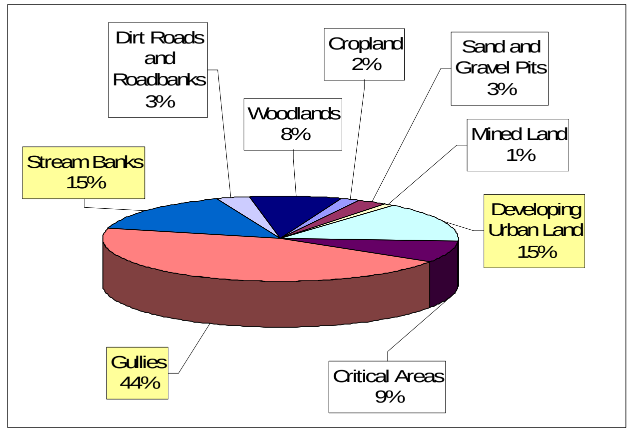


Figure 14. Sediment loading estimates for the Lower Tombigbee River Basin. Percentages reflect the proportion of the total sediment loading for the Lower Tombigbee River Basin that is attributed to each source of sediment erosion.



The five subwatersheds in the Tombigbee River Basin with the highest sediment loading for each of the nine sediment erosion sources are shown in **Table 29**. Nine of the subwatersheds stand out as having significant annual sediment loading from specific erosion sources:

- Upper Buttahatchee River subwatershed - has the highest annual sediment loading from woodlands, and is at least 267 percent higher than all other subwatersheds.
- Upper Tuckabum Creek and East Bassett Creek subwatersheds – combined have 45 percent of the total sediment loading from gully erosion for all 85 subwatersheds in the Tombigbee River Basin.
- Lower Okatuppa Creek subwatershed - has the highest annual sediment loading from streambank erosion, and is at least 198 percent higher than all other subwatersheds.
- Big Creek and Boguechitto Creek subwatersheds – combined have 29 percent of the total sediment loading from sand and gravel pits for all 85 subwatersheds in the Tombigbee River Basin.
- Tauler Creek subwatershed - has the highest annual sediment loading from cropland, and is at least 349 percent higher than all other subwatersheds.
- Alamuchee Creek and Hells Creek subwatersheds – combined have 52 percent of the total sediment loading from mined lands for all 85 subwatersheds in the Tombigbee River Basin.

Table 29. Sediment loading from various sources in the Tombigbee River Basin[1]

CROPLAND	Load (tons/yr)
Tombigbee River Basin	702,452
Upper Tombigbee River Basin	407,972
Lower Tombigbee River Basin	294,480
Top 5 Subwatersheds:	**Load (tons/yr)**
Tauler Creek	171,174
Factory Creek[2]	49,052
Bodka Creek	31,229
Sipsey River[3]	24,769
Upper Buttahatchee River	24,623

SAND AND GRAVEL PITS	Load (tons/yr)
Tombigbee River Basin	1,758,871
Upper Tombigbee River Basin	1,246,674
Lower Tombigbee River Basin	512,198
Top 5 Subwatersheds:	**Load (tons/yr)**
Big Creek	319,207
Boguechitto Creek	192,382
Spring Creek	118,831
Wilkes Creek	70,133
East Bassett Creek	69,472

MINED LAND	Load (tons/yr)
Tombigbee River Basin	478,412
Upper Tombigbee River Basin	334,045
Lower Tombigbee River Basin	144,368
Top 5 Subwatersheds:	**Load (tons/yr)**
Alamuchee Creek	144,368
Hells Creek	103,368
Buttahatchee River	52,890
Yellow Creek	32,194
Little New River	28,908

DEVELOPING URBAN LAND	Load (tons/yr)
Tombigbee River Basin	4,828,855
Upper Tombigbee River Basin	2,097,985
Lower Tombigbee River Basin	2,730,870
Top 5 Subwatersheds:	**Load (tons/yr)**
Upper Lubbub Creek	510,926
East Bassett Creek	499,857
Alamuchee Creek	420,118
Lower Sucarnoochee River	378,134
West Bassett Creek	345,303

CRITICAL AREAS	Load (tons/yr)
Tombigbee River Basin	3,046,315
Upper Tombigbee River Basin	1,473,107
Lower Tombigbee River Basin	1,573,208
Top 5 Subwatersheds:	**Load (tons/yr)**
Upper Buttahatchee River	296,922
Bodka Creek	255,175
Lower Okatuppa Creek	187,129
Factory Creek[2]	172,529
Wahalak Creek	165,092

GULLIES	Load (tons/yr)
Tombigbee River Basin	10,211,973
Upper Tombigbee River Basin	2,036,624
Lower Tombigbee River Basin	8,175,349
Top 5 Subwatersheds:	**Load (tons/yr)**
Upper Tuckabum Creek	3,263,264
East Bassett Creek	1,362,322
Noxubee River	735,027
Lower Tuckabum Creek	556,033
Lower Okatuppa Creek	489,997

STREAM BANKS	Load (tons/yr)
Tombigbee River Basin	3,963,554
Upper Tombigbee River Basin	1,186,108
Lower Tombigbee River Basin	2,777,446
Top 5 Subwatersheds:	**Load (tons/yr)**
Lower Okatuppa Creek	431,586
Upper Tuckabum Creek	217,645
Double Creek	210,996
Yantley Creek	166,639
Wahalak Creek	160,293

DIRT ROADS AND ROADBANKS	Load (tons/yr)
Tombigbee River Basin	2,022,777
Upper Tombigbee River Basin	1,455,617
Lower Tombigbee River Basin	567,160
Top 5 Subwatersheds:	**Load (tons/yr)**
Sipsey River[3]	173,386
Upper Luxapallila Creek	101,201
Lower Luxapallila Creek	93,091
Hells Creek	90,193
Coal Fire Creek	82,993

WOODLANDS	Load (tons/yr)
Tombigbee River Basin	7,303,504
Upper Tombigbee River Basin	5,797,151
Lower Tombigbee River Basin	1,506,353
Top 5 Subwatersheds:	**Load (tons/yr)**
Upper Buttahatchee River	1,629,450
Buttahatchee River	608,652
Upper Sipsey Creek	572,614
Bull Mountain Creek	469,916
Upper Luxapallila Creek	383,621

- (red) Both an ADEM Priority and a High NPS Potential Subwatershed
- (blue) ADEM Priority Subwatershed
- (green) High NPS Potential Subwatershed
- (purple) 2004 303(d) Subwatershed

[1] Source of data: ADEM (2003). NPS impairment ratings of "H" were weighted by a factor of 3, while "M" ratings were weighted by a factor of 2. Ratings of "L" were not included in the score.

[2] Has designated 303(d) impaired waters, and is a High NPS Potential subwatershed and an ADEM Priority Subwatershed.

[3] Has designated 303(d) impaired waters, and is an ADEM Priority Subwatershed.

The subwatersheds with the highest total sediment loading estimates from all sources are shown in **Table30**. The Upper Tuckabum Creek subwatershed has the highest annual sediment loading from all erosion sources, with 88 percent of that sediment load coming from gully erosion. Upper Buttahatchee River had the second highest total annual sediment loading from all erosion sources, with 79 percent of that total coming from woodlands. East Bassetts Creek had the third highest total annual sediment loading from all erosion sources, with 67 percent of that total coming from gully erosion. Further breakdowns can be derived from the sediment loading estimates for each of the subwatersheds, provided in **Appendix E.**

Table 30. Subwatersheds in the Tombigbee River Basin with the highest total sediment loading estimates from all erosion sources. Sediment loading estimates are in tons per year. Source of data: Alabama Soil and Water Conservation Districts, published by the SWCC.

Subwatershed	*Tons/year*		*Subwatershed*	*Tons/year*
Upper Tuckabum Creek	3,728,939		Noxubee River	906,883
Upper Buttahatchee River	2,058,176		Buttahatchee River	862,187
East Bassetts Creek	2,040,094		Alamuchee Creek	840,999
Lower Okatuppa Creek	1,280,697		Lower Tuckabum Creek	825,451
Wahalak Creek	1,036,627		Sipsey River	738,577
Lower Sucarnoochee River	968,238		Upper Lubbub Creek	721,920

6.5 Summary of Management Needs.

A listing of the primary resource concerns and management needs and issues is provided below. This list is based on the previous summaries of stakeholder concerns derived from public meetings, the impairment potential for subwatersheds as determined by the local Soil and Water Conservation Districts, resource concerns for subwatersheds as developed by the local Soil and Water Conservation Districts, and sediment loading rates as provided by the Alabama Soil and Water Conservation Committee on the web. Many of the concerns or issues were cited from several of these information sources.

Primary Resource Management Concerns
(Concerns are not ranked or prioritized)

• nonpoint source impairment from sedimentation	• property loss from streambank erosion
• soil erosion from roads, road banks and new road construction	• sediment loading from urban land development
• animal husbandry / waste management impacts	• sediment loading from sand and gravel pits
• livestock access to streams	• gully erosion
• livestock overgrazing of pastureland	• fish abundance and fisheries diversity in the Tombigbee River; aquatic biodiversity in the Buttahatchee River in Alabama and Mississippi
• pesticides, bacteria and other organisms in surface waters	• septic tank nutrient and pathogen loading
• mining and excavation impacts on surface waters	• road crossings and boat ramp problems
• sediment and nutrient loading from forestry practices	• river traffic management
• sediment and nutrient loading from pastureland	• dumping from boats
• sediment, nutrient, and pesticide loading from cropland	• integrating management plans and efforts across Alabama and Mississippi
• sediment and nutrient loading from aquaculture	• technology transfer for BMPs across industries
• Improper disposal of deer carcasses	

These are the major resource issues in the Tombigbee River Basin. Other concerns discussed in earlier sections of this plan may be significant on a local or subwatershed scale, but are not widespread concerns across the river basin. These more localized concerns should not be ignored at the subwatershed level, and management efforts toward those concerns should be pursued as opportunities arise.

The assessments for all subwatersheds in the river basin in terms of nonpoint source impairment, resource concerns, and sediment loading are provided in **Appendices C through E**. Information on a subwatershed scale can also be found in the Surface Water Quality Screening

Assessment of the Esctawpa River, Mobile Bay, and Upper and Lower Tombigbee River Basins - 2001, published by ADEM (2003).

6.6 Targeted Subwatersheds

The highest priority areas in the Tombigbee River Basin, where management efforts are most needed, are identified in Table 6.5 on the following pages and illustrated in **Maps 8 and 9**. These priority areas, referred to as Targeted Subwatersheds in this plan, are those subwatersheds identified by ADEM as priority subwatersheds in their Surface Water Quality Screening Assessment of the Esctawpa River, Mobile Bay, and Upper and Lower Tombigbee River Basins - 2001, published by ADEM (2003); those subwatersheds with a "high" potential for nonpoint source pollution impairment, as determined by the Soil and Water Conservation Districts and published by ADEM (2003), see **Appendix C**; or those subwatersheds with segments identified by ADEM as impaired on their 303(d) surface water impairment list.

It should be emphasized that additional subwatersheds not included in **Table 31** may become Targeted Subwatersheds after additional assessment efforts are completed. Possible subwatersheds requiring additional assessment include Upper Tuckabum Creek, Lower Okatuppa Creek, Big Creek, Boguechitto Creek, Hells Creek, Wahalak Creek, and Alamuchee Creek subwatersheds, receiving all high estimated sediment loading from one or more nonpoint sources.

Table 31. Target subwatersheds in the Tombigbee River Basin. These subwatersheds were identified as either having a high NPS Impairment Potential, being an ADEM Priority Subwatershed, or having a 303(d) impaired water in the subwatershed. Source of data: ADEM (2003).

HUC Code	Subwatershed	Criteria	Modeled	Primary Causes and Sources
Upper Tombigbee River Basin (0316-01):				
08-090	Noxubee River	High NPS Potential	yes	Nutrient enrichment and sedimentation from aquaculture and pastureland runoff
03-010	Upper Buttahatchee River	ADEM Priority SW	yes	Nutrient enrichment and sedimentation from runoff from croplands and pastureland; mining impacts
03-020	Buttahatchee River	ADEM Priority SW	yes	Pathogens and sedimentation from cropland runoff and mining impacts
03-030	Beaver Creek	ADEM Priority SW	no	Sedimentation from mining impacts
03-050	Upper Sipsey Creek	ADEM Priority SW	yes	Sedimentation from runoff from croplands and pasturelands
05-010	Upper Luxapallila River	ADEM Priority SW	yes	Nutrient enrichment, sedimentation, and pathogens from cattle, roadbank erosion, pasture grazing, and mining; dissolved oxygen and organic enrichment issues
05-030	Lower Luxapallila River	ADEM Priority SW	yes	Nutrient enrichment, sedimentation, and pathogens from cattle, roadbank erosion, pasture grazing, and mining
06-060	Coal Fire Creek	ADEM Priority SW	yes	Nutrient enrichment and sedimentation from forestry and aquaculture
06-160	Trussells Creek	ADEM Priority SW	yes	Nutrient enrichment and sedimentation from cropland runoff
06-170	Factory Creek	High NPS Potential; ADEM Priority SW	yes	Nutrient enrichment, sedimentation and habitat degradation from aquaculture, cropland and pastureland runoff, and animal husbandry
07-040	Sipsey River	ADEM Priority SW	yes	Sedimentation from runoff from croplands and pasturelands, mining impacts
07-080	Sipsey River	ADEM Priority SW	yes	Nutrient enrichment from runoff from croplands and pasturelands
08-110	Woodward Creek	High NPS Potential; ADEM Priority SW	yes	Nutrient enrichment and sedimentation from runoff from croplands and pasturelands, aquaculture, animal husbandry
08-140	Bodka Creek	ADEM Priority SW	yes	Sedimentation from runoff from croplands and pasturelands
03-030	Beaver Creek (Purgatory Creek)	303(d)	no	pH impairments from abandoned surface mining

Table 31. Target subwatersheds in the Tombigbee River Basin. These subwatersheds were identified as either having a high NPS Impairment Potential, being an ADEM Priority Subwatershed, or having a 303(d) impaired water in the subwatershed. Source of data: ADEM (2003). (cont'd).

HUC Code	Subwatershed	Criteria	Modeled	Primary Causes and Sources
Upper Tombigbee River Basin (0316-01):				
06-110	Bear Creek (Little Bear Creek)	303(d)	no	Low dissolved oxygen and organic enrichment from urban runoff and storm sewers
06-	Aliceville Reservoir on the Tombigbee River	303(d)	no	Organic enrichment and low dissolved oxygen from flow regulation and modifications by dam operations
07-080	Sipsey River	303(d)	no	Metals (iron) from abandoned surface mining
06-170	Factory Creek	303(d)	yes	Organic enrichment and low dissolved oxygen
Lower Tombigbee Alabama River Basin (0316-02):				
01-040	Dry Creek	ADEM Priority SW	yes	Nutrient enrichment and sedimentation from pasture runoff, animal husbandry
01-050	Powell Creek	High NPS Potential; ADEM Priority SW	yes	Nutrient enrichment and sedimentation from pasture runoff, animal husbandry, aquaculture
01-060	Upper Chickasaw Bogue	ADEM Priority SW	yes	Nutrient enrichment, sedimentation, and pathogens from aquaculture and pasture runoff
02-080	Lower Sucarnoochee River	High NPS Potential; ADEM Priority SW	yes	Sedimentation, nutrient enrichment and habitat degradation from cropland and pastureland runoff, aquaculture, and animal husbandry
02-100	Alamuchee Creek	ADEM Priority SW	yes	Nutrient enrichment and sedimentation from pasture runoff and forestry
03-090	East Bassett Creek	ADEM Priority SW	yes	Nutrient enrichment and sedimentation from pasture runoff and forestry
03-130	Bilbo Creek (Olin Basin)	303(d)	no	Contaminated sediments from pesticides and metals (mercury)
03-130 03-140	Tombigbee River (Bilbo Creek and Sand Hill Creek)	303(d)	no	Mercury contamination in fish tissue
03-130	Bilbo Creek	303(d)	yes	Organic enrichment and low dissolved oxygen
03-090	East Bassett Creek	303(d)	no	Pathogens

6.7 Sediment Load Modeling of Targeted Subwatersheds

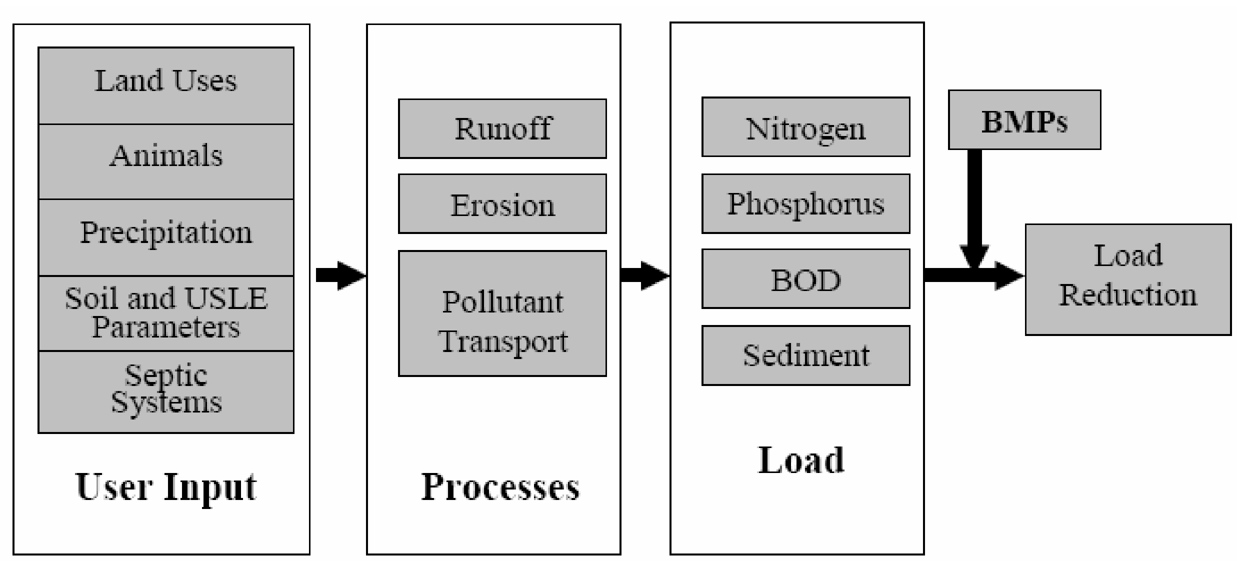
Some of the best management tools we have for addressing nonpoint source pollution problems are the implementation of land use specific Best Management Practices (BMPs). Over 79 percent of the land use in the Tombigbee River Basin is forested, with 12 percent in pastureland and 4 percent in cropland. These three land uses account for 95 percent of the land use in the Tombigbee River Basin. There are important benefits from implementing BMPs for these three land uses, particularly in reducing the loading of sediment, nitrogen, and phosphorus to surface waters.

A publicly-available watershed model was used for the targeted subwatersheds in order to illustrate the benefits from implementing several BMPs for each land use. The Environmental Protection Agency (EPA) STEPL (Spreadsheet Tool for the Estimation of Pollutant Load) watershed model was utilized for each targeted subwatershed for estimating the loading of sediments, nitrogen, and phosphorus to surface waters from forested land, cropland, and pastureland. The model includes a small selection of best management practices and their load reduction efficiencies for each land use that can selected by the user. For the illustrative purposes of this modeling in the plan, the installed best management practices were utilized; no other best management practices were used in the model.

STEPL (Spreadsheet Tool for the Estimation of Pollutant Load) is an EPA-approved modeling approach to calculate sediment and nutrient loads from different land uses and the load reductions that would result from the implementation of various best management practices (BMPs). It computes surface runoff; nutrient loads, including nitrogen, phosphorus, and 5-day biological oxygen demand (BOD_5); and sediment delivery based on various land uses and management practices.

Land uses considered in the model are urban land, cropland, pastureland, feedlots, forested land, and a user-defined type. The pollutant sources include potential nonpoint sources such as cropland, pastureland, farm animals, feedlots, urban runoff, and failing septic systems. The types of animals considered in the calculations are beef cattle, dairy cattle, swine, horses, sheep, chickens, turkeys, and ducks. For each watershed, the annual nutrient loading is calculated based on the runoff volume and the pollutant concentrations in the runoff water as influenced by factors such as the land use distribution and management practices.

The annual sediment load, from sheet and rill erosion only, is calculated based on the Universal Soil Loss Equation (USLE) and the sediment delivery ratio. The sediment and nutrient load reductions that result from the implementation of BMPs are computed using known BMP reduction efficiencies. The user has the capacity to incorporate additional BMPs and to modify the reduction efficiencies of BMPs. The general framework of STEPL is shown below:



The quality of the model outputs are very dependent on the accuracy of its inputs. Data sources utilized to run STEPL included land use, animal density, and septic system statistics as published by the Soil and Water Conservation Districts on the SWCC web site. **For this reason, the modeling conducted for forested land in the Tombigbee Basin is not representative of accurate statistics do to the incompleteness of the 1998 survey of forested land.** STEPL provides rainfall, runoff curves, and nutrient concentrations in runoff for each county in the state. While STEPL also provides USLE factors for each county, we utilized input from the NRCS for USLE factors for each county and subwatershed in the model.[49]

STEPL runs on a watershed and county basis, so watersheds that encompass several counties have to be run individually by each county segment of the watershed. Each

[49] These factors consider the **Sediment Delivery Ratio,** which stands for the percentage or proportion that estimates the amount of the sediment load that ultimately reaches the water via precipitation from the land.

subwatershed model using STEPL was calibrated for sediment loads from cropland and forested land to the estimates made by the Soil and Water Conservation Districts in 1998. Model calibration was made first for cropland sediment loads by adjusting the sediment delivery ratio[50] as needed to meet the 1998 sediment load estimate for cropland. Model calibration was deemed successful for a subwatershed if the sediment delivery ratio used to match the 1998 load estimate was less than 0.48. There were 4 of the 17 modeled subwatersheds where calibration to the 1998 sediment load estimates was unsuccessful (i.e., sediment delivery ratios above 0.48 were required in order to calibrate). In these cases, a sediment delivery ratio of 0.48 was utilized in STEPL and the resulting sediment load estimate was utilized for subsequent BMP load reduction modeling.

The sediment delivery ratio utilized for cropland load calibration was incorporated in the calibration of sediment loads from forested lands. Calibration for forested land sediment loads was accomplished by adjusting the C-factor[51] in the USLE equation in order to match the 1998 sediment load estimates from forested land. Model calibration was deemed successful for a subwatershed if the C-factor used to match the 1998 load estimate was less than 0.06. In all but one case, the STEPL sediment load estimates for forested land were successfully calibrated to the 1998 SWCD load estimates.[52]

STEPL provides estimates of sediment and nutrient load reductions with the incorporation of BMPs for cropland, forested land, and pastureland. Once the model is calibrated for a subwatershed, as described above, a BMP can be added to the model to predict the load reductions attributable to that BMP. <u>An assumption that has been made with the modeling for this basin management plan is that any BMPs already implemented in the basin have been accounted for in the 1998 sediment load estimates made by the Soil and Water Conservation Districts.</u> In other words, the effectiveness of BMPs, other than the ones included in the model estimates, were assumed to be estimated as a part of the 1998 SWCD data. Therefore, estimates for subwatersheds where forested land is the predominant land use,

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[50] The sediment delivery ratio is a percentage that reflects the proportion of the soil eroded from the land surface that ultimately reaches (delivered to) the stream or river.

[51] The C-factor in the USLE equation is the cropping management factor, which for forested land is influenced by canopy cover, the type of soil cover, and the percent of ground cover.

[52] A sediment load estimate for the Galbraith Mill Creek subwatershed for forested land (3,000 acres) was not made by the SWCD in 1998, while the STEPL model predicted 37 tons/year in sediment from forested land in the subwatershed.

underestimate or **overlook** the effectiveness of best management practices implemented by forest land owners and managers. The SWCDs are presently updating their sediment load estimates for the subwatersheds, with new data expected to be available in 2006. The STEPL models developed as part of this basin management plan can be updated at that time to incorporate the newer information.

Nine BMPs were modeled as part of this basin management plan. These BMPs were modeled at five implementation levels (0%, 25%, 50%, 75%, and 100%) for the land use acreage applicable to the BMP. The BMPs, and their sediment and nutrient load reduction efficiencies, are shown in **Table 32**. Descriptions of the BMPs are provided in Section 7.0.

Table 32. Load reduction efficiencies for the nine BMPs utilized in STEPL for this basin management plan.

	Load Reduction Efficiencies (%)		
	Sediment Loads	Nitrogen Loads	Phosphorus Loads
Agricultural Land Use			
Filter Strips	65%	70%	75%
Reduced Tillage	75%	55%	45%
Streambank Stabilization and Fencing	75%	75%	75%
Terraces	85%	20%	70%
Pastureland Land Use			
Streambank Protection and Fencing	75%	60%	60%
Terraces	42%	24%	26%
Forested Land Use			
Site Preparation / Steep Slope Seeder / Transplant	81%	ND	ND
Site Preparation / Straw / Crimp Seed / Fertilizer / Transplant	95%	ND	ND
Site Preparation / Straw / Net / Seed / Fertilizer / Transplant	83%	ND	ND
ND *denotes not determined; nutrient load reductions based on nutrient content in the runoff.*			

Modeling results for sediment loading using STEPL are shown in **Table 33**. The predicted sediment loads from STEPL model runs presented in Table 6.6 were compared to the 1998 estimated sediment loads made by the Soil and Water Conservation Districts (SWCD). These comparison were used to calibrate the model to an existing data set. The yellow-shaded entries highlight subwatersheds where the modeling results could not be calibrated to the SWCD data. The right-hand columns entitled, *2005 Modeled Estimate,* show the results of the STEPL modeling. Sediment loading from cropland, pastureland, and forested land was estimated using STEPL, while SWCD sediment load estimates were made in 1998 for cropland and forested land.

In all but 3 of the 19 subwatersheds modeled, the STEPL sediment loads for cropland were successfully calibrated to the 1998 SWCD load estimates. Sediment loads from forested land were successfully calibrated to the 1998 SWCD load estimates for only 7 of the 19 targeted subwatersheds.[53] The STEPL sediment load estimates were all lower than the 1998 SWCD load estimates for the targeted subwatersheds that were not successfully calibrated for cropland, and substantially lower for the subwatersheds not successfully calibrated for forested land. STEPL sediment load estimates were utilized as the baseline for subsequent modeling of sediment and nutrient load reductions with BMP implementation.

[53] This outcome could be an indicator that the 1998 SWCD data does not accurately account for the forestland in the basin.

Table 33. Sediment load estimates for targeted subwatersheds in the Tombigbee River Basin for cropland, pastureland, and forested land. Comparison of load estimates are made between those made by the Soil and Water Conservation Districts in 1998 and those derived from STEPL modeling as part of this plan.

River Basin	SubWatershed	County	CROPLAND SEDIMENT LOADING (tons/year)		FORESTRY SEDIMENT LOADING (tons/year)		2005 MODELED PASTURELAND SEDIMENT LOADING (tons/year)
			1998 Soil and Water Conservation Districts Estimate	2005 Modeled Estimate [1]	1998 Soil and Water Conservation Districts Estimate	2005 Modeled Estimate [2]	
Upper Tombigbee	Bodka Creek	Sumter	31,050	31,052	3,000	2,974	10,376
	Woodward Creek	Pickens	13,248	13,241	**1,323**	**46**	1,100
	Woodward Creek	Sumter	5,714	5,715	662	669	3,223
	Sipsey River	Fayette	25,320	25,308	25,025	25,937	12,246
	Sipsey River	Greene	2,453	2,459	4,907	4,911	1,473
	Sipsey River	Pickens	6,783	6,780	**57,000**	**5,669**	262
	Coal Fire Creek	Fayette	477	478	1,920	1,897	286
	Coal Fire Creek	Lamar	0	0	**5,686**	**1,740**	159
	Coal Fire Creek	Pickens	5,196	5,197	20,417	20,548	570
	Lower Luxapallila	Fayette	3,528	3,532	6,477	6,750	2,093
	Lower Luxapallila	Lamar	295	295	**72,895**	**10,338**	1,171
	Lower Luxapallila	Pickens	0	0	**2,250**	**860**	0
	Upper Luxapallila	Fayette	13,416	13,430	10,217	10,647	5,887
	Upper Luxapallila	Marion	360	363	**373,050**	**12,680**	2,510
	Trussells Creek	Greene	19,307	19,317	11,033	11,058	14,858
	Buttahatchee River	Lamar	3,112	3,114	**32,296**	**7,513**	678
	Buttahatchee River	Marion	7,020	7,008	**576,000**	**21,325**	1,835
	Upper Buttahatchee River	Marion	24,000	23,980	**1,629,450**	**89,932**	18,999
	Upper Sipsey Creek	Marion	11,280	11,287	**572,400**	**33,892**	8,065
	Factory Creek	Sumter	**48,960**	**32,659**	**9,580**	**2,853**	21,693
	Noxubee River	Sumter	15,750	15,751	2,400	2,379	7,780

[1] For those subwatersheds where calibration to the SWCD sediment load value required an unrealistic sediment delivery ratio above 0.480, a sediment delivery ratio of 0.480 was used. Successful STEPL m was deemed to have occurred if the sediment delivery ratio entered in the model was less than 0.480.

[2] For those subwatersheds where calibration to the SWCD sediment load value required an unrealistic USLE forestry C Factor above 0.060, a USLE forestry C Factor of 0.030 was used, which is the mean fo all subwatersheds successfully calibrated to SWCD forestry sediment load estimates. Successful STEPL model calibration was deemed to have occurred if the USLE forestry C Factor entered in the model w 0.060. Bold entries in shaded boxes denote subwatersheds where the 2005 model could not be calibrated to the 1998 Soil and Water Conservation Districts' loading estimates.

Table 33. Sediment load estimates for targeted subwatersheds in the Tombigbee River Basin for cropland, pastureland, and forested land. Comparison of load estimates are made between those made by the Soil and Water Conservation Districts in 1998 and those derived from STEPL modeling as part of this plan (cont'd).

River Basin	SubWatershed	County	CROPLAND SEDIMENT LOADING (tons/year)		FORESTRY SEDIMENT LOADING (tons/year)		2005 MODELED PASTURELAND SEDIMENT LOADING (tons/year)
			1998 Soil and Water Conservation Districts Estimate	2005 Modeled Estimate[1]	1998 Soil and Water Conservation Districts Estimate	2005 Modeled Estimate[2]	
Lower Tombigbee	East Bassett Creek	Clarke	330	331	11,064	11,229	3,817
	Dry Creek	Marengo	458	458	**12,745**	**3,212**	9,307
	Powell Creek	Marengo	1,944	1,946	4,856	4,937	11,677
	Upper Chickasaw Bogue	Marengo	2,280	2,284	16,805	16,938	13,908
	Bilbo Creek	Mobile	**795**	**609**	1,383	1,366	137
	Bilbo Creek	Washington	**5,700**	**2,298**	152,794	151,266	1,455
	Alamuchee Creek	Sumter	**19,901**	**17,661**	18,507	18,859	3,633
	Lower Sucarnoochee River	Sumter	4,860	4,852	**3,234**	**927**	6,482

[1] For those subwatersheds where calibration to the SWCD sediment load value required an unrealistic sediment delivery ratio above 0.480, a sediment delivery ratio of 0.480 was used. Successful STEPL model calibration was deemed to have occurred if the sediment delivery ratio entered in the model was less than 0.480.

[2] For those subwatersheds where calibration to the SWCD sediment load value required an unrealistic USLE forestry C Factor above 0.060, a USLE forestry C Factor of 0.030 was used, which is the mean forestry C Factor of all subwatersheds successfully calibrated to SWCD forestry sediment load estimates. Successful STEPL model calibration was deemed to have occurred if the USLE forestry C Factor entered in the model was less than 0.060.

Bold entries in shaded boxes denote subwatersheds where the 2005 model could not be calibrated to the 1998 Soil and Water Conservation Districts' loading estimates.

6.8 BMP Load Reductions for Targeted Subwatersheds

The predicted reductions in sediment, nitrogen, and phosphorus loading through BMP implementation are discussed in the "Recommendations" section of this plan, where it is recommended that BMPs be implemented to address specific management concerns. It should be understood that the nine BMPs that were modeled here for each targeted subwatershed using STEPL were chosen as example BMPs for forestry, cropland, and pastureland. More detailed modeling, done at a smaller spatial scale and with additional BMPs, should be undertaken as needed in the process of future implementation of this plan. This approach was taken to demonstrate that a simple model like STEPL can be an effective way to measure BMP effectiveness if the correct data for model input is available.

For each of the nine BMPs that were modeled, we incorporated five different levels of BMP implementation in the subwatershed being modeled. These were 0 % (no additional BMP implementation), and 25%, 50%, 75%, and 100% implementation of the BMP. These percentages relate to the proportion of the total acreage of that particular land use (e.g. cropland) in the subwatershed in which the BMP would be implemented. BMPs that have already been implemented in the Tombigbee River Basin are assumed to have been accounted for as part of the calibration of the STEPL model to the 1998 SWCD sediment load data for each targeted subwatershed.

The BMP modeling is a useful component of this plan because it provides a set of expected benefits from the implementation of specific plan recommendations. It also provides a sense of the level of effort needed in implementing specific BMPs to get particular sediment, nitrogen, and phosphorus load reductions. Ultimately this enhances the ability to make important management decisions regarding where to expend effort and funds, which management approaches to take, and the level of effort that should be targeted in order to achieve desired benefits. The modeling approach used here is not intended as a means for predicting sediment and nutrient concentrations in surface waters. The STEPL modeling results presented in this plan should be utilized as a planning tool for guiding management decisions.

7.0 RIVER BASIN MANAGEMENT RECOMMENDATIONS

The primary resource concerns and issues expressed by watershed stakeholders, and those derived from existing subwatershed and river basin studies and data, were outlined in the previous section of the plan. The remainder of this river basin management plan is devoted to identifying goals and strategies that address those concerns and issues so that they are corrected. These strategies will involve restoration, protection, and education projects or tasks focused on attaining a specific goal. In the list below, eight basin goals have been developed that address identified basin resource concerns and issues.

7.1 Basin Management Goals and the Concerns / Issues they Address

GOAL 1: *Reduce nonpoint source pollution from agricultural activities - cropland, pastureland, and animal husbandry*

- livestock access to streams, and streambank erosion
- nutrient runoff from pasture & cropland
- sediments from pasture and cropland
- gully erosion and erosion from critical areas
- animal waste management impacts
- livestock overgrazing of pastureland
- pesticides, bacteria and pathogens in surface waters

GOAL 2: *Reduce nonpoint source pollution from forestry*

- sediment loading from land
- streambank erosion from riparian buffer loss
- nutrient runoff from land
- erosion and sediment from logging roads
- thermal stress in streams from riparian canopy cover
- gully erosion on hillsides

GOAL 3: *Reduce nonpoint source pollution from aquaculture operations*

- nutrient loading from pond discharges
- sediment loading from pond discharges

GOAL 4: *Reduce nonpoint source pollution from roads, road banks, and new road construction*

- soil erosion from dirt roads and road banks
- gully erosion

GOAL 5: *Reduce pollution from urban and residential areas*

- septic tank and sewage treatment nutrient loading and pathogens
- soil erosion from new road construction
- soil erosion from land clearing and construction activities
- sediment loading from urban land development
- stormwater runoff – pathogens, bacteria and toxics

GOAL 6: *Reduce nonpoint source pollution from mining activities*

- sediment loading from sand and gravel pits
- mining and excavation impacts on surface waters

GOAL 7: *Protect and restore aquatic habitat and aquatic species diversity, with a focus on fish and mussel species in Alabama and Mississippi.*

- wetland and aquatic habitat destruction
- loss of fish and mussel species diversity

GOAL 8: *Improve river recreation management*

- river traffic management and bank erosion
- improper animal carcasses disposal
- boat ramp litter problems

Several additional goals are included in this plan that are not directly related to specific resource management issues. These goals are:

GOAL 9: Promote education and outreach, and watershed awareness of issues in the river basin. Promote volunteer activities throughout the watershed.

GOAL 10: Promote watershed management technology transfer across industries and state lines (Alabama and Mississippi). Coordinate watershed assessment, planning, restoration and conservation efforts between basin stakeholders in Alabama and Mississippi.

GOAL 11: Continue to track resource trends in the river basin to measure progress in restoration and protection efforts, and identify new resource concerns and issues.

GOAL 12: Develop a framework in the river basin to implement the projects and tasks in this plan at the subwatershed level.

These goals are critical to the implementation and success of this basin plan. In the following pages, each goal will be presented and related strategies will be established to achieve the goal. For each strategy, specifics are provided regarding the agencies or groups that are integral to implementing the strategy; the timeframe or priority of the strategy; a qualitative assessment of the level of funding needed for the strategy; monitoring needs; and performance indicators by which to gauge the success of implementing the strategy. A discussion follows describing how these strategies work to achieve the goal. For the first two goals related to reducing nonpoint source pollution from agricultural and forestry land uses, the results from the BMP load reduction modeling will be provided and discussed.

Key Participatory Groups for Implementation of the River Basin Management Plan

AAGC	Alabama Association of General Contractors
ACES	Alabama Cooperative Extension System
ACOE	United States Army Corps of Engineers
ACP	Alabama Catfish Producers
ACWP	Alabama Clean Water Partnership
ADCNR	Alabama Department of Conservation and Natural Resources
ADAI	Alabama Department of Agriculture and Industry
ADECA	Alabama Department of Economic and Community Affairs
ADEM	Alabama Department of Environmental Management
ADOT	Alabama Department of Transportation
ADPH	Alabama Department of Public Health
AFA	Alabama Forestry Association
AFC	Alabama Forestry Commission
AFF	Alabama Farmers Association
AFS	American Fisheries Society
AFPA	American Forest and Paper Association
ALC	Alabama Loggers Council
ALFA	Alabama Farmers Federation
AMI	Alabama Mining Institute
ANEMO	Alabama Nonpoint Education for Municipal Officials
ANHP	Alabama Natural Heritage Program
ANLA	Alabama Nursery and Landscape Association
AOWA	Alabama Onsite Wastewater Association
AOWB	Alabama Onsite Wastewater Board
APPC	Alabama Pulp and Paper Council
ARA	Alabama Rivers Alliance
ASMC	Alabama Surface Mining Commission
ASTA	Alabama Septic Tank Association
ATA	Alabama Turfgrass Association
AU	Auburn University
AWF	Alabama Wildlife Federation
AWWA	Alabama Water Watch Association
CG	United States Coast Guard
DU	Ducks Unlimited
FFA	Future Farmers of America
FSA	Farm Services Agency
GSA	Geological Survey of Alabama
FS	United States Forest Service
HBAA	Home Builders Association of Alabama
HOBOs	Home Owners and Boat Owners Associations
MPD	Marine Police Division
MDEQ	Mississippi Department of Environmental Quality
MDWFP	Mississippi Department of Wildlife, Fisheries and Parks
MSWCC	Mississippi Soil and Water Conservation Commission
NRCS	Natural Resources Conservation Service
RC&D	Resource Conservation and Development
SWCC	Soil and Water Conservation Committee
SWCD	Soil and Water Conservation District
SWCS	Soil and Water Conservation Society
SWS	Society of Wetland Scientists
TNC	The Nature Conservancy of Alabama
TTWDA	Tennessee-Tombigbee Waterway Development Authority
TTWDC	Tennessee-Tombigbee Waterway Development Council
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

GOAL 1: *Reduce nonpoint source pollution from agricultural activities – cropland, pastureland, and animal husbandry*
<u>Issues and Concerns in the Basin</u>: • livestock access to streams, and streambank erosion • nutrient runoff from pasture and cropland • sediments from pasture and cropland • gully erosion and erosion from critical areas • animal waste management impacts • livestock overgrazing of pastureland • pesticides, bacteria and pathogens in surface waters

Recommended Strategies to Achieve the Goal:

Lead Agency or Group[1]	Timeframe[2]	Level of Funding[3]	Monitoring Need[4]	Performance Indicator[5]
Implement streambank fencing and streambank buffer restoration projects.				
Landowners; NRCS, SWCD, AWF	High priority, continuous, long term	Medium; private /public	quarterly for fence/buffer condition	Stream miles for buffers and fences
Implement cropland BMPs to reduce sediment and nutrient loading to surface waters.				
Landowners; NRCS, SWCD, ACES	Medium priority, continuous, long term	Medium to high; private /public	Post-rain event; quarterly for BMP condition	Units of implemented BMPs
Implement pastureland BMPs to reduce sediment and nutrient loading to surface waters.				
Landowners; NRCS, SWCD, ACES	High priority, continuous, long term	Medium to high; private /public	quarterly for BMP condition	Units of implemented BMPs
Implement effective agricultural waste management plans.				
Landowners; NRCS, SWCD, ACES	Medium priority, continuous, long term	Medium to high; private /public	quarterly for system effectiveness	Number of systems implemented
Implement BMPs to reduce sediment erosion from gullies and critical areas.				
Landowners; NRCS, SWCD, ACES	High priority, continuous, long term	Medium; private /public	quarterly for erosion effectiveness	Number of acres in which BMP has been implemented

Lead Agency or Group[1]	Timeframe[2]	Level of Funding[3]	Monitoring Need[4]	Performance Indicator[5]
Establish benchmarks or goals in each subwatershed for the voluntary implementation of agricultural BMPs.				
Farming Community, ACWP, FSA, NRCS, SWCD, SWCC	Medium priority, periodic revisions	Low; private /public	Biennial revisions	New program of goals established every 2 years
Coordinate BMP demonstration projects on local farms in selected subwatersheds spread across the river basin.				
Landowners; NRCS, SWCD, SWCC, ACES, ACWP	Medium priority, periodic, long term	Medium; private /public	quarterly for condition of BMPs	Number of BMP demonstration projects implemented
Work with the agricultural community via outreach to identify funding sources for BMP implementation, to promote the implementation of BMPs, and to recognize those who implement them.				
Landowners; NRCS, SWCD, SWCC, ACES, ADEM, ACWP, ADAI	Medium priority, continuous, long term	Low to Medium; private /public	Annual progress reports	Number of outreach efforts or projects completed; number of funding sources identified; number of farmers recognized
Initiate educational outreach activities with youth involved in agriculture to promote the use of BMPs.				
NRCS, SWCD, SWCC, ACES, FFA, 4H, schools, SWCS, ACWP	Medium priority, continuous, long term	Low to Medium; private /public	Annual progress reports	Number of outreach events and number of groups and youth engaged
Promote the retirement of highly erosive farmland to conservation use through NRCS programs.				
NRCS, SWCD, SWCC, ACWP, land trusts	High priority, continuous, long term	High; public	Annual progress reports for the watershed	Acres of highly erosive land retired
Coordinate a program for the agriculture community to gather and properly dispose of pesticides and herbicides where necessary.				
Landowners; ADEM, ADAI, SWCD, ACES, ACWP, County Waste Mgmt., chemicals companies	Medium priority, continuous, long term	Low; private /public	Annual progress reports	Number of collection events; amount of material disposed of; types of materials disposed of

1 Lists responsible parties/primary actors; acronyms are defined on page xvii, and on the following page.
2 Quantifies the start time of the measure suggesting priority, as well as stating the duration of the implementation of the measure in the following terms: *short-term* (6 – 12 months), *mid-range* (6 – 18 months), *long-term* (18 months and greater), and/or *continuous* (ongoing, regular measure).
3 Estimates funding in terms of *low* (volunteer support through $25K), *medium* ($25K - $100K), and *high* ($100K ->). *May also state “source” of funding by program or simply, “private/public” to indicate sector of investment.
4 Captures the monitoring need and sets a frequency.
5 Performance indicator(s) are those measures that will indicate the degree of success in implementing the strategy.

How the Strategies Will Achieve the Goal.

The solutions to the concerns and issues identified in this plan related to agricultural land use lie primarily in the implementation of BMPs. These BMP implementation strategies are focused on cropland, pastureland, streambank fencing and streambank buffers, animal waste management systems, and erosion control for gullies and critical areas. Additional strategies identified here are in direct support for promoting the implementation of these BMPs, through education, outreach, and recognition. The reduction of pesticides and herbicides will be accomplished through the collection of leftover amounts of these chemicals, and through the BMPs as they reduce surface runoff. The retirement of highly erosive land to conservation purposes is a key strategy as well, with the benefits of both soil erosion and wildlife enhancement. Several of the key BMPs are described below.

Vegetative Filter Strips

Strips of vegetation, which may include grass, shrubs, or trees that filter runoff and retain contaminants before they reach surface waters.

The filter strip vegetation slows or intercepts surface runoff from cropland, capturing or providing temporary retention of pollutants like sediment, pesticides, and nutrients. Vegetative uptake of nutrients or retention of other pollutants protects adjacent surface waters.

No-Till Farming

A method of farming where the soil is not tilled between each year's crops.

This method of farming includes no seedbed preparation other than opening a small slit for the purpose of placing the seed at the intended depth. The continuous ground cover prevents soil erosion and surface runoff into adjacent surface waters. No till residue also improves soil tilth and adds organic matter to the soil as it decomposes, and reduces soil compaction.

Terraces

Terraces are earthen embankments around a hillside that stop water flow, storing or conveying it off a field.

Terraces break long slopes into shorter ones, and usually follow the contour. As surface runoff makes its way down a hillside through cropland, terraces serve as small dams to intercept water and guide it to an outlet or allow it to evaporate or infiltrate. Water quality in adjacent streams is improved by this interception of surface runoff.

Riparian Buffers and Stream Fencing

Riparian buffer restoration is the replanting of trees along streambanks to restore the canopy cover over streams, reduce streambank erosion, and improve water quality. Streambank fencing controls livestock access to streams, which decreases streambank erosion and improves water quality. Streambank fencing and riparian buffer restoration are best undertaken simultaneously along with development of an alternative water source for animals.

Pastureland Management

Some of the same BMPs used for cropland can be utilized in pastureland. These include riparian buffers and streambank fencing, terraces, critical areas planting, and pasture or paddock rotation with fencing.

These BMPs increase vegetative cover in the pasture areas and in riparian areas, thereby reducing erosion and protecting water quality. Forage production is increased as well.

The benefits expected from implementation of these agricultural BMPs are significant in this river basin. STEPL watershed modeling was utilized to estimate the reductions in sediment, nitrogen, and phosphorus loading from cropland and pastureland gained by the implementation of six different BMPs. There are many other BMPs that can be utilized and should be considered. The six modeled here were chosen as example BMPs that could play a significant role in achieving this plan goal. Five different levels of BMP implementation were considered: 0, 25, 50, 75, and 100 percent implementation to the number of acres devoted to either cropland or pastureland. The six BMPs that were modeled were:

- Cropland - Filter Strips
- Cropland - Streambank Stabilization and Fencing
- Cropland - Terraces
- Cropland - Reduced Tillage
- Pastureland - Streambank Stabilization and Fencing
- Pastureland - Terraces

The potential benefits from implementation of these BMPs are shown in Tables 34 through 39 for the targeted subwatersheds with the highest sediment loading from cropland. The Factory Creek subwatershed in Sumter County is the targeted subwatershed with the highest estimated sediment loading from cropland. With the implementation of filter strip BMPs on half the cropland acreage in this subwatershed, for instance, sediment loading is expected to be reduced from 32,700 tons per year to 22,000 tons per year (**Tables 34**). Similar significant benefits in sediment, nitrogen, and phosphorus load reductions in other subwatersheds are shown in these tables. The BMP load reduction modeling results for all targeted subwatersheds are in **Appendix F**.

The modeling was done at a subwatershed scale and the BMP being modeled is assumed to be implemented on a given percentage of the total acreage of that land use. When implemented, however, some BMPs have a positive impact only on a portion of a farm (the portion where the BMP is needed most) and not the entire acreage of that farm. These modeled BMP load reductions overestimate load reductions are therefore are intended to serve as a management guide for strategic planning at the watershed scale. They provide guidance on the comparative benefits of implementing BMPs on different subwatersheds, and the relative load reduction benefits from different BMPs.

There are numerous additional agricultural BMPs that can be implemented, including BMPs that address agricultural waste management and BMPs for reducing erosion from gullies and critical areas. The NRCS and SWCD offices provide outstanding assistance to farmers in identifying and implementing appropriate BMPs. Several documents provide good reviews of agricultural BMPs, including the SWCC's "*Protecting Water Quality on Alabama's Farms*"; the ACES's and NRCS's "*Nutrient Management Planning for Animal Feeding Operations*"; and an overview of agricultural BMPs, with pictures, on the web at: http://faculty.msmary.edu/envirothon/current/guide/ag_urban_bmp.htm

Some of these additional agricultural BMPs include grassed waterways, diversions, critical areas planting, sediment control ponds and detention basins, contour farming, crop rotation, cover crops, nutrient management, manure storage and management, grazing land management, pasture renovation and planting, integrated pest management, wetland creation, roof runoff management, composting, livestock watering facilities, and pesticide management.

Critical Areas Planting

Critical areas planting is the planting of grass or other vegetation to protect a badly eroding soils in an agricultural area.

These areas typically have a significant erosion problem. The planting of vegetation provides a surface cover that reduces erosional processes and also traps surface runoff.

Sediment, nutrient, and pesticide runoff to adjacent streams is reduced by critical areas planting.

Manure Management

Manure management involves several BMPs, including the storage of animal manure, the proper use of animal manure as field fertilizer, and improved collection methods from barnyard to storage area.

The proper storage of animal manure is a critical BMP step, with numerous options tailored to the farm operation characteristics. These BMPs offer benefits by reducing the surface runoff and ground water infiltration of nutrients and organic matter.

Table 34. Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Filter Strips" agricultural BMPs for cropland. The subwatersheds with the highest sediment loading from cropland are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.

SubWatershed	*Acres of Cropland*	*Percent of Acres Put in BMP*	BMP - Filter Strips for Cropland: *Nitrogen Load from Cropland- With Percent Reductions (lbs/year)*		*Phosphorus Load from Cropland- With Percent Reductions (lbs/year)*		*Sediment Load from Cropland- With Percent Reductions (tons/year)*	
Factory Creek - Sumter County	9,600	0%	297,287	0%	80,934	0%	32,659	0%
	2,400	25%	253,877	15%	67,568	17%	27,352	16%
	4,800	50%	210,468	29%	54,202	33%	22,045	33%
	7,200	75%	167,059	44%	40,836	50%	16,738	49%
	9,600	100%	94,411	68%	24,257	70%	11,431	65%
Bodka Creek - Sumter County	6,900	0%	190,970	0%	58,271	0%	31,052	0%
	1,725	25%	167,568	12%	49,456	15%	26,006	16%
	3,450	50%	133,658	30%	39,487	32%	20,960	33%
	5,175	75%	105,002	45%	30,095	48%	15,914	49%
	6,900	100%	62,259	67%	18,393	68%	10,868	65%
Sipsey River - Fayette County	8,440	0%	191,083	0%	55,234	0%	25,308	0%
	2,110	25%	162,889	15%	46,351	16%	21,195	16%
	4,220	50%	126,229	34%	36,080	35%	17,083	33%
	6,330	75%	93,801	51%	26,503	52%	12,970	49%
	8,440	100%	61,374	68%	16,927	69%	8,858	65%
Upper Buttahatchee River Marion County	10,000	0%	207,382	0%	58,088	0%	23,980	0%
	2,500	25%	184,565	11%	49,582	15%	20,083	16%
	5,000	50%	136,717	34%	37,782	35%	16,187	33%
	7,500	75%	101,384	51%	27,629	52%	12,290	49%
	10,000	100%	66,051	68%	17,476	70%	8,393	65%
Trussells Creek - Greene County	9,194	0%	182,662	0%	50,202	0%	19,317	0%
	2,299	25%	156,119	15%	42,147	16%	16,178	16%
	4,597	50%	120,276	34%	32,566	35%	13,039	33%
	6,896	75%	89,086	51%	23,749	53%	9,900	49%
	9,194	100%	57,889	68%	14,930	70%	6,761	65%

Table 35. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Reduced Tillage" agricultural BMPs for cropland. The subwatersheds with the highest sediment loading from cropland are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	Acres of Cropland	Percent of Acres Put in BMP	BMP - Reduced Tillage Systems for Cropland: Nitrogen Load from Cropland- With Percent Reductions (lbs/year)		Phosphorus Load from Cropland- With Percent Reductions (lbs/year)		Sediment Load from Cropland- With Percent Reductions (tons/year)	
Factory Creek - Sumter County	9,600	0%	297,287	0%	80,934	0%	32,659	0%
	2,400	25%	262,148	12%	70,578	13%	26,536	19%
	4,800	50%	227,010	24%	60,222	26%	20,412	38%
	7,200	75%	191,872	35%	49,867	38%	14,288	56%
	9,600	100%	112,877	62%	32,443	60%	8,165	75%
Bodka Creek - Sumter County	6,900	0%	190,970	0%	58,271	0%	31,052	0%
	1,725	25%	172,906	9%	51,386	12%	25,230	19%
	3,450	50%	139,082	27%	41,961	28%	19,408	38%
	5,175	75%	113,137	41%	33,807	42%	13,585	56%
	6,900	100%	66,063	65%	20,572	65%	7,763	75%
Sipsey River - Fayette County	8,440	0%	191,083	0%	55,234	0%	25,308	0%
	2,110	25%	167,109	13%	48,209	13%	20,563	19%
	4,220	50%	130,437	32%	38,130	31%	15,817	38%
	6,330	75%	100,114	48%	29,577	46%	11,072	56%
	8,440	100%	69,790	63%	21,025	62%	6,327	75%
Upper Buttahatchee River Marion County	10,000	0%	207,382	0%	58,088	0%	23,980	0%
	2,500	25%	193,803	7%	52,960	9%	19,484	19%
	5,000	50%	142,678	31%	40,587	30%	14,988	38%
	7,500	75%	110,326	47%	31,836	45%	10,491	56%
	10,000	100%	77,975	62%	23,085	60%	5,995	75%
Trussells Creek - Greene County	9,194	0%	182,662	0%	50,202	0%	19,317	0%
	2,299	25%	161,430	12%	44,447	11%	15,695	19%
	4,597	50%	126,249	31%	35,337	30%	12,073	38%
	6,896	75%	98,046	46%	27,905	44%	8,451	56%
	9,194	100%	69,835	62%	20,472	59%	4,829	75%

Table 36. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Streambank Stabilization and Fencing" agricultural BMPs for cropland. The subwatersheds with the highest sediment loading from cropland are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	*Acres of Cropland*	*Percent of Acres Put in BMP*	BMP - Streambank Stabilization and Fencing for Cropland: *Nitrogen Load from Cropland- With Percent Reductions (lbs/year)*		*Phosphorus Load from Cropland- With Percent Reductions (lbs/year)*		*Sediment Load from Cropland- With Percent Reductions (tons/year)*	
Factory Creek - Sumter County	9,600	0%	297,287	0%	80,934	0%	32,659	0%
	2,400	25%	247,637	17%	66,562	18%	26,536	19%
	4,800	50%	197,987	33%	52,190	36%	20,412	38%
	7,200	75%	148,337	50%	37,818	53%	14,288	56%
	9,600	100%	74,322	75%	20,233	75%	8,165	75%
Bodka Creek - Sumter County	6,900	0%	190,970	0%	58,271	0%	31,052	0%
	1,725	25%	162,476	15%	48,499	17%	25,230	19%
	3,450	50%	125,226	34%	37,574	36%	19,408	38%
	5,175	75%	92,354	52%	27,225	53%	13,585	56%
	6,900	100%	47,743	75%	14,568	75%	7,763	75%
Sipsey River - Fayette County	8,440	0%	191,083	0%	55,234	0%	25,308	0%
	2,110	25%	158,782	17%	45,572	17%	20,563	19%
	4,220	50%	119,427	38%	34,521	38%	15,817	38%
	6,330	75%	83,599	56%	24,165	56%	11,072	56%
	8,440	100%	47,771	75%	13,809	75%	6,327	75%
Upper Buttahatchee River Marion County	10,000	0%	207,382	0%	58,088	0%	23,980	0%
	2,500	25%	178,928	14%	48,843	16%	19,484	19%
	5,000	50%	129,614	38%	36,305	38%	14,988	38%
	7,500	75%	90,730	56%	25,414	56%	10,491	56%
	10,000	100%	51,845	75%	14,522	75%	5,995	75%
Trussells Creek - Greene County	9,194	0%	182,662	0%	50,202	0%	19,317	0%
	2,299	25%	152,288	17%	41,552	17%	15,695	19%
	4,597	50%	114,164	38%	31,376	38%	12,073	38%
	6,896	75%	79,917	56%	21,964	56%	8,451	56%
	9,194	100%	45,666	75%	12,551	75%	4,829	75%

Table 37. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Terraces" agricultural BMPs for cropland. The subwatersheds with the highest sediment loading from cropland are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	Acres of Cropland	Percent of Acres Put in BMP	BMP - Terraces for Cropland: Nitrogen Load from Cropland- With Percent Reductions (lbs/year)		Phosphorus Load from Cropland- With Percent Reductions (lbs/year)		Sediment Load from Cropland- With Percent Reductions (tons/year)	
Factory Creek - Sumter County	9,600	0%	297,287	0%	80,934	0%	32,659	0%
	2,400	25%	284,931	4%	66,225	18%	25,719	21%
	4,800	50%	272,576	8%	51,517	36%	18,779	43%
	7,200	75%	260,221	12%	36,809	55%	11,839	64%
	9,600	100%	169,898	43%	18,245	77%	4,899	85%
Bodka Creek - Sumter County	6,900	0%	190,970	0%	58,271	0%	31,052	0%
	1,725	25%	188,675	1%	48,024	18%	24,454	21%
	3,450	50%	158,361	17%	36,392	38%	17,855	43%
	5,175	75%	142,057	26%	25,453	56%	11,256	64%
	6,900	100%	88,187	54%	11,743	80%	4,658	85%
Sipsey River - Fayette County	8,440	0%	191,083	0%	55,234	0%	25,308	0%
	2,110	25%	179,656	6%	45,232	18%	19,930	21%
	4,220	50%	145,655	24%	33,564	39%	14,552	43%
	6,330	75%	122,940	36%	22,729	59%	9,174	64%
	8,440	100%	100,226	48%	11,893	78%	3,796	85%
Upper Buttahatchee River Marion County	10,000	0%	207,382	0%	58,088	0%	23,980	0%
	2,500	25%	217,918	-5%	48,791	16%	18,884	21%
	5,000	50%	161,704	22%	35,541	39%	13,789	43%
	7,500	75%	138,865	33%	24,268	58%	8,693	64%
	10,000	100%	116,027	44%	12,995	78%	3,597	85%
Trussells Creek - Greene County	9,194	0%	182,662	0%	50,202	0%	19,317	0%
	2,299	25%	175,882	4%	41,439	17%	15,212	21%
	4,597	50%	144,306	21%	30,847	39%	11,107	43%
	6,896	75%	125,134	31%	21,169	58%	7,003	64%
	9,194	100%	105,950	42%	11,491	77%	2,898	85%

Table 38. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Streambank Stabilization and Fencing" agricultural BMPs for pastureland. The subwatersheds with the highest sediment loading from pastureland are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Streambank Protection and Fencing for Pastureland					
			Nitrogen Load from Pastureland - With Percent Reductions (lbs/year)		Phosphorus Load from Pastureland - With Percent Reductions (lbs/year)		Sediment Load from Pastureland - With Percent Reductions (tons/year)	
Factory Creek - Sumter County	31,932	0%	366,460	0%	49,004	0%	21,693	0%
	7,983	25%	308,888	16%	40,651	17%	17,626	19%
	15,966	50%	251,316	31%	32,298	34%	13,558	38%
	23,949	75%	193,743	47%	23,946	51%	9,491	56%
	31,932	100%	136,171	63%	15,593	68%	5,423	75%
Upper Buttahatchee River - Marion County	17,000	0%	216,155	0%	35,058	0%	18,999	0%
	4,250	25%	181,452	16%	28,922	18%	15,436	19%
	8,500	50%	146,749	32%	22,785	35%	11,874	38%
	12,750	75%	112,046	48%	16,649	53%	8,312	56%
	17,000	100%	77,343	64%	10,512	70%	4,750	75%
Trussells Creek - Greene County	42,000	0%	433,962	0%	47,286	0%	14,858	0%
	10,500	25%	367,085	15%	39,507	16%	12,072	19%
	21,000	50%	300,208	31%	31,727	33%	9,286	38%
	31,500	75%	233,330	46%	23,948	49%	6,500	56%
	42,000	100%	166,453	62%	16,169	66%	3,714	75%
Upper Chickasaw Bogue - Marengo County	36,655	0%	384,903	0%	42,665	0%	13,908	0%
	9,164	25%	325,500	15%	35,623	17%	11,300	19%
	18,328	50%	266,096	31%	28,580	33%	8,693	37%
	27,491	75%	206,689	46%	21,538	50%	6,085	56%
	36,655	100%	147,285	62%	14,496	66%	3,477	75%
Sipsey River - Fayette County	11,816	0%	146,992	0%	23,173	0%	12,246	0%
	2,954	25%	123,473	16%	19,131	17%	9,950	19%
	5,908	50%	99,955	32%	15,089	35%	7,654	38%
	8,862	75%	76,437	48%	11,048	52%	5,358	56%
	11,816	100%	52,918	64%	7,006	70%	3,062	75%

Table 39. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Terraces" agricultural BMPs for pastureland. The subwatersheds with the highest sediment loading from pastureland are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	*Acres of Pasture-land*	*Percent of Acres Put in BMP*	BMP - Terraces for Pastureland					
			Nitrogen Load from Pastureland - With Percent Reductions (lbs/year)		*Phosphorus Load from Pastureland - With Percent Reductions (lbs/year)*		*Sediment Load from Pastureland - With Percent Reductions (tons/year)*	
Factory Creek - Sumter County	31,932	0%	366,460	0%	49,004	0%	21,693	0%
	7,983	25%	341,349	7%	44,750	9%	19,415	11%
	15,966	50%	316,237	14%	40,495	17%	17,138	21%
	23,949	75%	291,126	21%	36,241	26%	14,860	32%
	31,932	100%	266,014	27%	31,987	35%	12,582	42%
Upper Buttahatchee River - Marion County	17,000	0%	216,155	0%	35,058	0%	18,999	0%
	4,250	25%	200,450	7%	31,843	9%	17,004	11%
	8,500	50%	184,745	15%	28,628	18%	15,009	21%
	12,750	75%	169,040	22%	25,413	28%	13,014	32%
	17,000	100%	153,335	29%	22,198	37%	11,019	42%
Trussells Creek - Greene County	42,000	0%	433,962	0%	47,286	0%	14,858	0%
	10,500	25%	405,785	6%	43,480	8%	13,298	11%
	21,000	50%	377,608	13%	39,675	16%	11,738	21%
	31,500	75%	349,430	19%	35,869	24%	10,178	32%
	42,000	100%	321,253	26%	32,063	32%	8,618	42%
Upper Chickasaw Bogue - Marengo County	36,655	0%	384,903	0%	42,665	0%	13,908	0%
	9,164	25%	359,808	7%	39,206	8%	12,448	10%
	18,328	50%	334,713	13%	35,748	16%	10,988	21%
	27,491	75%	309,610	20%	32,289	24%	9,527	32%
	36,655	100%	284,515	26%	28,830	32%	8,067	42%
Sipsey River - Fayette County	11,816	0%	146,992	0%	23,173	0%	12,246	0%
	2,954	25%	136,409	7%	21,063	9%	10,961	11%
	5,908	50%	125,826	14%	18,953	18%	9,675	21%
	8,862	75%	115,243	22%	16,844	27%	8,389	32%
	11,816	100%	104,660	29%	14,734	36%	7,103	42%

GOAL 2: *Reduce nonpoint source pollution from forestry activities -*
<u>Issues and Concerns in the Basin</u>: • industry is doing an excellent job of implementing BMPs • sediment loading from land • streambank erosion from riparian buffer loss • nutrient runoff from land • loss of streamside canopy cover; increasing water temperatures • erosion and sediment from logging roads • gully erosion on hillsides

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Implement forestry management BMPs to reduce sediment and nutrient loading to surface waters. Identify those tracts in greatest need of BMP enhancement.				
Landowners; AFA, AFC, APPC, ALC, SWCD, ACES	High priority, continuous, long term	Medium to high; private /public	quarterly for BMP condition	Acres of forested land where BMPs are implemented
Implement BMPs on new, in-use, and abandoned logging roads and road banks to reduce sediment and nutrient loading to surface waters.				
Landowners; AFA, AFC, APPC, ALC, SWCD, ACES, county engineers, stakeholders	High priority, continuous, long term	Medium to high; private /public	quarterly for BMP condition	Miles of roads where BMPs have been implemented
Implement BMPs to reduce sediment erosion from gullies and critical areas on forested lands.				
Landowners; AFA, AFC, APPC, ALC, SWCD, ACES	High priority, continuous, long term	Medium to high; private /public	quarterly for erosion effectiveness	Number of acres in which BMP has been implemented
Promote BMPs for stream buffers and wetlands in commercially forested areas.				
Landowners; NRCS, SWCD, SWCC, AFA, AFC, ALC, ACES, ACWP	High priority, continuous, long term	Medium; private /public	quarterly for buffer and wetlands condition	Stream miles for buffers and acres for wetlands that are restored or protected
Educate forest landowners concerning the importance of BMPs in reducing nonpoint source pollution associated with timber management.				
Landowners; AFC, AFA, APPC, ALC, ACES, ACWP	High priority, continuous, long term	Low to medium; private /public	Annual progress reports	Number of outreach efforts or educational projects completed; number of landowners engaged

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Continue education and outreach programs with students involved in forestry activities.				
AFC, AFA, APPC, FFA, 4H, schools, SWCS, SWCD, NRCS, ACWP	Medium priority, continuous, long term	Low to Medium; private /public	Annual progress reports	Number of outreach events and number of groups and youth engaged
Utilize the Alabama TREASURE Forest Association's TREASURE Forest program and American Tree Farm System to recognize forest landowners with a proven record of Best Management Practices, and to recognize and reward good forest management stewardship. Promote participation in the American Tree Farm System and the programs of the Sustainable Forestry Initiative for environmental and forestry benefits.				
Landowners, AFC, AFA, AFPA, ACWP	High priority, continuous, long term	Low; private /public	Annual progress reports	Number of landowners recognized
Work with the forestry community via outreach to identify funding sources for BMP implementation, to promote the implementation of BMPs, and to recognize those who implement them.				
Landowners; AFC, AFA, APPC, ALC, ACES, ACWP	High priority, continuous, long term	Low; private /public	Annual progress reports	Number of outreach efforts or events completed; number of funding sources identified

<u>How the Strategies Will Achieve the Goal.</u>

The continued implementation of forestry BMPs in the river basin is key to mitigating sediment and nutrient loading from forested land. These BMP implementation strategies are focused on actively managed forested land, in-use and abandoned logging roads, and areas of gully and critical area sediment erosion. The protection of streams and streambanks, and riparian wetlands, is also crucial to enhancing aquatic systems health in the basin. The restoration and maintenance of degraded stream buffers and wetlands in forested areas can also enhance the integrity of streams and could be accomplished by incorporating riparian restoration into the suite of available forestry BMPs.

Currently, the Alabama Forestry Commission reports BMP implementation rates across the state at 96.5% compliance rate. This report highlights the forest industry's vigilance in implementing BMPs. Education, outreach, and recognition are strategies supportive of and critical to BMP implementation efforts because they promote their implementation. The TREASURE Forest program provides a significant mechanism for BMP promotion and stewardship recognition. The promotion of participation in the American Tree Farm System and the programs of the Sustainable Forestry Initiative (SFI®) Program and Alabama Loggers Council will further enhance both environmental and forestry benefits. Workshops and the distribution of educational materials are key efforts. Educational efforts with youth involved or interested in forestry are key steps for stewardship in the future. The SFI Program submitted the following program description in order to highlight the forest industry's efforts to sustainably manage land and water resources:

"The Sustainable Forestry Initiative (SFI®) Program was initiated in 1994 by the American Forest and Paper Association (AF&PA). There are nine principles that guide this program. The first of these defines "sustainable forestry" as practicing a land stewardship ethic which provides for the needs of the present without compromising the ability of future generations to meet their own needs. Managed forests make a vital contribution to the quality of life by providing economic, environmental and social benefits. The SFI Program is a partnership among landowners, wood producers, contractors, and the companies that purchase wood.

The SFI Program in Alabama began with the establishment of the Alabama SFI Implementation Committee (SFI-IC). This organization is comprised of the AF&PA member companies with operations and/or forest land located in Alabama plus interested non-member companies and organizations. New SFI-IC members have been added through an AF&PA licensing program or as "supporting members", such as the Alabama Forestry Commission, The Department of Conservation, the Auburn School of Forestry and Wildlife Sciences, the Alabama Tree Farm Committee, the Alabama Forestry Association, the Alabama Wildlife Federation, the Alabama Loggers Council, etc.

The Alabama SFI-IC has four operating groups, Logger Education, Landowner Education, Public Outreach, and Inconsistent Practices to implement the SFI Program. The first three groups developed and implemented programs to educate loggers, wood dealers, wood procurement employees, landowners, and the general public as to what constitutes sustainable forestry. These efforts combined existing programs and resources and added new initiatives as needed. The Inconsistent Practices group implemented a "1-800" number. Anyone can call and get information about sustainable forestry practices or report what appears to be an inconsistent practice by a member company. Every reported inconsistent practice is investigated and the result reported back to the caller. In recent years, a website (www.alaforestry.org/sfi) alternative to the 1-800 # has been added where the same thing can be accomplished.

Logger Education in cooperation with the Alabama Loggers Council (ALC) adapted and expanded the existing Professional Logging Manager (PLM) course of instruction to meet the requirements of the SFI Program. This is a five day course of instruction, usually taken one day per week for five weeks at various locations around the State. To date, over 3000 loggers and other wood supply individuals have completed the PLM course. Once successfully completed, a logging contractor is listed on the Alabama Forestry Association website, www.alaforestry.org/frameset_plm.html. Annually, the logging contractor must complete six hours of appropriate continuing education to remain on the PLM list. AF&PA member companies have individually established wood purchasing guidelines which encourage their wood suppliers to have a current PLM designation. In 2005, There are approximately 2200 individuals on the PLM list. Logger Education and the ALC have also sponsored a series of Driver Education courses around Alabama, which are attended by Contractors and Drivers. These are taught by highway safety experts to raise the awareness of participants about defensive driving habits, as well as, the financial and emotional cost of accidents.

Landowner Education developed an excellent handbook on sustainable forestry. The member companies attempt to distribute these to all landowners from whom their wood originates. Through Forestry Extension at Auburn and Dr. Glenn Glover, the SFI Program supported the development of the Private Forest Management Team website (PFMT.org) which became an award winning and nationally recognized website for forestry information. This was primarily designed with private landowners in mind, but is packed with scientific and other information about forest and the practice of Forestry. Landowner Education is currently sponsoring the development of a "Forest Management" text similar to the "Wildlife Management" text published about five years ago. A diverse group of forest scientist is writing the chapters. Publication is anticipated in early 2006. Landowner Education also works with the Alabama Tree Farm Committee, the Alabama TREASURE Forest program, and other forest landowner initiatives to increase the knowledge base about sustainable forestry. The SFI-IC and Alabama Forestry Extension in Auburn also sponsor the Master Tree Farmer continuing education program in Alabama. This 21 hour program is offered annually in February and March by live satellite feed from Clemson University through Extension offices all over the Southeast. More than 200 landowners have participated in this program each year. A sister program, Master Wildlife Management, is offered one out of every three years from the same source and sponsored by the Alabama Wildlife Federation.

Public Outreach has been responsible for informing the general public about the SFI Program and more specifically opinion leaders such as State Legislators and other public officials. For two years, the SFI Program ran sponsorship ads on Alabama Public Radio during the "Morning Edition" and "All Things Considered" news programs. For several years, State legislators who deal with forestry issues and appropriate State Agency leaders have been provided a dinner program about SFI and sustainable forestry in Alabama.

Another component of the SFI Program is the Sustainable Forestry Initiative Standard (SFIS). AF&PA sponsored the development of this performance standard with the combined efforts of the member companies, forest scientists, public forestry leaders, and environmental organizations. The SFIS is managed by the Sustainable Forestry Board (SFB). The SFB is an independent multi-stakeholder body comprised of one-third AF&PA member companies, one-third national environmental organizations, and one third forest scientists and/or public agency leaders. Since its implementation in 1995, the SFIS evolved annually until the 2000-04 Standard was published. Now the 2005-09 revised Standard has just been released. The SFIS is a means by which member companies and licensees can measure and certify their performance in meeting the Principles of Sustainable Forestry. While voluntary conformance is an option, most member companies and licensees go through a third party audit of their operations to gain the most objective review of their performance. These audits are conducted by organizations that must be environmental management system (EMS) registrars and accredited by the American National Standards Institute (ANSI). To achieve certification the auditor must find the Company and each facility to be in full conformance with the SFI Standard. Third party certified facilities will go through a full re-certification audit every five years with periodic third party surveillance audits in the interim. Once third party certified, member company and licensees may apply to use the

SFI on product label as a visible sign the product was produced through a sustainable managed system.

Today there are over 120,000,000 acres of forest land in North America that are third party certified to the Sustainable Forestry Initiative Standard. For more information visit the following websites: http://www.afandpa.org/ and http://www.aboutsfb.org/."

There are numerous forestry BMPs being implemented throughout the Tombigbee River basin, including BMPs for abandoned logging road and in-use roads (and associated road banks), BMPs for reducing erosion from gullies and critical areas, and BMPs for protecting streams, streambanks, and wetlands in forested areas. Two excellent references for forestry BMPs are the AFC's[54] "*Alabama's Best Management Practices for Forestry*" and the GEPD's[55] "*Georgia's Best Management Practices for Forestry*". These forestry BMPs focus on (1) streamside management zones, (2) stream crossings, (3) forest roads, (4) timber harvesting, (5) reforestation and stand management, (6) forested wetland management, and (7) revegetation and stabilization. Brief descriptions of several examples of BMPs from these forestry manuals are provided to illustrate the common methods used to decrease erosion and nonpoint source pollution from forestry activities.

Seeding and Mulching
Seeding can be done in a number of ways. The most common method is with a farm tractor and a broadcast seeder. On steep or severely erosive sites, a hydroseeder can be used. Seed should be covered by pulling a section harrow, cultipacker, or brush. Mulch should be used on slopes over 5%, on sites where vegetation will establish slowly, or on deep sands or heavy clay soils. Mulch helps prevent erosion and allows vegetation to become established. Where there is a danger of mulch being blown or washed off-site, anchor it by running over the mulched area with a disk harrow. On steep slopes, anchor mulch with netting and tack-down staples or spray it with a tackifier.
Gully Stabilization
Gully stabilization should receive high priority during all land management activities. Actively eroding gully systems should be stabilized. The most effective way to reduce increases in sediment production and/or reduce the chance of reactivating the erosion process in healed gully systems is to avoid operating in them and maintain all existing vegetation. Site preparation, including herbicide and burning, should be avoided.

[54] Alabama Forestry Commission, published in January 1993.
[55] Georgia Environmental Protection Department, published in January 1999.

Roadside Erosion Control
Access roads are an essential part of any forest management operation and provide access for other activities on forestland. With proper planning, location, construction, and maintenance techniques, well-constructed access roads allow for productive operations and cause minimal soil and water quality impacts. However, poorly located, poorly constructed, or poorly maintained access roads, especially at stream crossings, can result in sediment reaching streams; changing stream flow patterns, degrading fish and aquatic organism habitat, and adversely affecting aesthetics.

<table>
<tr><th colspan="2">Streambank Stabilization</th></tr>
<tr><td colspan="2">Streambank erosion is a wearing-away of soil and rock that form streambanks. This process is accelerated by activities that increase stream flow and velocity, including stream channelization and straightening, the removal of streamside vegetation, and the construction of impervious surfaces.

Streambank stabilization and restoration utilizes inexpensive vegetative and bioengineering techniques to limit streambank erosion. The re-establishment of a functional floodplain by removal of accumulated streambank sediments will decrease streambank erosion and enhance the nutrient uptake capacity of the floodplain.

Photos courtesy of the Adams County Soil and Water Conservation District, Quincy, Illinois.</td></tr>
<tr><td>Before
</td><td>After
</td></tr>
</table>

The expected benefits from implementation of forestry BMPs are significant in this river basin. Without extensive water quality monitoring to measure the positive impacts of forestry BMPs on water quality, a model can be a useful tool. To illustrate this point, STEPL watershed modeling was utilized to estimate the reductions in sediment, nitrogen, and phosphorus loading from forested lands gained by the implementation of three *example* BMPs provided within the

STEPL model. *There are many other BMPs that are currently utilized in Alabama and could be incorporated into the model in the future to estimate their effectiveness to reduce sediment loads.* The three BMPs modeled here were chosen as example BMPs to demonstrate the use of the STEPL model as a way to quantify the potential to protect water quality. The economics of these modeled BMPs was not considered by the model or the plan. Therefore, these BMPs may not be the most economically feasible solution but they are actual BMPs that are used throughout the region. Five different levels of BMP implantation were considered: 0, 25, 50, 75, and 100 percent implementation to the number of acres of forested lands. The three BMPs that were modeled were selected from the "BMP Menu" within the STEPL software and are presented in here:

	Best Management Practices Load Reduction Efficiencies (%)		
	Sediment Loads	**Nitrogen Loads**	**Phosphorus Loads**
BMP Combination			
Site Preparation / Steep Slope Seeder / Transplant	81%	ND	ND
Site Preparation / Straw / Crimp Seed / Fertilizer / Transplant	95%	ND	ND
Site Preparation / Straw / Net / Seed / Fertilizer / Transplant	83%	ND	ND
ND *denotes not determined; nutrient load reductions based on nutrient content in the runoff.*			

These BMPs are combinations of different practices that can be employed during the site preparation phase of timber management, after harvest and before planting, or for road construction. The individual practices are listed in the box on the next page.[56] For example, **'Site Preparation / Straw / Net / Seed / Fertilizer / Transplant'** refers to any combination of site preparation practices where straw, jute net(s), and/or native plants are placed on areas to be seeded, especially steep slops, to reduce surface erosion from wind and rain. 'Fertilizer' characterizes the practice of fertilizing the area-of-concern to encourage rapid plant growth (ensuring soil stabilization in the root zone).

[56] STEPL Models and Documentation are available online through EPA Region 5 at: http://it.tetratech-ffx.com/stepl/

Soil Stabilization Measures (Forests Site Preparation)

The following measures can be used to stabilize soils for forest site preparation and road construction:

Measure	**Description**
Hydromulch	Mix of cellulose fiber and water sprayed on slope
Straw	Straw hand-placed evenly on slope
Crimping	Rolling the placed straw with a sheepfoot roller
Seeding	Spreading grasses, alfalfa, or other legumes using a hand spreader or water mix
Fertilizer	Application of nitrogen, phosphorus, and potassium by hand spreader or water mix
Transplanting	Hand transplantation of locally grown plant species
Net	Jute netting hand-placed on slope and pinned in place

The potential benefits from implementation of the three example BMPs are shown in - **Table 40** through **Table 42** for the targeted subwatersheds with the highest sediment loading from forested lands. The Bilbo Creek subwatershed in Washington County is the targeted subwatershed with the highest estimated sediment loading from forested lands. With the implementation of the site preparation BMP of "Straw/Crimp Seed/ Fertilizer/Transplant" on half the forestland acreage in the Washington County portion of this subwatershed, for instance, sediment loading is expected to be reduced from 151,300 tons per year to 79,400 tons per year (**Table 41**). Similar significant benefits in sediment, nitrogen, and phosphorus load reductions in other subwatersheds are shown in these tables. The BMP load reduction modeling results for all targeted subwatersheds are in **Appendix F**.

It should be pointed out that this modeling was done at a subwatershed scale, and the BMP being modeled is assumed to be implemented on a given percentage of the total acreage of that land use. An important consideration with this modeling is that not all forested land in the Tombigbee River Basin is commercially planted and harvested. These three site preparation BMPs are not applicable to non-commercially managed forests. As discussed previously, these modeled BMP load reductions are intended to illustrate how STEPL may be used to estimate load reductions from BMP implementation. They also provide guidance on the comparative benefits of implementing BMPs on different subwatersheds, and the relative load reduction benefits from different BMPs in different subwatersheds. ***The load reductions from forestry BMPs in this plan do not reflect actual situations in Alabama.*** However, future modeling could be adapted to estimate (quantify) the load reductions that the most popular BMPs used in Alabama.

Table 40. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Site Preparation/Steep Slope Seeder/Transplant" forestry BMPs for forested land. The subwatersheds with the highest sediment loading from forested land are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	*Acres of Forest Land*	*Percent of Acres Put in BMP*	**BMP - Forestry: Site Preparation/Steep Slope Seeder/Transplant**					
			Nitrogen Load from Forest Land - With Percent Reductions (lbs/year)		*Phosphorus Load from Forest Land - With Percent Reductions (lbs/year)*		*Sediment Load from Forest Land - With Percent Reductions (tons/year)*	
Bilbo Creek - Washington County	127,328	0%	525,737	0%	207,203	0%	151,266	0%
	31,832	25%	427,717	19%	169,465	18%	120,635	20%
	63,664	50%	329,696	37%	131,727	36%	90,003	41%
	95,496	75%	231,676	56%	93,989	55%	59,372	61%
	127,328	100%	133,655	75%	56,251	73%	28,741	81%
Upper Buttahatchee River - Marion County	107,295	0%	322,847	0%	128,328	0%	89,932	0%
	26,824	25%	264,571	18%	105,892	17%	71,721	20%
	53,648	50%	206,295	36%	83,456	35%	53,510	40%
	80,471	75%	148,019	54%	61,020	52%	35,298	61%
	107,295	100%	89,743	72%	38,583	70%	17,087	81%
Upper Sipsey Creek Marion County	36,419	0%	120,355	0%	47,706	0%	33,892	0%
	9,105	25%	98,394	18%	39,250	18%	27,029	20%
	18,210	50%	76,432	36%	30,795	35%	20,166	40%
	27,314	75%	54,470	55%	22,340	53%	13,302	61%
	36,419	100%	32,508	73%	13,884	71%	6,439	81%
Sipsey River - Fayette County	83,418	0%	110,211	0%	45,561	0%	25,937	0%
	20,855	25%	93,404	15%	39,090	14%	20,685	20%
	41,709	50%	76,597	30%	32,619	28%	15,432	41%
	62,564	75%	59,790	46%	26,149	43%	10,180	61%
	83,418	100%	42,982	61%	19,678	57%	4,928	81%
Buttahatchee River - Marion County	37,185	0%	80,393	0%	32,349	0%	21,325	0%
	9,296	25%	66,574	17%	27,028	16%	17,007	20%
	18,593	50%	52,756	34%	21,708	33%	12,689	40%
	27,889	75%	38,937	52%	16,388	49%	8,370	61%
	37,185	100%	25,118	69%	11,068	66%	4,052	81%

Table 41. Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Site Preparation/Straw/Crimp Seed/ Fertilizer/Transplant" forestry BMPs for forested land. The subwatersheds with the highest sediment loading from forested land are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.

SubWatershed	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Straw/Crimp Seed/ Fertilizer/Transplant					
			Nitrogen Load from Forest Land - With Percent Reductions (lbs/year)		Phosphorus Load from Forest Land - With Percent Reductions (lbs/year)		Sediment Load from Forest Land - With Percent Reductions (tons/year)	
Bilbo Creek - Washington County	127,328	0%	525,737	0%	207,203	0%	151,266	0%
	31,832	25%	410,775	22%	162,942	21%	115,341	24%
	63,664	50%	295,812	44%	118,682	43%	79,415	48%
	95,496	75%	180,850	66%	74,421	64%	43,489	71%
	127,328	100%	65,888	87%	30,161	85%	7,563	95%
Upper Buttahatchee River - Marion County	107,295	0%	322,847	0%	128,328	0%	89,932	0%
	26,824	25%	254,499	21%	102,014	21%	68,573	24%
	53,648	50%	186,150	42%	75,700	41%	47,214	47%
	80,471	75%	117,802	64%	49,386	62%	25,855	71%
	107,295	100%	49,453	85%	23,072	82%	4,497	95%
Upper Sipsey Creek Marion County	36,419	0%	120,355	0%	47,706	0%	33,892	0%
	9,105	25%	94,598	21%	37,789	21%	25,842	24%
	18,210	50%	68,840	43%	27,872	42%	17,793	47%
	27,314	75%	43,082	64%	17,955	62%	9,744	71%
	36,419	100%	17,324	86%	8,039	83%	1,695	95%
Sipsey River - Fayette County	83,418	0%	110,211	0%	45,561	0%	25,937	0%
	20,855	25%	90,499	18%	37,972	17%	19,777	24%
	41,709	50%	70,787	36%	30,382	33%	13,617	48%
	62,564	75%	51,075	54%	22,793	50%	7,457	71%
	83,418	100%	31,363	72%	15,204	67%	1,297	95%
Buttahatchee River - Marion County	37,185	0%	80,393	0%	32,349	0%	21,325	0%
	9,296	25%	64,185	20%	26,109	19%	16,260	24%
	18,593	50%	47,979	40%	19,869	39%	11,196	47%
	27,889	75%	31,771	60%	13,629	58%	6,131	71%
	37,185	100%	15,564	81%	7,390	77%	1,066	95%

Table 42. **Expected reductions in sediment, nitrogen, and phosphorus loading with implementation of "Site Preparation/Straw/ Net/Seed/Fertilizer/Transplant" forestry BMPs for forested land. The subwatersheds with the highest sediment loading from forested land are listed below. Other subwatershed load reduction modeling results are provided in Appendix F.**

SubWatershed	*Acres of Forest Land*	*Percent of Acres Put in BMP*	BMP - Forestry: Site Preparation/ Straw/Net/Seed/Fertilizer/Transplant					
			Nitrogen Load from Forest Land - With Percent Reductions (lbs/year)		*Phosphorus Load from Forest Land - With Percent Reductions (lbs/year)*		*Sediment Load from Forest Land - With Percent Reductions (tons/year)*	
Bilbo Creek - Washington County	127,328	0%	525,737	0%	207,203	0%	151,266	0%
	31,832	25%	425,296	19%	168,533	19%	119,878	21%
	63,664	50%	324,856	38%	129,863	37%	88,491	42%
	95,496	75%	224,415	57%	91,193	56%	57,103	62%
	127,328	100%	123,974	76%	52,524	75%	25,715	83%
Upper Buttahatchee River - Marion County	107,295	0%	322,847	0%	128,328	0%	89,932	0%
	26,824	25%	263,132	18%	105,338	18%	71,271	21%
	53,648	50%	203,417	37%	82,348	36%	52,610	41%
	80,471	75%	143,702	55%	59,358	54%	33,949	62%
	107,295	100%	83,987	74%	36,368	72%	15,288	83%
Upper Sipsey Creek Marion County	36,419	0%	120,355	0%	47,706	0%	33,892	0%
	9,105	25%	97,851	19%	39,042	18%	26,859	21%
	18,210	50%	75,348	37%	30,378	36%	19,827	41%
	27,314	75%	52,843	56%	21,713	54%	12,794	62%
	36,419	100%	30,339	75%	13,049	73%	5,762	83%
Sipsey River - Fayette County	83,418	0%	110,211	0%	45,561	0%	25,937	0%
	20,855	25%	92,989	16%	38,930	15%	20,555	21%
	41,709	50%	75,767	31%	32,300	29%	15,173	42%
	62,564	75%	58,545	47%	25,669	44%	9,791	62%
	83,418	100%	41,323	63%	19,039	58%	4,409	83%
Buttahatchee River - Marion County	37,185	0%	80,393	0%	32,349	0%	21,325	0%
	9,296	25%	66,233	18%	26,897	17%	16,900	21%
	18,593	50%	52,073	35%	21,446	34%	12,475	41%
	27,889	75%	37,913	53%	15,994	51%	8,050	62%
	37,185	100%	23,753	70%	10,542	67%	3,625	83%

GOAL 3: *Reduce nonpoint source pollution from aquaculture operations***.**
Concerns in the Basin: • management of effluent quality from ponds

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Continued implementation of aquaculture BMPs to reduce sediments in effluents from aquaculture ponds. Identify those ponds in greatest need of BMP enhancement.				
Aquaculture operators; AU, ACP, AFF, NRCS, SWCD, ACES	High priority, continuous, long term	Medium; private /public	quarterly for BMP condition	Acres of aquaculture ponds where BMPs are implemented
Continued implementation of aquaculture BMPs to improve water quality in aquaculture ponds and reduce the export of nutrients, organic matter, and low dissolved oxygen water from ponds.				
Aquaculture operators; AU, ACP, AFF, NRCS, SWCD, ACES	High priority, continuous, long term	Medium; private /public	quarterly for BMP condition	Acres of aquaculture ponds where BMPs are implemented
Educate aquaculture operators and owners concerning the importance of BMPs in reducing nonpoint source pollution associated with aquaculture operations.				
Aquaculture operators; AU, ACP, AFF, NRCS, SWCD, ACES	Medium priority, continuous, long term	Low; private /public	Annual progress reports	Number of outreach efforts or educational projects completed; number of operators engaged
Develop a program to recognize aquaculture operations that have exemplary management protocols and implemented BMPs, for their environmental stewardship.				
Aquaculture operators; AU, ACP, AFF, AFS, SWCD, ACWP	Medium priority, continuous, long term	Low; private /public	Annual progress reports	Number of operators recognized

How the Strategies Will Achieve the Goal.

Catfish farming in Alabama is concentrated primarily in the Blackland Prairie region. Soils in this region are high in clay content, resulting in runoff after significant storm events. The watersheds for catfish ponds are therefore important to water quality. The continued implementation of BMPs for aquaculture operations in the river basin is important for reducing sediment and nutrient loading in effluent from catfish farming ponds.

Aquaculture BMP implementation strategies are focused on commercial catfish farming operations and the effluent from the ponds. BMPs focus on the pond itself, how it is operated, and the watershed supplying surface water to the pond. Sediment and nutrients are the primary concern, although effluent high in organic matter and low in dissolved oxygen is also an issue. The use of therapeutic agents, water quality enhancers, and methods used for mortality management are also areas that have been examined for possible water quality impacts. The pond operations most in need of BMPs should be identified and targeted for implementation.

Strategies supportive of and critical to BMP implementation efforts are education, outreach, and recognition. Workshops and the distribution of educational materials are key efforts. Methods of recognition, and possible green certification, should be developed for aquaculture operations of outstanding stewardship. These efforts could be led by the Alabama Catfish Producers, a division of the Alabama Farmer's Federation, with input from watershed organizations and the support of the Alabama Clean Water Partnership.

Recognizing the importance of environmental stewardship, the Alabama Catfish Producers (ACP), a division of the Alabama Farmers Federation, contracted with Auburn University (AU) to conduct an environmental assessment of catfish farming in the state in 1997. The environmental assessment was completed in 1999, resulting in the proposed development of Best Management Practices (BMPs) for Alabama Channel Catfish Farming. Several agencies including AU, the Alabama Department of Environmental Management (ADEM), and the Natural Resources Conservation Service (NRCS), worked with the ACP in developing the BMPs. A first draft of the BMPs was completed in the spring of 2000. Several more drafts followed, with EPA recognizing the final version in September of 2002. The final version was published in a manual format in 2003.

The BMPs have been widely implemented by catfish producers in the state in an effort to minimize any potential environmental impacts from catfish production. The BMPs address various aspects catfish production including reducing runoff into ponds, managing ponds to reduce effluent volume, erosion control, feed management, and water quality. A list of aquaculture BMPs that can be implemented are shown below for aquaculture pond operations.

- Reducing storm runoff into ponds
- Managing ponds to reduce effluent volume
- Erosion control for watersheds and pond embankments
- Pond management to minimize erosion
- Control of erosion by effluents
- Settling basins and wetlands
- Feed management
- Pond fertilization
- Managing ponds to improve quality of overflow effluent
- Managing ponds to improve quality of draining effluent

These BMPs are described in 15 documents published by Auburn University and the NRCS titled "*Alabama Aquaculture Best Management Practices*". These BMPs can be found on the web at:http://efotg.nrcs.usda.gov/toc.aspx?CatID=213

Storm Inflow and Effluent Control

Storm runoff or overland flow enters aquaculture ponds. Excessive flow through ponds and increased discharge from the ponds can cause erosion of pond outlet structures and increase total suspended solids concentration in effluents.

Water flowing through ponds also flushes out products added to ponds to enhance water quality and fish production, e.g. fertilizer, lime, and salt, and lowers alkalinity. If phytoplankton abundance and nutrient concentrations are high in ponds at time of overflow, pollutant loads to streams can increase.

Managing Pond Water Quality

Catfish ponds can release effluents of poor water quality when they are intentionally drained. With proper pond design, most catfish ponds do not need to be drained, as fish can be harvested with seining. Proper pond design and seining should be promoted.

The proper positioning and use of pond aerators can induce water currents that can increase erosion of embankments and the pond bottom. Embankment vegetation should be promoted to reduce erosion.

Settling basins to improve the water quality of effluents should also be considered. This will improve the water quality of receiving streams.

GOAL 4: *Reduce nonpoint source pollution from dirt roads, road banks, and new road construction*
<u>Issues and Concerns in the Basin</u>: • Soil erosion from roads and road banks • Gully erosion

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Implement recommended repair and maintenance practices for unpaved roads that reduce erosion and protect water quality from roadways and road banks[57]. Address gullies that have developed from improper road drainage.				
County engineers, public works departments, local governments, ADOT, SWCD	High priority, continuous, long term	Medium; private/ public	Annual report on improvements	Miles of unpaved roads where improvements have been made
Implement repair practices to road banks on paved roads to reduce erosion and sediment loading to surface waters. Address gullies that have developed from improper road drainage.				
County engineers, public works departments, local governments, ADOT, SWCD, ADEM	Medium priority, continuous, long term	Medium; public	Annual report on improvements	Miles of paved roads where road bank improvements have been made
Implement recommended construction practices for new roadways and road banks, to reduce erosion and sediment loading to surface waters during construction and from the roads after they are operational.				
County engineers, public works departments, local governments, ADOT, home builders associations, HBAA, SWCD, NRCS	Medium priority, continuous, long term	Medium; private/ public	Annual report on improvements	Miles of new roads where enhanced efforts have been fostered through this program
Identify and rank unpaved roads in the subwatersheds that contribute most to sediment loading to surface waters.				
County engineers, public works departments, local governments, ADOT, SWCD	Medium priority, continuous, long term	Low; public	Periodic updates on ranking of needs in subwatersheds	Number of ranking reports over time

[57] The "Recommended Practices Manual - A Guideline for Maintenance and Service of Unpaved Roads" by the Choctawhatchee, Pea, and Yellow Rivers Watershed Management Authority (2000) is an excellent guide.

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Provide training workshops and educational programs on sediment and erosion control for county and city public works employees and others involved in building and maintaining roads.				
County engineers, public works departments, local governments, ADOT, ADEM	Medium priority, continuous, long term	Low; private /public	Annual progress reports	Number of outreach efforts, workshops, or educational projects completed; number of groups engaged

How the Strategies Will Achieve the Goal.

Improvement to roads and road banks, particularly unpaved roads, is both a necessary and important task for reducing sediment loading to surface waters in the river basin. According to the 1998 SWCD Assessments, sediment loading from unpaved roads and road banks comprised 6 percent of the total sediment loading in the Tombigbee River Basin. It was also a commonly cited resource issue in the Tombigbee River Basin, having been listed as an issue in 56 percent of the subwatersheds in the basin.

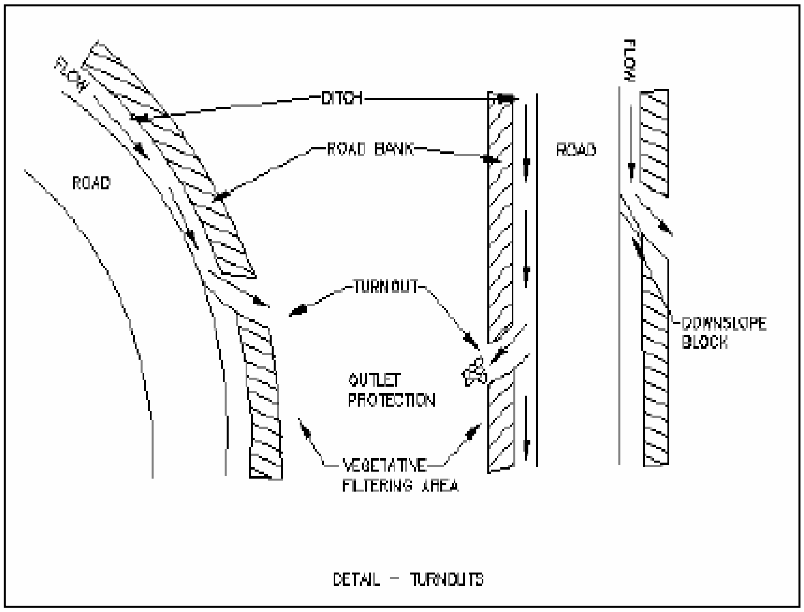
The implementation of BMPs and recommended maintenance practices for unpaved roads is the solution for reducing this load. The Choctawhatchee, Pea, and Yellow Rivers Watershed Management Authority has published an excellent guide for improving unpaved roads and reducing their environmental impacts. This guide is titled "Recommended Practices Manual - A Guideline for Maintenance and Service of Unpaved Roads", published in February 2000, is available at: http://www.adem.state.al.us/Education%20Div/Nonpoint%20Program/ResourceMat/unpavedtxtonly.pdf

Educational outreach and workshops are a key to promoting the implementation of these BMPs and practices. ADEM and ALDOT play an important role in working with the development (i.e., homebuilders, construction companies) community, such as the Homebuilder's Association of Alabama. Coordination with county engineers and governments is an important component of this outreach. As part of this outreach, the unpaved roads most in need of BMPs should be identified and targeted for implementation.

Road Bank Ditch Design and Maintenance

Efficient disposal of runoff from roads helps preserve roadbed and banks, and well-vegetated ditches slow, control, and filter runoff. This provides an opportunity for sediments to be removed from the runoff water before it enters surface waters.

A stable ditch will not become an erosion problem itself. Ideally, "turn-outs" (intermittent discharge points also called "tail ditches") will help maintain a stable velocity and the proper flow capacity within the road ditches by timely outleting water from them. This will help distribute roadway runoff and sediments over a larger vegetative filtering area.



Gully Stabilization and Road Drainage

Gullies are a specific form of severe erosion
typically caused by concentrated water flow on erosive soils. Once formed, gullies grow with time and continue down cutting until resistant material is reached, expanding laterally as they deepen.

Gullies often form at the outlet of culverts or cross-drains at roads, due to the concentrated flows and relatively fast water velocities. Also, gullies can form upslope of culvert pipes if the pipe is set below the elevation.

Stabilization of gullies typically requires removing or reducing the source of water flowing through the gully and refilling the gully with dikes, or small dams, built at specific intervals along the gully.

GOAL 5: *Reduce pollution from urban and residential areas.*
<u>Issues and Concerns in the Basin</u>: • Septic tank and sewage treatment nutrient loading and pathogens • Soil erosion from new road construction • Soil erosion from land clearing and construction activities • Sediment loading from urban land development • Stormwater runoff – pathogens, bacteria and toxics

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Implement urban BMPs and environmentally friendly stormwater management policies to reduce stormwater runoff, including wetland treatment approaches. BMPs and management strategies should focus on reducing the quantity and improving the quality of stormwater runoff.				
Municipal and county public works, ADEM, ACWP, local government, HBAA, SWCD, NRCS, ACES	Medium priority, continuous, long-term	High, public/ private	Annual report on progress	Number of urban BMP projects, number of enhanced policies, number of innovative approaches implemented
Coordinate local urban BMP demonstration projects and promote their environmental enhancements to citizens and the construction industry as appropriate.				
Municipal public works, ACWP, ADEM, HBAA, NRCS, SWCD, ACES, ANEMO, AAGC	Medium priority, continuous, long-term	Medium to high, private/ public	Annual report on progress	Number of urban BMP demonstration projects
Encourage and enforce ordinances that reduce surface runoff and wetlands destruction from land clearing activities during new development construction.				
Local governments, ADEM, ACOE, SWCD, HBAA	Medium priority, continuous, long-term	Low to medium, public	Annual report on progress	Number and/or location of construction ordinances addressed

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Implement recommended construction practices for new roadways and road banks, to reduce erosion and sediment loading to surface waters during construction and from the roads after they are operational.				
County engineers, public works departments, local governments, ADOT, home builders associations, HBAA, SWCD, NRCS, AAGC	Medium priority, continuous, long term	Medium; private/ public	Annual report on improvements	Miles of new roads where enhanced efforts have been fostered through this program
Promote outreach with commercial landscapers about ways to reduce nutrient pollution in surface runoff and ground water infiltration from fertilization.				
Commercial landscapers, ANLA, ATA, ACES, ADEM, NRCS, SWCD, ACWP	Medium to low priority, continuous, long-term	Low, private/ public	Annual report on progress	Number of outreach efforts, number of groups engaged
Promote the reduction in impervious cover in residential and commercial development areas.				
Municipal public works, local governments, local regional planning departments, ACWP, ADEM, HBAA, NRCS, SWCD, ACES, ANEMO, AAGC	Medium to low priority, continuous, long-term	Low, private/ public	Annual report on progress	Number of outreach efforts, number of groups engaged, acres of pervious cover installed (new and retrofit)
Conduct nonpoint source pollution and BMP workshops and educational programs for the construction industry.				
Developers, county planners, county engineers, public works departments, local governments, home builders associations, building and industry associations, HBAA, SWCD, ADEM, NRCS, ACES, AAGC	Medium to high priority, continuous, long term	Low to medium; private/ public	Annual report on progress	Number of workshops and outreach efforts, number of groups engaged
Recognize developers and contractors who are participating in the Clean Water Partnership and have implemented effective BMPs on their sites.				
Developers, county planners, municipalities, stormwater permit holders, home builders associations, building and industry associations, HBAA, SWCD, NRCS, ACWP, AAGC	Medium priority, continuous, long term	Low; private/ public	Annual report on progress	Number of developers and contractors recognized

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Develop and distribute a homeowners' informational packet regarding prevention of residential nonpoint source pollution. Promote the use of stormwater drain stencils in residential and urban areas of the watershed. Coordinate a Watershed-wide Amnesty Day event for residential hazardous waste disposal.				
SWCD, NRCS, ACES, ACWP, ADEM, ADAI, HBAA, watershed groups, realtors, utility companies, cities, municipalities	Low to medium to high priority, continuous, long term	Low to medium; private/ public	Annual report on progress	Number of workshops and outreach efforts, number of groups engaged
Identify areas with significant impacts such as overflows, failures, and nutrient loading, from onsite sewage disposal systems (OSDSs) and public-owned treatment works (POTWs). Promote improvements through enhanced requirements, monitoring, education and outreach, and incentives.				
Municipal and county public works, county health departments, ADPH, ADEM, AOWA, AOWB, SWCD, NRCS, ACES, ACWP, publicly-owned treatment works	Medium to high priority, continuous, long term	Medium to high; private/ public	Annual report on progress	Number of workshops and outreach efforts, number of groups engaged, number of OSDSs and POTWs inventoried/assessed
Implement advanced onsite sewage treatment system demonstration projects that enhance phosphorus removal and reduce nitrate pollution. Promote education and outreach through these demonstration projects.				
ADPH, AOWA, AOWB, Municipal and county public works, developers, ADEM, SWCD, NRCS, ACES	Medium to high priority, continuous, long term	High; private/ public	Annual report on progress	Number of workshops and outreach efforts, number of groups engaged, number of demonstration projects implemented
Educate homeowners and businesses on proper septic tank siting, installation, operation, and maintenance.				
Municipal and county public works, county health departments, ACWP, ASTA, AOWA, AOWB, SWCD, NRCS, ACES, ADPH, homebuilders	Medium to high priority, continuous, long term	Low, private/ public	Annual report on progress	Number of workshops and outreach efforts, number of homeowner and business groups engaged

How the Strategies Will Achieve the Goal.

Urban development can have significant impacts on surface waters in watersheds. The 1998 SWCD reports stated that sediment loading from urban development comprises 14 percent of the total sediment load in the Tombigbee River Basin, and is the third highest source of sediment in both the Upper and Lower Tombigbee basins. And as urban centers expand, effects from urban development should be considered. Environmentally sensitive or low-impact development (LID) is one means of protecting and enhancing hydrologic systems. LID practices aim to reduce floods in developed areas, to reduce storm water storage requirements, to improve the water quality of runoff, and to help maintain and restore fish habitat. When implemented properly, LID allows for increased growth with minimal environmental effects.

The matrix chart below borrowed from the Upper Tallapoosa Basin Management Plan provides recommended management strategies for dealing with nutrient, bacteria, sedimentation, and solid waste pollution typical of urban areas.[58]

Parameters	Riparian Buffers	Pervious Parking	Surface Sand Filter	Biosolids Reuse	Constructed Wetlands	Storm Drain Stenciling	Illicit Discharge Detection & Elimination
Nutrient enrichment	X		X	X			
Pathogen contamination	X	X	X		X		X
Siltation	X		X		X		X
Illegal Dumping						X	

Reductions in the loading of sediments, nutrients, pathogens, and toxics from developing urban areas should be made on several fronts. Stormwater management BMPs and management protocols should be pursued to reduce the quantity and improve the quality of stormwater runoff. Innovative stormwater management approaches, including the use of constructed and natural wetlands for treatment, need to be evaluated and implemented where feasible.

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58 CH2MHILL, 2005. *Tallapoosa River Basin Management Plan*. Prepared for the Alabama Clean Water Partnership, Montgomery, AL. pp. 4-26.

The construction and development industry should be diligent in utilizing BMPs in their land clearing, road building, and construction work, with education and enforcement being critical. Wetland impacts from construction activities should be avoided. The incorporation of pervious surfaces with new construction and retrofitting of impervious surfaces should be fostered. Many of these measures are being promoted on an industry-wide basis by the Home Builders Association of Alabama. They offer a 'Qualified Credentialed Inspection Program Certification (QCIP) to their members demonstrating an obtained level of knowledge about environmental best management practices for the development process. More information on QCIP can be found online at HBAA's website (http://www.hbaa.org/pdf/qci_brochure.pdf).

Demonstration projects promoting the incorporation of BMPs and green initiatives should promoted through education and outreach and implemented when possible. Builders that incorporate these initiatives should be recognized, perhaps by the Clean Water Partnership and watershed organizations. Similar frameworks exist in several areas nationwide. Workshops educating citizens, landowners, and the building and industry community on urban BMPs and construction BMPs are critical. Educating landscapers on the impacts of improper fertilization resulting in nutrient loading in both surface runoff and ground water infiltration is necessary.

Citizens and homeowners should be involved in promoting environmentally friendly solutions to common problems such as the disposal of hazardous wastes, water conservation, lawn care and fertilization, and septic system maintenance.

Nutrient and pathogen loading from improperly functioning onsite sewage disposal systems (OSDSs) and public-owned treatment works (POTWs) can have severe impacts on surface waters. The OSDSs and POTWs should be reviewed and assessed to identify areas with significant impacts such as overflows, failures, and nutrient loading are occurring. Improvements to these identified OSDSs and POTWs need to be pursued through enhanced requirements, monitoring, education and outreach, and incentives. Alternative onsite sewage treatment system demonstration projects should be pursued.

An example of alternative community-based sewage treatment systems is the decentralized wastewater system. This is a small, community-based system used in rural and developing areas to collect, treat, and reuse wastewater near the point of generation. Advantages include minimizing the infrastructure to conduct waste to a central treatment plan, decreasing solids handling, and limiting stream discharge. Most systems utilize an "effluent sewer" concept, which collects wastewater using a septic tank at each home to remove the solids, while the liquid waste is transported through small diameter sewer lines to a local treatment facility. Treatment is typically accomplished by simple and cost-effective attached growth biological processes. The treated effluent is dispersed or reused via in-ground methods. This method of wastewater management is very cost-effective, protects the public health, minimizes or eliminates stream discharges, and provides enhanced property values. Public or private utilities (certified by the ADPH) manage decentralized wastewater infrastructure, while in-ground dispersal or reuse of treated effluents is permitted by ADEM via underground injection control (UIC) permits for systems with capacities greater than 10,000 gpd and by ADPH for systems of lesser capacities.

Educational outreach and workshops are a key to promoting the implementation of these BMPs and practices. Coordination with municipal and county engineers, planners, and governments is an important component of this outreach. The epicenter of this type of educational activity is the Alabama Onsite Wastewater Association Training Center located in Livingston, AL. Overseen by the AOWA, this project started in 1997 under the auspices of the Alabama 319 Program and additional support of UWA and ALFA. Mandatory licensing for onsite sewage professionals became effective in Alabama in January 2000 and the Training Center opened for business in June of 2000. The Advanced Installers Licensing Class is the principal training offered. Over 1,200 have been trained including, installers, pumpers, and septic tank manufacturers; ADPH Staff; as well as, engineers, students, and the general public. The Training Center's Mission is, to install and demonstrate various advanced treatment systems; to provide education regarding installation, cost, maintenance and suitability of advanced systems to specific site conditions for system designers, installers, and government personnel; to bring about attitudinal and behavioral changes on the part of local and state policy makers and general public by educating them on the use of advanced systems; and, to serve as a regional and international demonstration and educational facility.

The AOWA is focused on several ongoing projects and developments including the following activities listed here:

- Alabama Onsite Wastewater Association Training Center
- Sumter County Soil and Water Conservation District Projects
- Local and Regional Wastewater Workshops
- UWA Projects
- Memorandum of Agreement signed between UWA and AOWA in January 2003.
- Agreement provides for UWA staff to oversee state onsite training and licensing programs in association with AOWA.
- Continuing Education programs to be conducted both at UWA and abroad.
- Basic Installer, Basic Pumper, and Advanced Licensing classes to be conducted at the Training Center, now known as the Alabama Onsite Wastewater Association Training Center (AOWATC).

Excellent reference materials are available that focus on urban and stormwater BMPs. The 2003 update of the "Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas" is an outstanding compendium of BMPs. Troy State University published a report in May 2000 titled "'How To' Guide for Stormwater and Urban Watershed Management". The City of Knoxville, Tennessee also published an extensive report on "Best Management Practices (BMP) Manual" through their Stormwater Engineering Division. These sources provide excellent background on BMPs and approaches that can be utilized to minimize sediment and water quality impacts from urban development.

GOAL 6: *Reduce nonpoint source pollution from mining activities.*
<u>Issues and Concerns in the Basin</u>: • Sediment loading from sand and gravel pits • Mining and excavation impacts on surface waters

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Promote and enforce BMPs for resource extraction operations, including sand and gravel mining, to reduce sediment runoff and water quality impacts.				
County engineers, ADEM, SWCD, NRCS, GSA, AMI, ACES	High priority, continuous, long-term	Medium private	Annual report on progress	Number of resource extraction operations engaged in these efforts, reduction in sediment loading and improvement in water quality
Conduct nonpoint source pollution and BMP workshops and educational programs for the resource extraction industry.				
Resource extraction operators, county engineers, ADEM, SWCD, NRCS, GSA, AMI, ACES	Medium priority, continuous, long term	Low; private/ public	Annual report on progress	Number of workshops and outreach efforts, number of operators engaged
Identify areas with significant sediment and water quality impacts from sand and gravel mining.				
Resource extraction operators, county engineers, ADEM, SWCD, NRCS, GSA, AMI, ACES	Medium priority, continuous, long term	Low; private/ public	Biennial updates of targeted areas	Biennial reports issued; number of targeted areas identified

<u>How the Strategies Will Achieve the Goal.</u>

Mining in Alabama is regulated under NPDES and must obtain a permit to discharge into Alabama's waters from ADEM. At the same time, resource extraction is a nonpoint source category as defined by the EPA, as it can contribute to the degradation of surface waters. Significant to the Tombigbee River Basin, resource extraction includes sand and gravel mining.

Contamination of streams can occur from sand and gravel mining at times of heavy or sustained rainfall, mining to close to streams, and from gravel washing processes. Good management practices need to be followed in order to keep nonpoint source pollution at a minimum.

Enforcement of the construction best management practices plan, as part of the permitting for these extraction operations, is critical to reducing surface water impacts. Periodic monitoring of receiving surface waters at these sites is critical to assure the BMPs are effective. Monitoring and enforcement should be coupled with education and outreach for resource extraction operators for an effective overall approach. Periodic review of surface water quality below all extraction operations should be completed, with the intent of identifying operations where further efforts need to be focused for reducing nonpoint source impacts.

GOAL 7: *Protect and restore aquatic habitat and aquatic species diversity, with a focus on fish and mussel species in Alabama.*
<u>Issues and Concerns in the Basin</u>: • Wetland and aquatic habitat destruction • Reduction in fish species diversity, such as the Alabama sturgeon • Reduction in mussel species diversity and mussel species losses

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Identify subwatersheds and stream segments with habitats of exceptional quality and high aquatic species diversity, and target parcels for acquisition or conservation projects.				
USFWS, ADCNR, ADEM, SWCD, NRCS, ACWP, ANHP, GSA, MDEQ, MDWFP, MSWCC	High priority, continuous, long term	Medium; public	Biennial report of rankings and priorities	Basinwide prioritizations of stream segments and habitats, supported by participants
Identify the specific causes for the loss of fish and mussel species diversity in targeted stream segments, and prioritize restoration and BMP projects to reduce those land use impacts.				
USFWS, ADCNR, ADEM, SWCD, NRCS, ACWP, ANHP, GSA, MDEQ, MDWFP, MSWCC, TTWDA, TTWDC, ACOE	High priority, continuous, long term	Medium; public	Biennial report of targeted streams, causes for diversity losses, and restoration and BMP projects	Basinwide prioritizations of targeted streams and projects, supported by participants
Coordinate efforts across Alabama and Mississippi, and coordinate efforts with federal agencies, to manage critical habitat for rare and endangered fish and mussel species. Develop special land use guidelines in these critical habitats for species protection through coordinated state and federal efforts.				
USFWS, ADCNR, ADEM, SWCD, NRCS, ACWP, ANHP, GSA, MDEQ, MDWFP, MSWCC, TTWDA, TTWDC, ACOE	High priority, continuous, long term	Medium; public	Biennial report of critical habitats and proposed land use regulations	Basinwide support by participants for the report; progress in implementation of land use regulations
Implement habitat restoration and BMP projects that will target specific causes for the loss of fish and mussel species diversity in the priority stream. Identify funding programs and mechanisms that support these projects.				
USFWS, ANHP, ADCNR, SWCD, NRCS, ADEM, AWF, TNC, ACWP, GSA, MDEQ, MDWFP, MSWCC, TTWDA, TTWDC, ACOE	High priority, continuous, long term	High; public/ private	Annual report of restoration and protection progress; monitoring of fish and mussel species	Acres of habitat protected; acres of habitat restored; increases in species diversity metrics

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Pursue habitat protection initiatives through acquisition and easement mechanisms, utilizing grant and assistance programs for these purposes. These mechanisms include Environmental Quality Incentives Program (EQIP), Wetlands Reserve Program (WRP), Conservation Reserve Program (WHIP), Forever Wild and Partners for Wildlife (FWS).				
USFWS, ANHP, ADCNR, SWCD, NRCS, Forever Wild, Land Trusts, MDWFP, MSWCC, ACWP	High priority, continuous, long term	High to medium; public/ private	Annual report of habitat protection progress	Acres of habitat protected
Review ACOE permit applications for wetland filling & dredging permits in the watershed.				
ACOE, watershed groups, ACWP, ANHP, TNC	Medium priority, continuous, long term	Low; public /private	Biennial report of progress	Number of applications reviewed

<u>How the Strategies Will Achieve the Goal.</u>

Alabama’s diversity of freshwater mussels is greater than anywhere else in the world, with 59% of the species of freshwater mussel species in North America reported from Alabama. Fish species, such as the Alabama sturgeon, has disappeared from approximately 85% of its historic range in the Alabama and Tombigbee rivers and their major tributaries in Alabama and Mississippi. These losses in species diversity and in rare and endangered species have been attributed to aquatic habitat alterations, including flow modifications from dams and navigation projects, river channel dredging and channelization, sand and gravel mining, the loss of riparian buffers, access of livestock to streams, and other nonpoint sediment sources.

Habitat restoration and critical habitat protection are essential to the long-term ecological value of the river basin. Knowing what areas are most in need of restoration, and those with the highest ecological value for protection, is the critical first step. These prioritizations might be developed on a subwatershed basis, using the TNC *Biological and Conservation Database* in concert with the *Recovery Plan for the Mobile River Basin Aquatic Ecosystem* and specific mussel recovery plans developed by the USFWS. These efforts should be coordinated with the ADCNR's and the MDWFP’s wildlife conservation plans for consistency.

Restoration and protection projects identified within the prioritization plan should be undertaken, and utilizing the numerous funding mechanisms that exist. Federal and state agencies, NGOs, and private foundations often provide funding for these projects. The NRCS has several funding programs that assist landowners in putting land into conservation easements.

Review of selected COE dredge and fill permit applications in the river basin would serve to provide an extra assessment of potential impacts to habitats. This independent review would function to provide an extra measure of protection to wetlands in the basin.[59]

[59] Any person or agency who would like to review ACOE permit applications can call or write the ACOE and request that their name be placed on the ACOE's mailing list to receive copies of public notices for both private and public actions on wetland filling and dredging permits.

GOAL 8: *Decrease water quality impacts such as in-stream bank erosion, littering, and chemical pollution by increasing awareness and improving river recreation management***.**

Issues and Concerns in the Basin:

- River traffic management
- Dumping trash from boats
- Boat ramp abuse and littering
- Improper disposal of animal carcasses

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Work with the ADCNR, ACOE, the Alabama Marine Police Division, U.S. Army Corps of Engineers and the U.S. Coast Guard to identify ways to better manage river traffic on the Tombigbee River and at boat ramps.				
ADCNR, ACOE, USCG, MPD, ACWP, HOBOs, and boat ramp operators	Medium priority, continuous, long term	Low; public	Annual progress reports	Reduction in complaints
Work with the ADCNR, ADEM, the Alabama Marine Police Division, the U.S. Coast Guard, and watershed groups to reduce pollution from recreational boaters.				
ADCNR, CG, ACOE, MPD, ACWP, HOBOS, and boat ramp operators	Medium priority, continuous, long term	Low; public	Annual progress reports	Reduction in complaints
Work with the ADCNR, ADEM, and the Alabama Wildlife Federation to education hunters about the potential water quality concerns and the improper disposal of animal carcasess.				
ADCNR, ADEM, AWF	Medium priority, continuous, long term	Low; Public and private	Annual progress reports	Informational materials created; presentations performed

How the Strategies Will Achieve the Goal.

Boaters associations, hunter organizations, watershed associations, and river recreation users need to work together, and with the Alabama Marine Police, ACOE and the U.S. Coast Guard, to identify specific issues and problem areas. Stakeholder concerns have centered on the erosion of streambanks due to boat traffic on the river and at boat ramps. A formalized framework to address these concerns may need to be established via a committee or working group, with representation of those with concerns and those that can do something about them. It is likely that stepped up patrols and enhanced boater education will play key roles as solutions. The use and expansion of pump-out facilities for boaters should be promoted, and can be aided by funding from the Clean Vessel Act.

- A Marina on the Tombigbee River

GOAL 9: *Promote resource education and outreach, and watershed awareness of issues in the river basin. Promote volunteer activities throughout the watershed.*

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Promote participation and membership in regional watershed groups within the river basin, and establish watershed associations for key subwatersheds.				
ACWP, ADEM, watershed groups, ARA, AWWA	High priority, continuous, long term	Low; public	Annual progress reports	Number of members or participants; number of watershed groups
Promote the implementation of the Tombigbee River Basin Plan, once approved, through public meetings at key regional locations in the river basin. Use to further participation and membership in watershed groups (strategy listed above).				
ACWP, ADEM, watershed groups	High priority, continuous, long term	Low; public	Annual progress reports	Number of meetings and workshops, number of members or participants
Expand educational programs for K-12 students on watershed awareness and environmental concerns.				
ACWP, ADEM, AFA, Legacy, AFF, watershed groups, schools	Medium priority, continuous, long term	Low; public	Annual progress reports	Number of educational programs and schools involved
Promote river clean-ups throughout the river basin.				
ACWP, ADEM, watershed groups, ARA, AWWA, SWCD, APPC, ACOE, TTWDA, APPCO	Medium priority, continuous, long term	Low; public	Annual progress reports	Number of clean-ups held; number of different locations where held
Develop web-based and printed media coverage, and utilize the news media, to promote watershed events and implementation progress.				
ACWP, ADEM, watershed groups, ARA, AWWA, news outlets	High priority, continuous, long term	Low; public	Annual progress reports	Number of events and publicized mechanisms utilized for promotion

How the Strategies Will Achieve the Goal.

The successful implementation of this river basin plan is directly dependent on the involvement and commitment of watershed stakeholders and all the agencies and organizations identified in this plan. The first two strategies listed on the previous page are critical for moving this plan forward to implementation. Significant outreach efforts need to be made in order to get greater involvement of watershed stakeholders in organized watershed associations. Regional and subwatershed organizations that are functionally active are an immediate need.

It is recommended that additional grant monies be identified, secured and utilized to foster the establishment and participation in these regional watershed groups. Strong leadership will need to be identified. All the strategies identified for this goal are important, and efforts need to be focused from the beginning to develop momentum for implementing the plan.

GOAL 10: *Promote watershed management technology transfer across industries and Alabama and Mississippi with regards to the Tombigbee Basin. Coordinate watershed planning, restoration and conservation efforts between Alabama and Mississippi.*

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Promote watershed management technology transfer across industries, and promote the integration of watershed management techniques in restoration projects.				
ACWP, ADEM, agencies/organizations representing land use industries, MDEQ, watershed groups, ADCNR, MDWFP, SWCDs, NRCS	High priority, continuous, long term	Low; public	Annual progress reports on transfer and integration efforts	Number of meetings and workshops, number of participants, number of industries represented
Coordinate watershed planning, restoration, and conservation projects between Alabama and Mississippi, recognizing hydrologic connections and impacts on restoration success.				
ACWP, ADEM, MDEQ, ADCNR, MDWFP, watershed groups, SWCDs, USFWS, FS, TNC, ANHP	Medium priority, continuous, long term	Low; public	Annual progress reports on coordination efforts	Number of coordination meetings and workshops, number of coordinated projects
Coordinate water quality and biological monitoring between Alabama and Mississippi for the Tombigbee River Basin, particularly with respect to Clean Water Act Section 303 activities.				
ADEM, ACWP, MDEQ, watershed groups, USGS, GSA	Medium priority, continuous, long term	Low; public	Annual progress reports on coordination efforts	Number of coordination meetings and workshops, number of coordinated monitoring programs
Coordinate Clean Water Act Section 303(d) TMDL activities between Alabama and Mississippi on streams where impairment impacts potentially cross the state line. Joint TMDL development and implementation should be considered in this river basin.				
ADEM, MDEQ, USEPA, watershed groups, ACWP	Medium priority, continuous, long term	Low; public	Annual progress reports on coordination efforts	Number of coordination meetings and workshops, number of coordinated monitoring programs

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Promote and publicize the coordination efforts between Alabama and Mississippi in the Tombigbee River Basin. Develop web-based and printed media coverage, and utilize the news media, to promote these coordinated efforts at restoration and conservation.				
ACWP, ADEM, MDEQ, watershed groups, ARA, AWWA, news outlets	Medium priority, continuous, long term	Low; public	Annual progress reports on promotion efforts	Number of events and publicized mechanisms utilized for promotion

<u>How the Strategies Will Achieve the Goal.</u>

The successful implementation of this river basin plan is directly dependent on the involvement and commitment of watershed stakeholders and all the agencies and organizations identified in this plan. The first two strategies listed above are critical for moving this plan forward to implementation. Significant outreach efforts should be made to get greater involvement of watershed stakeholders in organized watershed associations. Regional and subwatershed organizations that are functionally active are an immediate need.

It is recommended that additional grant monies be secured and utilized to foster the establishment and participation in these regional watershed groups. Strong leadership will need to be identified. All the strategies identified for this goal are important, and efforts need to be focused from the beginning to develop momentum for implementing the plan.

GOAL 11: *Continue to track resource trends in the river basin to measure progress in restoration and protection efforts, and identify new resource concerns and issues.*

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Support and expand citizen monitoring programs, being sure that targeted subwatersheds are included in monitoring programs.				
ACWP, ADEM, watershed groups, schools, ARA, AWWA	High priority, continuous, long term	Low; public	Annual progress reports	Number of sites monitored; number of citizen participants
Support agency, local government, and university efforts for monitoring streams in the river basin, and encourage these monitoring efforts to include post BMP implementation monitoring.				
ACWP, ADEM, watershed groups, ARA, AWWA, USGS, GSA, universities	High priority, continuous, long term	Low; public	Annual progress reports	Number of sites monitored; number of monitoring programs
Incorporate monitoring results and summaries in watershed progress reports as this plan is implemented. Utilize the progress identified with monitoring results to promote the successes of plan implementation.				
ACWP, ADEM, watershed groups, ARA, AWWA, USGS, universities, GSA	High priority, continuous, long term	Low; public	Annual implementation progress reports	Number of plan implementation projects supported by monitoring data

<u>How the Strategies Will Achieve the Goal.</u>

Water quality monitoring is an important component in determining whether goals are being achieved. While the performance measures listed in this plan are important measures for determining implementation success, restoration success is measured in the field with data. Citizen monitoring is an essential component of this monitoring, as there is seldom sufficient funding for state and federal agencies to accomplish all the monitoring that is needed. The river basin watershed groups and associations should work closely with both agencies and citizen monitoring groups to assure that the most important sites are being covered.

As BMPs are being implemented, citizen and agency monitoring should be performed over the long term to gauge the effectiveness of the BMPs at a site or in a subwatershed. Many BMPs require a long time frame to fully realize nutrient and sediment reduction benefits. Further, it may take a critical number of sites in a subwatershed where BMPs are implemented before water quality improvements can be observed in field data. Monitoring commitments need to be established over the long-term. It is therefore important that the targeted watersheds are included in monitoring plans.

Finally, successes in implementing the plan will build upon themselves if those successes are publicized. It is important to demonstrate the successes with documentation of the implementation activities, and with the successes as evidenced with field data.

GOAL 12: *Develop a framework in the river basin to implement the projects and tasks in this plan.*

Recommended Strategies to Achieve the Goal:

Lead Agency or Group	Timeframe	Level of Funding	Monitoring Need	Performance Indicator
Promote the implementation of the Tombigbee River Basin Plan, once approved, through public meetings at key regional locations in the river basin. Use to further participation and membership in watershed groups.				
ACWP, ADEM, watershed groups, ARA, AWWA	High priority, continuous, long term	Low; public	Annual progress reports	Number of members or participants; number of watershed groups
Promote participation and membership in regional watershed groups within the river basin, and establish watershed associations for key subwatersheds.				
ACWP, ADEM, watershed groups, ARA, AWWA	High priority, continuous, long term	Low; public	Annual progress reports	Number of members or participants; number of watershed groups
Coordinate with federal, state and local agencies to promote the implementation of the plan through education, outreach, and funding opportunities for projects.				
ACWP, ADEM, watershed groups, ARA, AWWA, EPA, SWCD, NRCS, USFWS, ACOE, AFA, Legacy	High priority, continuous, long term	Low; public	Annual progress reports	Number of members or participants; number of watershed groups

How the Strategies Will Achieve the Goal.

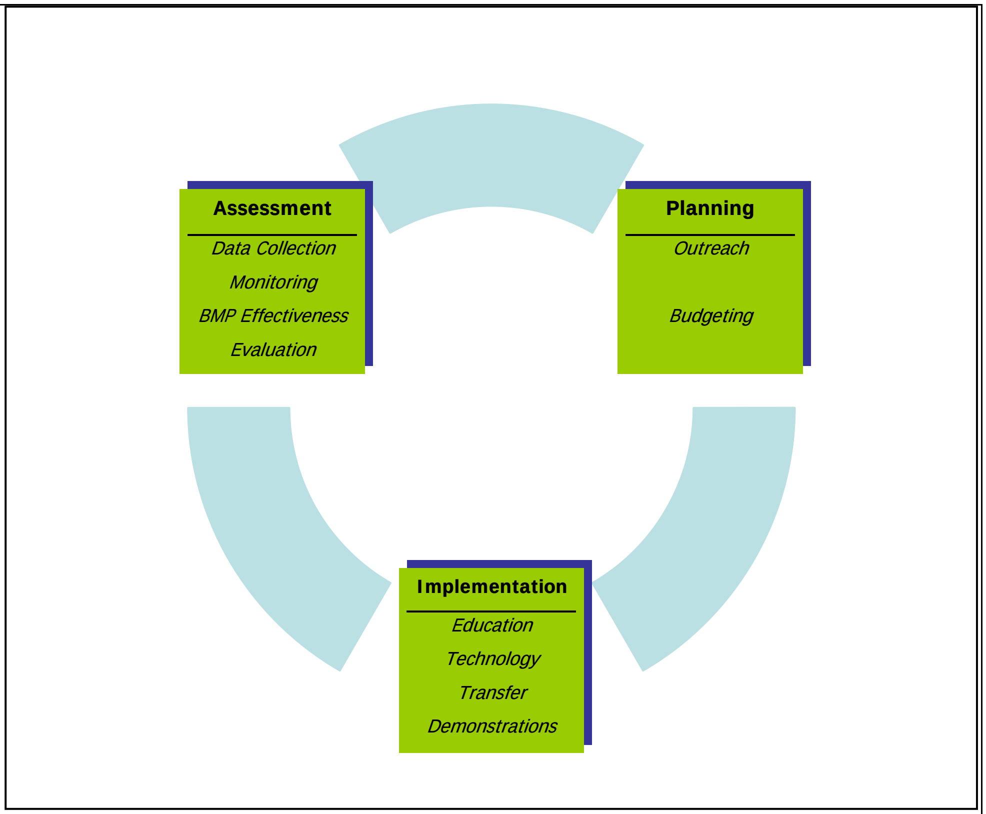
As discussed under the education and outreach goal, the successful implementation of this river basin plan is directly dependent on the involvement and commitment of watershed stakeholders and all the agencies and organizations identified in this plan. The strategies listed above are critical to moving this plan forward to implementation. Significant outreach efforts should be made to get greater involvement of watershed stakeholders in an organized framework. Regional and subwatershed organizations that are functionally active are an immediate need.

As mentioned previously, it is recommended that additional grant monies be secured and utilized to foster the establishment and participation in these regional watershed groups. Strong leadership will need to be identified. All the strategies identified for this goal are important, and efforts need to be focused from the beginning to develop momentum for implementing the plan.

The next section of this river basin plan focuses on implementation opportunities, with particular emphasis on funding sources. As with all plans, it takes committed people and funding for goals to come to fruition.

8.0 *IMPLEMENTATION*

Implementation of this Basin Management Plan for the Tombigbee River requires, among other things, funding, time, motivated people, and eventually, another round of planning. The process of creating this plan began with an assessment of current conditions. Planning considers the information and data from the assessment phase in order to map out management measures to address key basin issues. Implementation occurs when financial and human resources are targeted to complete planned actions to achieve specific goals and objectives as outlined by the planning phase. Once implementation occurs, an evaluation of the impacts the management measures have on the basin signals the beginning of another round of assessment. The assessment leads to plan changes and consequently, changes to implementation, and so on.



Continuous Planning Process for Basin Management

This iterative process of **ASSESSMENT – PLANNING – IMPLEMENTATION** is characteristic of the *continuous planning process* that constitutes basin management planning. This basin management plan is not an end, it is more of a beginning. This plan should be revisited annually to check progress according to the plan's milestones. In general, there are several strategic targets that constitute key implementation steps for this basin management plan. These strategic ‘next steps’ are discussed below and are followed by references to funding options to support implementation.

8.1 Strategic Next Steps for Basin Management Plan Implementation

- ***Adopt and distribute the Tombigbee River Basin Management Plan.*** The basin management plan should be used as an outreach and education tool, becoming a central planning and implementation document for the basin.

- ***Expand stakeholder involvement in the subbasins and Alabama-Tombigbee Steering Committee.*** These steps may help the ACWP and the Alabama-Tombigbee Steering Committee increase the number of its participants over time.
    - Plan stakeholder meetings based on the convenience of the target participants. Consider these following factors: Time of day vs. schedule of target audience; travel time/distance to meeting.
    - Avoid the “just another meeting” syndrome by building meetings around a provocative program including special speakers/presentations, actual work assignments, etc. Always meet with a purpose!
    - Work with stakeholders to establish the most effective meeting frequency.
    - Find local sponsorship of the meetings that will provide a space for the gathering and refreshments for the participants. Are their local businesses or organizations that have a strong and/or influential following in the community that will attract a crowd?
    - Build off ongoing efforts that have momentum. The Mississippi Chapter of The Nature Conservancy, Big Black – Tombigbee – Tennessee River Basins Group, and the Natural Resources Initiative of Northern Mississippi represent established efforts to work across state borders to more effectively manage the Tombigbee River Basin.
    - Instead of forming a new group, try to fit a watershed sub-group or standing agenda item into an existing business, social or faith-based group. Unless there is a groundswell of activity, then it will be difficult to sustain a group on a singular “watershed” based agenda.

- Coordinate the distribution of information through the regional or state headquarters of the many organizations that send representatives to the subbasin meetings. Quarterly meetings focusing on grassroots issues and implementation could occur in Demopolis, Livingston, Hamilton or other central population centers. Organizational representatives may be charged with the distribution of information, documents, etc.

- ***Focus state and federal grant funding on targeted sub-watersheds.*** This plan sets priorities for action in that the modeling provides a scientific basis to direct management activities.

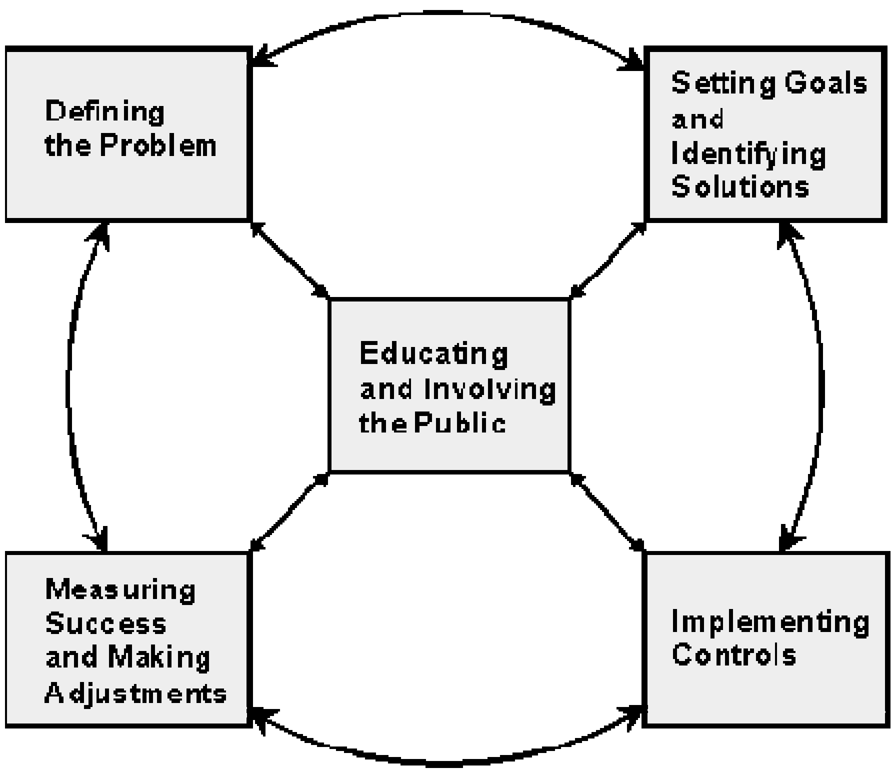
- ***Increase the number of water quality monitoring sites throughout the Basin.*** The most effective way to get people involved in managing the basin *and* in collecting much-needed water quality data is to encourage involvement in Alabama Water Watch. Additional state and federal governmental resources for staff to expand existing monitoring is also imperative. Lastly, when private landowners can play a role, they, too, should be asked to participate in assessing local waters. The Category 2 and 3 waters shall be the top priority for these efforts.

- ***Teach the Watershed Language***. The value of educating people about water quality issues and watershed protection is beyond limit. At some point in the learning process people realize that they play a part in the management process. Water Festivals, television-based watershed education ("Storm Team Reports"), and classroom programs are necessary parts of a comprehensive watershed education campaign.

- ***Focus conservation and restoration efforts on threatened and endangered aquatic ecosystems.*** This Plan was written to be consistent with the goals and objectives of the *Recovery Plan for the Mobile River Basin Aquatic Ecosystem*. There are several stream segments delineated in the Basin that harbor imperiled species. These segments are priorities for protection.

8.2 Steps to Plan Implementation

Successful implementation of watershed projects requires coordination and commitment. The US EPA has identified a simple strategy for coordinating a watershed project. The following schematic illustrates the interactions of the principle elements in the implementation of a successful watershed project. A brief description of the actions associated with these elements is provided below. Additional information on these elements, or the process in general are available on the EPA website (http://www.epa.gov/owow/watershed/focus/).



Source: US EPA. Watershed Protection: A Project

The EPA strategy includes the basic elements of:

- **Build Partnerships** – Identify, educate and establish a framework of stakeholders; this network will serve to provide public and private support for watershed projects. The most effective partners are vested in maintaining or improving the condition of the resources in the watershed.

- **Define Problems –** Assess baseline watershed conditions; understanding the current condition of watershed resources will help identify problems and create a baseline index for assessing project success.
- **Set Goals and Identifying Action Items** - Project objectives and measures of success should be identified. Projects and actions aimed at achieving these objectives can then be developed or selected.
- **Implementation, Assessment and Adjustment –**
  - *Funding* - Watershed programs and projects may be planned and implemented using funding from a variety of federal and non-federal sources. Funding awards may be contingent on additional match funding or based on the proposed activities relation to funding program objectives. Table 8.2 provides a brief listing and description of funding options for watershed protection and management projects and programs in the Alabama River watershed.
  - *Incentives and Commitments* - Often times project actions will require the modification of activities in the private and/or public sector, which can prove to be substantial obstacles in the implementation process. Providing incentives and receiving good faith commitments to make these adjustments are common methods employed to achieve successful implementation.
  - *Adaptive Management* – It is important for watershed projects to identify a measure of success before implementing actions. These measures are then used to refine future actions and have proven to be invaluable lessons in project effectiveness. This approach is commonly referred to as "adaptive management", due to its constant assessment and adjustment to resource responses.

Without financial resources, many of the recommendations in this plan can not be implemented. On the following pages a summary table (Table 43) of funding options is provided that will serve as reference to move this plan forward. Many of these sources are already at work in the basin. Several others will require further research and coordination on behalf of the ACWP to obtain these funds and direct them to plan implementation.

Table 43. Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)

Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Federal				
Section 319	Clean Water Act non-point source implementation competitive grant program funding; education and outreach, technical assistance, BMP demonstration projects, water quality monitoring, and watershed protection projects.	40% non-federal match	Phase I and II permitted areas and confined animal feeding operations generally not eligible.	www.adem.state.al.us
Hazard Mitigation Grant Program	Provides financial assistance to state and local governments for projects that reduce or eliminate the long-term risk to human life and property from the effects of natural hazards.	75% Federal 25% Local	State and Local Governments	Federal Emergency Management Agency (FEMA)
Tea3 Funds - Intermodel Surface Transportation Efficiency Act (ISTEA) and Transportation Equity ACT (TEA)	Provides funding for transportation enhancements including; wetland mitigation, highway runoff pollution control, and roadside landscaping.	80% Federal 20% Local	Local Governments, profit and non-profit entities, and colleges and universities	State DOT
Environmental Quality Incentive Program (EQIP)	Provides technical assistance, cost-sharing, financial incentives, and producer education related to soil, water, air, wildlife and other related natural resource concerns.	40% property owner cost share	Alabama ranchers and farmers	Local NRCS

Table 43 continued - Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)				
Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Section 206 - Aquatic Ecosystem Restoration	Provides funding to improve, protect, and restore aquatic ecosystems including streambank restoration and planning and construction activities.	35% non-federal match	Local governments	http://www.sam.usace.army.mil
Community Development Block Grant Program (CDBG)	Provides funding to develop viable affordable communities. Eligible activities include; construction or reconstruction of water and sewer facilities, management infrastructure development or improvement, public works improvement, property acquisition, or to support feasibility studies related to development.	Match Required	Local governments in non-entitlement areas	ADECA Office of Community Services 334-242-5100
Direct Federal Funding	Supports projects with national significance.	NA	Open	State Representative or Senator
Direct State Funding	Supports projects with state significance.	NA	Open	Local Representative
Grant Programs				
National Fish and Wildlife Foundation (NFWF)	Awards challenge grants for natural resource conservation projects.			http://www.nfwf.org.
Southern Rivers Conservation Initiative	Provides funding to restore and enhance habitat in southern states, including; stream restoration, freshwater mussel conservation, and management of imperiled fishes. Projects must demonstrate a community-based approach, benefit water quality, and involve specific on-the-ground activities.			http://www.nfwf.org/programs/grant_apply.htm.

Table 43 continued - Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)

Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Flood Hazard Mitigation and Riverine Ecosystem Restoration Program	Also known as Challenge 21, this program focuses on identifying sustainable solutions to flooding problems.			http://www.hq.usace.army.mil/cepa/pubs/cf-challenge21.htm.
Environmental Education Grants	Supports environmental education projects that enhance the public's awareness, knowledge, and skills to make informed decisions that affect environmental quality.			http://www.epa.gov/enviroed/grants.html
Watershed Protection and Flood Prevention Program	Program provides technical and financial assistance to address resource and related economic problems on a watershed basis.			Local NRCS
Water Quality Cooperative Agreements	Support the creation of unique and new approaches to meeting sanitary sewer, and combined sewer outflows, biosolids, and pretreatment requirements, as well as enhancing state capabilities.			http://www.epa.gov/owm/cwfinance/waterquality.htm.
Watershed Assistance Grants	Supports organizational development and capacity building for watershed partnerships with diverse membership.			http://cfpub.epa.gov/fedfund/program.cfm?prog_num=63.
Five-Star Restoration Program	Competitive projects will have a strong on-the-ground habitat restoration component that provides long-term ecological, educational, and/or socioeconomic benefits to the people and their community.			http://www.epa.gov/owow/wetlands/restore/5star.
U.S. Fish and Wildlife Service Cooperative Endangered Species Conservation Fund	Assists in the development of programs for the conservation of endangered and threatened species. There are four program areas; Conservation Grants, Habitat Conservation Planning Assistance Grants, Habitat Conservation Plan Land Acquisition Grants, and Recovery Land Acquisition Grants.		States and territories that have entered into cooperative agreements with the FWS	http://endangered.fws.gov/grants/section6/index.html.

Table 43 continued - Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)

Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Urban and Community Forestry Challenge Cost-share Grant Program	Grant awards are based on recommendations by The National Urban and Community Forestry Advisory Council.			http://www.treelink.org/nucfac/ccs_info.htm
Legacy, Inc., Partners in Environmental Education	Statewide organization that provides grants to support programs that aim to help educate people to become environmentally responsible citizens.	$10,000	No match required	http://www.legacyenved.org.
Private Foundation Grants and Awards	Private foundations are potential sources of funding to support watershed management activities. Many private foundations post grant guidelines on websites. Two online resources for researching sources of potential funding are provided in the contact information.			http://www.fdncenter.org http://www. foundations. org
Other				
Membership Drives	Membership drives can provide a stable source of income to support watershed management programs.			
Donations	Donations can be a major source of revenue for supporting watershed activities, and can be received in a variety of ways including: individual donations, family foundations, community foundations, corporations, federated funds, and church and civic groups.			
User Fees, Taxes, and Assessments	Taxes are used to fund activities that do not provide a specific benefit, but provide a more general benefit to the community; the user may not be able to avoid paying the tax. Assessments must show a benefit to the property owned by the user. There are various forms of taxes and assessments. It is important to note that, while taxes can create a solid funding base that can be used to fund annual capital and operating costs, there is often political pressure to keep taxes low and intensify competition for these resources.			

Table 43 continued – Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)

Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Rates and Charges	Alabama law authorizes some public utilities to collect rates and charges for the services they provide. Because watershed management programs provide benefits to water and wastewater systems by protecting water supply sources and providing receiving water for wastewater effluent, water and wastewater utility systems often provide funding for watershed management programs.			
Miscellaneous Fees and Incentives	Fees and incentives are used in Alabama. For example, the Water Works and Sewer Board of the City of Gadsden, which is in the Coosa River Basin, charges a sewer surcharge fee for restaurants that do not have a grease trap. For those, that do have a grease trap, it must be pumped monthly or have a system installed that drips a bacteria feed to prevent grease build up. Therefore, to avoid the additional fee, the restaurant operators have an incentive to use BMPs for grease management.			
Impact Fees	Impact fees, which also are known as capital contribution or facilities fees or system development charges, among other names, typically are collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth.			
Special Assessments	Special assessments are created for the specific purpose of financing capital improvements, such as provisions, to serve a specific area. Once the special assessment has been created, special assessment bonds can be issued, which are secured by liens on the properties benefited by the improvements.			
Sales Tax/Local Option Sales Tax	Local governments, both cities and counties, have the authority to add additional taxes. Local governments can use tax revenues to provide funding for a variety of projects and activities.			
Property Tax	These taxes generally support a significant portion of a county's or municipality's non- public enterprise activities. However, the revenues from property taxes also can be used for public enterprise projects, and to pay debt service on general obligation bonds issued to finance system improvements.			
Excise Taxes	These taxes require special legislation, and the funds generated through the tax are limited to specific uses. Examples include the lodging, food, and beverage tax, which generates funds for promotion of tourism; and the gas tax, which generates revenues for transportation–related activities.			

Table 43 continued – Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)				
Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Bonds and Loans	Bonds and loans can be used to finance capital improvements. These programs are appropriate for local governments and utilities that need to make improvements to improve and protect water resources. The cost of the improvements is borrowed through the issuance of bonds or a loan. Associated with the issuance of a bond or loan must be a source of funding for the payment of the resulting debt service on the loan or bonds.			
Investment Income	Some organizations have elected to establish their own foundations or endowment funds to provide long-term funding stability. Endowment funds can be established and managed by a single organization-specific foundation or an organization may elect to have a community foundation to hold and administer its endowment. With an endowment fund, the principal or actual cash raised is invested. The organization may elect to tap into the principal under certain established circumstances.			
Emerging Opportunities for Program Support				
Water Quality Trading	Trading allows regulated entities to purchase credits for pollutant reductions in the watershed or a specified part of the watershed to meet or exceed regulatory or voluntary goals. There are a number of variations for water quality credit trading frameworks. Credits can be traded, or bought and sold, between point sources only, between NPSs only, or between point sources and NPSs.			
PowerTree Carbon Company, LLC	Consortium of conservation groups and electric power generators in the southeast whose goal is to restore strategically located tracts of hardwood forests to increase carbon sequestration and other ecological functions. Power generators are credited for the carbon storage of the restored forests and conservation groups gain large tracts of protected forests which provide additional benefits such as; increased value for passive human use, wildlife habitat, maintenance of native species diversity, soil conservation and water quality buffering functions. Additional program and contact information is available online at: http://www.powertreecarboncompany.com			

Table 43 continued Watershed Management Funding Organizations and Opportunities; adapted from: CH2MHILL (2005)				
Funding Source	Program Description	Match Requirement	Eligibility	Contact Information
Mitigation and Conservation Banking	Mitigation and Conservation banks are created by property owners who restore and/or preserve their land in its natural condition; such banks have been developed by public, nonprofit, and private entities. In exchange for preserving the land, the “bankers” get permission from ADEM, COE, or other appropriate state and federal agencies to sell mitigation banking credits to developers wanting to mitigate the impacts of proposed development. By purchasing the mitigation bank credits, the developer avoids having to mitigate the impacts of their development on site. Public and nonprofit mitigation banks may use the funds generated from the sale of the credits to fund the purchase of additional land for preservation and/or for the restoration of the lands to a natural state.			
Options Often Overlooked or Unnoticed				
Public and Private Partnerships	Having both public and private stakeholders at the table when pursuing funding for the implementation of management strategies is vital. Public entities have advantages associated with public financing, and the involvement of these entities can bring key decision-makers to the table. Private entities sometimes can contribute significant financial support, needed expertise, and voluntary labor.			
Redirection of Existing Programs and Funding	For priority projects, one way to fund programs is to change the priorities or focus of existing activities to help achieve the objectives of the watershed management plan. This could entail reducing funding for other activities and making such resources available to fund the watershed management program.			

9.0 REFERENCES

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Appendix A – Sub-Watersheds (HUC 11) of the Tombigbee River Basin

Upper Tombigbee River Subbasin (not including Mississippi).

County	**HUC**	**Sub-Watershed**
Fayette	0316-0107-040	Sipsey River
		Upper North River
	0316-0105-010	Upper Luxapallila Creek
	0316-0105-020	Dodsen-Langston Creek
Franklin	0316-0101-070	Gum Creek
Greene	0316-0106-140	Wilkes Creek
	0316-0106-190	Taylor Creek
	0316-0106-160	Trussells Creek
Lamar	0316-0105-040	Hells Creek
	0316-0103-040	Bogue Creek
	0316-0105-030	Lower Luxapallila Creek
	0316-0105-050	Yellow Creek
	0316-0105-060	Wilson Creek
Marion	0316-0103-010	Upper Buttahatchee River
	0316-0103-050	Upper Sipsey Creek
	0316-0103-070	Sipsey Creek
	0316-0103-020	Buttahatchee River
	0316-0103-060	Bull Mountain Creek
	0316-0103-030	Beaver Creek
	0316-0107-020	Little New River
	0316-0107-010	New River
Pickens	0316-0106-100	Upper Lubbub Creek
	0316-0106-090	Boguechitto Creek
	0316-0106-110	Bear Creek
	0316-0106-070	Big Creek
	0316-0106-060	Coal Fire Creek
	0316-0105-100	Magby Creek
	0316-0106-020	Ellis Creek
	0316-0106-040	Kincaide Creek
	0316-0108-110	Woodward Creek
	0316-0106-130	Fenache Creek
	0316-0107-080	Sipsey River
	0316-0107-070	Brush Creek
	0316-0106-120	Lower Lubbub Creek

	0316-0105-120	McCrary Creek
Sumter	0316-0108-110	Woodward Creek
	0316-0108-090	Noxubee River
	0316-0108-140	Bodka Creek
	0316-0106-170	Factory Creek
	0316-0106-130	Fenache Creek
	0316-0106-180	Twelve Mile Bend Tributaries
	0316-0106-150	Cypress Swamp
Tuscaloosa	0316-0107-060	Malone Mill Creek
	0316-0107-050	Dunn Creek
Walker	0316-0107-030	Studhorse Creek

Lower Tombigbee River Subbasin (not including Mississippi).

County	**HUC**	**Sub-Watershed**
Choctaw	0316-0201-130	Upper Tuckabum Creek
	0316-0201-280	Lower Okatuppa Creek
	0316-0201-190	Wahalak Creek
	0316-0201-150	Yantley Creek
	0316-0201-290	Turkey Creek
	0316-0201-160	Lower Tuckabum Creek
	0316-0201-250	Upper Okatuppa Creek
	0316-0201-270	Puss Cuss Creek
	0316-0201-220	Big Tallawampa Creek
	0316-0203-020	Seyouyah Creek
Clarke	0316-0203-090	East Bassetts Creek
	0316-0203-070	Jackson Creek
	0316-0201-230	Witch Creek
	0316-0201-210	Bashi Creek
	0316-0203-040	Satilpa Creek
	0316-0203-140	Sand Hill Creek
	0316-0203-110	Salt Creek
	0316-0203-060	Salt Gut Slough
	0316-0201-200	Big Bunny Creek
	0316-0203-010	Ulcanush Creek
	0316-0203-080	Stave Creek
Marengo	0316-0201-060	Upper Chickasaw Bogue
	0316-0201-040	Dry Creek

	0316-0201-030	Double Creek
	0316-0201-070	Lower Chickasaw Bogue
	0316-0201-110	Beaver Creek
	0316-0201-180	Horse Creek
	0316-0201-050	Powell Creek
	0316-0201-170	Landrums Creek
Sumter	0316-0202-100	Alamuchee Creek
	0316-0202-080	Lower Sucarnoochie Creek
	0316-0202-110	Ponkabia Creek
	0316-0201-100	Kinterbish Creek
	0316-0201-020	Cotohauga Creek
	0316-0201-010	Spring Creek
	0316-0202-060	Ponta Creek
	0316-0202-040	Upper Sucarnoochee River
Washington	0316-0203-130	Bilbo Creek
	0316-0203-030	Santa Bogue Creek
	0316-0203-100	West Bassetts Creek
	0316-0203-050	Tauler Creek
	0316-0203-120	Lewis Creek

Appendix B – Use Classifications for the waters of the Lower and Upper Tombigbee River Subbasins

THE LOWER TOMBIGBEE RIVER BASIN

Stream	From	To	Classification
TOMBIGBEE RIVER	MOBILE RIVER	One-half mile downstream from Southern Railway Crossing	F&W
TOMBIGBEE RIVER	One-half mile downstream from Southern Railway Crossing	Five miles upstream from U. S. Highway 43	PWS/S/F&W
TOMBIGBEE RIVER	Five miles upstream from U. S. Highway 43	Jackson Lock and Dam	F&W
TOMBIGBEE RIVER	Jackson Lock and Dam	Beach Bluff (River Mile 141)	S/F&W
TOMBIGBEE RIVER	Beach Bluff (River Mile 141)	One-half mile downstream from Alabama Highway 114	F&W[1]
TOMBIGBEE RIVER	One-half mile downstream from Alabama Highway 114	Three miles upstream from Alabama Highway 114	PWS/F&W[1]
TOMBIGBEE RIVER	Three miles upstream from Alabama Highway 114	Demopolis Lock and Dam	F&W[1]
TOMBIGBEE RIVER	Demopolis Lock and Dam	WARRIOR RIVER	S/F&W
Okatuppa Creek	TOMBIGBEE RIVER	Alabama-Mississippi state line	F&W
Bogueloosa Creek	Okatuppa Creek	Its source	F&W
Tuckabum Creek	TOMBIGBEE RIVER	Alabama-Mississippi state line	F&W
Yantley Creek	Tuckabum Creek	Alabama-Mississippi state line	F&W
Sucarnoochee River	TOMBIGBEE RIVER	U. S. Highway 11	F&W
Sucarnoochee River	U. S. Highway 11	Five miles upstream from Livingston city limits	PWS/S/F&W
Sucarnoochee River	Five miles upstream from U. S. Highway 11	Alabama-Mississippi state line	F&W
Alamuchee Creek	Sucarnoochee River	Alabama-Mississippi state line	F&W
Toomsuba Creek	Alamuchee Creek	AT&N Railroad	F&W
Toomsuba Creek	AT&N Railroad	Alabama-Mississippi state line	PWS/F&W

[1] Applicable dissolved oxygen level below existing impoundments is 4.0 mg/l.

Stream	From	To	Classification
Bilbo Creek	TOMBIGBEE RIVER	Its source	S/F&W
Bates Creek	Bilbo Creek	Its source	S/F&W
Lewis Creek	TOMBIGBEE RIVER	Its source	S/F&W
Bassett's Creek (Washington County)	TOMBIGBEE RIVER	Its source	S/F&W
Little Bassett's Creek (Washington County)	Bassett's Creek (Washington County)	Its source	F&W
Miles Creek	Little Bassett's Creek (Washington County)	Its source	F&W
Bassett's Creek (Clarke County)	TOMBIGBEE RIVER	Its source	F&W
James Creek	Bassett's Creek (Clarke Co.)	Its source	F&W
Jackson Creek	TOMBIGBEE RIVER	Its source	F&W
Satilpa Creek	TOMBIGBEE RIVER	Its source	S/F&W
Santa Bogue Creek	TOMBIGBEE RIVER	Its source	S/F&W
Turkey Creek	TOMBIGBEE RIVER	Its source	S/F&W
Bashi Creek	TOMBIGBEE RIVER	Its source	S/F&W
Tishlarka Creek	TOMBIGBEE RIVER	Its source	F&W
Wahalak Creek	Tishlarka Creek	Its source	F&W
Horse Creek	TOMBIGBEE RIVER	Its source	S/F&W
Beaver Creek	TOMBIGBEE RIVER	Its source	S/F&W
Kinterbish Creek	TOMBIGBEE RIVER	Its source	S/F&W
Chickasaw Bogue	TOMBIGBEE RIVER	Its source	F&W
Sycamore Creek	Chickasaw Bogue	Its source	F&W
Unnamed tributary southwest of York (Lake Louise)	Toomsuba Creek	Its source	PWS

UPPER TOMBIGBEE RIVER BASIN

Stream	From	To	Classification
TOMBIGBEE RIVER	Junction with WARRIOR RIVER	Cobb Creek	S/F&W
TOMBIGBEE RIVER	Cobb Creek	Gainesville Lock and Dam	F&W
TOMBIGBEE RIVER (Gainesville and Aliceville Lakes)	Gainesville Lock and Dam	Alabama-Mississippi state line	S/F&W
Noxubee River	TOMBIGBEE RIVER	Alabama-Mississippi state line	F&W
Bodka Creek	Noxubee River	Alabama-Mississippi state line	F&W
Yellow Creek	At Alabama-Mississippi state line		PWS
Yellow Creek	Alabama-Mississippi state line	Its source	F&W
Buttahatchee River	Alabama-Mississippi state line	U.S. Hwy. 278 one mile east of junction of U.S. Highways 43 and 78 in Hamilton	F&W
Buttahatchee River	U.S. Hwy. 278 one mile east of junction of U.S Highways 43 and 78 in Hamilton	U.S. Hwy. 278 seven miles east of junction of U.S. Highways 43 and 78 in Hamilton	PWS/F&W
Buttahatchee River	U.S. Hwy. 278 seven miles east of junction of U.S. Highways 43 and 78 in Hamilton	Lake Buttahatchee Dam	F&W
Buttahatchee River	Lake Buttahatchee Dam	Head of backwaters of Lake Buttahatchee	S
Buttahatchee River	Head of backwaters of Lake Buttahatchee	Its source	F&W
Bull Mountain Creek	Alabama-Mississippi state line	Its source	F&W
Sipsey Creek	Alabama-Mississippi state line	Its source	F&W
Luxapallila Creek	At Alabama-Mississippi state line		PWS
Luxapallila Creek	Alabama-Mississippi state line	County Road 37	F&W
Luxapallila Creek	County Road 37	County road crossing approximately 6 miles upstream from Alabama Highway 18	PWS/F&W
Luxapallila Creek	County road crossing approximately 6 miles upstream from Alabama Highway 18	U .S. Highway 78	F&W
Luxapallila Creek	U. S. Highway 78	Its source	PWS/F&W

Stream	From	To	Classification
Sipsey River	TOMBIGBEE RIVER	U. S. Highway 43	F&W
Sipsey River	U. S. Highway 43	Alabama Highway 102	PWS/F&W
Sipsey River	Alabama Highway 102	Its source	F&W
New River	Sipsey River	Its source	F&W
Little New River	Sipsey River	Its source	F&W
Lubbub Creek	TOMBIGBEE RIVER	Its source	F&W
Bear Creek	Lubbub Creek	Its source	F&W
Little Bear Creek	Bear Creek	Its source	F&W
Coal Fire Creek	TOMBIGBEE RIVER	Its source	S/F&W
Bogue Creek	Buttahatchee River	Its source	F&W
Beaver Creek	Buttahatchee River	U. S. Highway 78	F&W
Beaver Creek	U. S. Highway 78	Its source	PWS/F&W
Purgatory Creek	Beaver Creek	U. S. Highway 278	F&W
Purgatory Creek	U. S. Highway 278	Its source	PWS/F&W
Camp Creek	Buttahatchee River	Its source	F&W
East Branch Luxapallila Creek	Luxapallila Creek At Winfield	Its source	PWS/F&W
Moore Creek	Buttahatchee River	Its source	F&W

Appendix C - Potential for Nonpoint Source Pollution Impairment of Streams in the Tombigbee River Basin

Appendix C Potential for nonpoint source pollution impairment of streams in the Tombigbee River Basin. Only rural land use sources of nonpoint pollution are considered here.									
			Rural Land Use Impairment Sources						
Subwatershed	**HUC Code**	**Overall Potential NPS Impairment**	**Animal Husbandry**	**Aquaculture**	**Row Crops**	**Pasture Runoff**	**Mining**	**Forestry Practices**	**Sedimentation**
Upper Tombigbee River Basin:									
Bull Mountain Creek	3160101060	14	M	L	L	M	L	ur	H
Gum Creek	3160101070	14	M	M	L	L	L	ur	H
Upper Buttahatchee River	3160103010	18	L	L	M	M	H	ur	H
Buttahatchee River	3160103020	16	L	L	M	L	H	ur	H
Beaver Creek	3160103030	12	L	L	L	L	M	ur	H
Bogue Creek	3160103040	14	L	L	M	M	M	ur	M
Upper Sipsey Creek	3160103050	14	L	L	M	M	L	ur	H
Sipsey Creek	3160103070	14	L	L	M	M	L	ur	H
Upper Luxapallila Creek	3160105010	18	L	L	M	M	H	ur	H
Dodsen-Langston Creek	3160105020	14	L	L	L	M	M	ur	H
Lower Luxapallila Creek	3160105030	10	L	L	L	L	M	ur	M
Hells Creek	3160105040	12	L	L	L	L	M	ur	H
Yellow Creek	3160105050	12	L	L	L	M	M	ur	M
Wilson Creek	3160105060	12	L	L	L	M	M	ur	M
Magby Creek	3160105100	10	L	L	M	L	L	ur	M
McCrary Creek[1]	3160105120								
Ellis Creek	3160106020	6	L	L	L	L	L	ur	L
Kincaide Creek	3160106040	8	L	L	L	L	L	ur	M
Coal Fire Creek	3160106060	10	L	M	L	L	L	ur	M
Big Creek	3160106070	12	L	L	M	L	L	ur	H
Boguechitto Creek	3160106090	20	M	H	M	M	L	ur	H
Upper Lubbub Creek	3160106100	10	L	L	L	L	L	ur	H
Bear Creek	3160106110	14	H	L	L	L	L	ur	H
Lower Lubbub Creek	3160106120	18	L	H	M	M	L	ur	H
Fenache Creek	3160106130	21	L	H	H	M	L	M	M
Wilkes Creek	3160106140	17	L	M	M	M	L	M	M
Cypress Swamp	3160106150	19	L	L	M	M	L	H	H
Trussells Creek	3160106160	19	L	H	M	H	L	L	M
Factory Creek	3160106170	23	L	H	H	H	L	L	H

Appendix C Potential for nonpoint source pollution impairment of streams in the Tombigbee River Basin. Only rural land use sources of nonpoint pollution are considered here.

			Rural Land Use Impairment Sources						
Subwatershed	**HUC Code**	**Overall Potential NPS Impairment**	**Animal Husbandry**	**Aquaculture**	**Row Crops**	**Pasture Runoff**	**Mining**	**Forestry Practices**	**Sedimentation**
Twelve Mile Bend Tributaries	3160106180	19	H	L	L	L	L	H	H
Taylor Creek	3160106190	21	L	H	M	H	L	L	H
New River	3160107010	15	L	L	L	L	H	L	H
Little New River	3160107020	14	L	L	L	L	H	ur	H
Studhorse Creek	3160107030	12	L	L	L	M	M	ur	M
Sipsey River	3160107040	16	L	L	M	M	M	ur	H
Dunn Creek	3160107050	10	L	L	L	M	L	ur	M
Malone Mill Creek	3160107060	10	L	L	L	M	L	ur	M
Brush Creek	3160107070	13	L	L	M	M	L	L	M
Sipsey River	3160107080	13	L	L	M	M	L	L	M
Noxubee River	3160108090	25	M	H	M	H	L	M	H
Woodward Creek	3160108110	23	L	H	H	H	L	L	H
Bodka Creek	3160108140	21	L	M	H	H	L	L	H
Lower Tombigbee River Basin:									
Spring Creek	3160201010	19	L	L	L	L	H	H	H
Cotomauga Creek	3160201020	13	L	L	M	L	L	H	L
Double Creek	3160201030	14	L	L	L	H	L	ur	H
Dry Creek	3160201040	16	M	L	L	H	L	ur	H
Powell Creek	3160201050	20	M	H	L	H	L	ur	H
Upper Chickasaw Bogue	3160201060	16	L	H	L	H	L	ur	M
Lower Chickasaw Bogue	3160201070	14	L	H	L	M	L	ur	M
Tombigbee River	3160201080	6	L	L	L	L	L	ur	L
Kinterbish Creek	3160201100	17	L	L	M	L	L	H	H
Beaver Creek	3160201110	10	L	L	L	M	L	ur	M
Upper Tuckabum Creek	3160201130	10	L	L	L	L	L	ur	H
Yantley Creek	3160201150	12	L	L	L	M	L	ur	H
Lower Tuckabum Creek	3160201160	10	L	L	L	L	L	ur	H
Landrums Creek	3160201170	6	L	L	L	L	L	ur	L
Horse Creek	3160201180	9	L	L	L	L	M	L	L
Wahalak Creek	3160201190	10	L	L	L	L	L	ur	H

Appendix C Potential for nonpoint source pollution impairment of streams in the Tombigbee River Basin. Only rural land use sources of nonpoint pollution are considered here.

			Rural Land Use Impairment Sources						
Subwatershed	HUC Code	Overall Potential NPS Impairment	Animal Husbandry	Aquaculture	Row Crops	Pasture Runoff	Mining	Forestry Practices	Sedimentation
Big Bunny Creek	3160201200	8	L	L	L	M	L	ur	L
Bashi Creek	3160201210	9	L	L	L	L	L	M	L
Big Tallawampa Creek	3160201220	10	L	L	L	L	L	ur	H
Witch Creek	3160201230	11	L	L	L	L	L	M	M
Upper Okatuppa Creek	3160201250	10	L	L	L	L	L	ur	H
Puss Cuss Creek	3160201270	12	M	L	L	L	L	ur	H
Lower Okatuppa Creek	3160201280	10	L	L	L	L	L	ur	H
Turkey Creek	3160201290	12	L	L	L	M	L	ur	H
Upper Sucarnoochee River[1]	3160202040								
Ponta Creek[1]	3160202060								
Lower Sucarnoochee River	3160202080	23	M	H	M	H	L	L	H
Alamuchee Creek	3160202100	19	L	L	M	L	M	H	H
Ponkabia Creek	3160202110	17	L	M	M	M	L	L	H
Ulcanush Creek	3160203010	11	L	L	L	L	L	M	M
Seyouyah Creek	3160203020	10	L	L	L	L	L	ur	H
Santa Bogue Creek	3160203030	15	L	L	L	L	L	H	H
Satilpa Creek	3160203040	13	L	L	L	L	L	H	M
Tauler Creek	3160203050	15	L	L	M	L	L	M	H
Salt Gut Slough	3160203060	9	L	L	L	L	L	M	L
Jackson Creek	3160203070	11	L	L	L	L	L	H	L
Stave Creek	3160203080	11	L	L	L	L	L	H	L
East Bassett Creek	3160203090	15	L	L	L	M	L	M	H
West Bassett Creek	3160203100	13	L	L	L	L	L	H	M
Salt Creek	3160203110	13	L	M	L	L	L	H	L
Lewis Creek	3160203120	11	L	L	L	L	L	H	L
Bilbo Creek	3160203130	11	L	L	L	L	L	H	L
Sand Hill Creek	3160203140	11	L	L	L	L	L	H	L

Source of Data: ADEM (2003).
[1] No data reported.
ur = unreported for this land use.

Appendix D - Resource Concerns in the Tombigbee River Basin

Appendix D Table 1 - Resource concerns related to agricultural land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Excessive Erosion on Cropland	Gully Erosion on Agricultural Land	Poor Soil Condition on Cropland	Excessive Animal Waste Applied to Land	Excessive Sediment from Cropland	Inadequate Management of Animal Wastes	Livestock are Overgrazing Pastures	Livestock Commonly Have Access to Streams
Upper Tombigbee River Basin:								
Bull Mountain Creek				X		X	X	X
Gum Creek							X	X
Upper Buttahatchee River				X		X		X
Buttahatchee River					X		X	X
Beaver Creek							X	X
Bogue Creek							X	X
Upper Sipsey Creek	X				X		X	X
Sipsey Creek							X	X
Upper Luxapallila Creek							X	X
Dodsen-Langston Creek							X	X
Lower Luxapallila Creek	X						X	X
Hells Creek							X	X
Yellow Creek							X	X
Wilson Creek							X	X
Magby Creek						X		
McCrary Creek[1]								
Ellis Creek						X		
Kincaide Creek								
Coal Fire Creek					X	X	X	X
Big Creek	X						X	X
Boguechitto Creek	X	X					X	X
Upper Lubbub Creek				X		X	X	X
Bear Creek				X		X	X	X
Lower Lubbub Creek							X	X
Fenache Creek	X	X			X		X	X
Wilkes Creek							X	X

Appendix D Table 1 - Resource concerns related to agricultural land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Excessive Erosion on Cropland	Gully Erosion on Agricultural Land	Poor Soil Condition on Cropland	Excessive Animal Waste Applied to Land	Excessive Sediment from Cropland	Inadequate Management of Animal Wastes	Livestock are Overgrazing Pastures	Livestock Commonly Have Access to Streams
Cypress Swamp		X						
Trussells Creek	X	X			X		X	X
Factory Creek	X	X	X		X		X	X
Twelve Mile Bend Tributaries							X	
Taylor Creek	X	X			X		X	X
New River							X	X
Little New River								X
Studhorse Creek							X	X
Sipsey River						X	X	X
Dunn Creek				X		X	X	X
Malone Mill Creek				X		X	X	X
Brush Creek	X	X			X		X	X
Sipsey River		X			X		X	X
Noxubee River	X	X	X		X		X	X
Woodward Creek	X	X			X		X	X
Bodka Creek	X	X	X		X		X	X
Lower Tombigbee River Basin:								
Spring Creek		X	X				X	X
Cotomauga Creek							X	X
Double Creek							X	X
Dry Creek							X	X
Powell Creek	X	X		X		X	X	X
Upper Chickasaw Bogue							X	X
Lower Chickasaw Bogue							X	X
Tombigbee River							X	X
Kinterbish Creek						X	X	X
Beaver Creek							X	X

Appendix D Table 1 - Resource concerns related to agricultural land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Excessive Erosion on Cropland	Gully Erosion on Agricultural Land	Poor Soil Condition on Cropland	Excessive Animal Waste Applied to Land	Excessive Sediment from Cropland	Inadequate Management of Animal Wastes	Livestock are Overgrazing Pastures	Livestock Commonly Have Access to Streams
Upper Tuckabum Creek								X
Yantley Creek								X
Lower Tuckabum Creek								X
Landrums Creek							X	X
Horse Creek							X	X
Wahalak Creek								X
Big Bunny Creek							X	X
Bashi Creek							X	X
Big Tallawampa Creek								X
Witch Creek								
Upper Okatuppa Creek								X
Puss Cuss Creek		X						X
Lower Okatuppa Creek								X
Turkey Creek								X
Upper Sucarnoochee River								
Ponta Creek								
Lower Sucarnoochee River	X	X			X		X	X
Alamuchee Creek	X	X			X		X	X
Ponkabia Creek		X					X	X
Ulcanush Creek								
Seyouyah Creek								
Santa Bogue Creek								X
Satilpa Creek								
Tauler Creek								
Salt Gut Slough								
Jackson Creek								
Stave Creek								
East Bassett Creek								

Appendix D Table 1 - Resource concerns related to agricultural land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Excessive Erosion on Cropland	Gully Erosion on Agricultural Land	Poor Soil Condition on Cropland	Excessive Animal Waste Applied to Land	Excessive Sediment from Cropland	Inadequate Management of Animal Wastes	Livestock are Overgrazing Pastures	Livestock Commonly Have Access to Streams
West Bassett Creek								
Salt Creek								
Lewis Creek								
Bilbo Creek								
Sand Hill Creek								

[1] No information for this subwatershed.

Appendix D Table 2 - Resource concerns related to other land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Road and Roadbank Erosion	Excessive Pesticides Applied to Land	Excessive Sediment from Roads and Roadbanks	Excessive Sediment From Urban Development	Nutrients in Surface Waters	Pesticides in Surface Waters	Bacteria and Other Organisms in Surface Waters	Low Dissolved Oxygen in Surface Waters
Upper Tombigbee River Basin:								
Bull Mountain Creek					X			
Gum Creek					X			
Upper Buttahatchee River								
Buttahatchee River	X		X					
Beaver Creek			X					
Bogue Creek	X		X					
Upper Sipsey Creek			X					
Sipsey Creek	X		X					
Upper Luxapallila Creek	X		X					
Dodsen-Langston Creek	X		X					
Lower Luxapallila Creek	X		X					
Hells Creek	X		X					
Yellow Creek	X		X					
Wilson Creek	X			X				
Magby Creek			X					
McCrary Creek[1]								
Ellis Creek			X					
Kincaide Creek			X				X	
Coal Fire Creek	X		X				X	
Big Creek			X				X	
Boguechitto Creek		X		X			X	
Upper Lubbub Creek			X	X	X		X	
Bear Creek			X	X	X		X	
Lower Lubbub Creek			X	X			X	

Appendix D Table 2 - Resource concerns related to other land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Road and Roadbank Erosion	Excessive Pesticides Applied to Land	Excessive Sediment from Roads and Roadbanks	Excessive Sediment From Urban Development	Nutrients in Surface Waters	Pesticides in Surface Waters	Bacteria and Other Organisms in Surface Waters	Low Dissolved Oxygen in Surface Waters
Fenache Creek	X		X				X	
Wilkes Creek	X		X		X		X	
Cypress Swamp	X		X					
Trussells Creek	X		X		X		X	
Factory Creek	X		X				X	
Twelve Mile Bend Tributaries	X		X					
Taylor Creek	X	X	X		X	X	X	
New River	X				X		X	
Little New River								
Studhorse Creek	X		X					
Sipsey River	X		X			X		
Dunn Creek	X			X	X		X	
Malone Mill Creek	X		X		X		X	X
Brush Creek	X		X				X	
Sipsey River	X		X				X	
Noxubee River	X		X				X	
Woodward Creek	X	X	X			X	X	
Bodka Creek	X		X				X	
Lower Tombigbee River Basin:								
Spring Creek	X		X		X	X		
Cotomauga Creek	X		X				X	
Double Creek			X					
Dry Creek								
Powell Creek	X				X			
Upper Chickasaw Bogue	X		X					

Appendix D Table 2 - Resource concerns related to other land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Road and Roadbank Erosion	Excessive Pesticides Applied to Land	Excessive Sediment from Roads and Roadbanks	Excessive Sediment From Urban Development	Nutrients in Surface Waters	Pesticides in Surface Waters	Bacteria and Other Organisms in Surface Waters	Low Dissolved Oxygen in Surface Waters
Lower Chickasaw Bogue	X		X					
Tombigbee River	X							
Kinterbish Creek	X		X		X		X	
Beaver Creek	X							
Upper Tuckabum Creek	X							
Yantley Creek	X							
Lower Tuckabum Creek	X							
Landrums Creek								
Horse Creek	X		X					
Wahalak Creek	X							
Big Bunny Creek								
Bashi Creek			X					
Big Tallawampa Creek	X							
Witch Creek								
Upper Okatuppa Creek	X							
Puss Cuss Creek	X		X					
Lower Okatuppa Creek	X		X					
Turkey Creek								
Upper Sucarnoochee River								
Ponta Creek								
Lower Sucarnoochee River	X		X	X			X	X
Alamuchee Creek	X		X	X		X	X	X
Ponkabia Creek	X		X	X			X	X
Ulcanush Creek								
Seyouyah Creek								
Santa Bogue Creek								

Appendix D Table 2 - Resource concerns related to other land use practices in the Tombigbee River Basin. Source of data: ADEM (2003).

Subwatershed	Road and Roadbank Erosion	Excessive Pesticides Applied to Land	Excessive Sediment from Roads and Roadbanks	Excessive Sediment From Urban Development	Nutrients in Surface Waters	Pesticides in Surface Waters	Bacteria and Other Organisms in Surface Waters	Low Dissolved Oxygen in Surface Waters
Satilpa Creek								
Tauler Creek								
Salt Gut Slough								
Jackson Creek								
Stave Creek								
East Bassett Creek								
West Bassett Creek								
Salt Creek								
Lewis Creek								
Bilbo Creek								
Sand Hill Creek	X				X		X	

[1] No information for this subwatershed.

Appendix E - Sediment Loading Estimates for Subwatersheds in the Tombigbee River Basin

Appendix E. Sediment loads from subwatersheds in the Tombigbee River Basin. Percentages reflect the proportion of a particular sediment load source to the total sediment load for a subwatershed. Source of data is ADEM (2003).

		Sediment Loads (tons per year)																	
Subwatershed	**Total Sediment Load**	**Cropland**		**Sand and Gravel Pits**		**Mined Land**		**Developing Urban Land**		**Critical Areas**		**Gullies**		**Stream Banks**		**Dirt Roads and Roadbanks**		**Woodlands**	
Upper Tombigbee River Basin:																			
Bull Mountain Creek	611,171	4,196	0.7%	27,971	4.6%	0	0.0%	0	0.0%	72,026	11.8%	17,482	2.9%	13,286	2.2%	6,294	1.0%	469,916	76.9%
Gum Creek	41,036	750	1.8%	468	1.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1,967	4.8%	94	0.2%	37,757	92.0%
Upper Buttahatchee River	2,058,176	24,623	1.2%	52,142	2.5%	8,690	0.4%	11,587	0.6%	296,922	14.4%	5,794	0.3%	13,036	0.6%	15,932	0.8%	1,629,450	79.2%
Buttahatchee River	862,187	10,074	1.2%	47,013	5.5%	52,890	6.1%	13,432	1.6%	31,062	3.6%	24,346	2.8%	27,704	3.2%	47,013	5.5%	608,652	70.6%
Beaver Creek	393,855	563	0.1%	31,508	8.0%	563	0.1%	7,877	2.0%	22,506	5.7%	16,880	4.3%	29,258	7.4%	27,007	6.9%	257,694	65.4%
Bogue Creek	146,823	2,871	2.0%	14,764	10.1%	820	0.6%	820	0.6%	9,023	6.1%	15,995	10.9%	28,298	19.3%	37,731	25.7%	36,501	24.9%
Upper Sipsey Creek	676,448	11,198	1.7%	35,120	5.2%	0	0.0%	0	0.0%	22,396	3.3%	21,887	3.2%	7,126	1.1%	6,108	0.9%	572,614	84.7%
Sipsey Creek	382,311	7,488	2.0%	17,618	4.6%	3,524	0.9%	0	0.0%	16,737	4.4%	21,142	5.5%	18,499	4.8%	20,261	5.3%	277,043	72.5%
Upper Luxapallila Creek	669,963	14,121	2.1%	32,165	4.8%	19,613	2.9%	8,630	1.3%	16,475	2.5%	21,182	3.2%	72,959	10.9%	101,201	15.1%	383,621	57.3%
Dodsen-Langston Creek	49,820	1,017	2.0%	5,638	11.3%	4,714	9.5%	0	0.0%	0	0.0%	0	0.0%	11,369	22.8%	24,956	50.1%	2,126	4.3%
Lower Luxapallila Creek	373,411	3,138	0.8%	17,781	4.8%	26,149	7.0%	43,931	11.8%	21,965	5.9%	17,781	4.8%	67,988	18.2%	93,091	24.9%	81,586	21.8%
Hells Creek	427,659	1,013	0.2%	19,255	4.5%	103,368	24.2%	1,013	0.2%	18,241	4.3%	35,469	8.3%	69,925	16.4%	90,193	21.1%	89,180	20.9%
Yellow Creek	241,141	1,263	0.5%	6,313	2.6%	32,194	13.4%	1,894	0.8%	19,569	8.1%	15,782	6.5%	46,082	19.1%	55,551	23.0%	62,495	25.9%
Wilson Creek	146,444	2,503	1.7%	7,510	5.1%	3,755	2.6%	0	0.0%	12,099	8.3%	4,589	3.1%	39,219	26.8%	38,384	26.2%	38,384	26.2%
Magby Creek	72,011	4,991	6.9%	10,457	14.5%	0	0.0%	0	0.0%	3,803	5.3%	11,645	16.2%	13,784	19.1%	21,152	29.4%	6,179	8.6%
McCrary Creek																			
Ellis Creek	8,736	472	5.4%	0	0.0%	0	0.0%	0	0.0%	1,102	12.6%	0	0.0%	1,181	13.5%	3,778	43.2%	2,204	25.2%
Kincaide Creek	117,554	2,755	2.3%	2,143	1.8%	0	0.0%	46,532	39.6%	4,592	3.9%	14,694	12.5%	13,776	11.7%	24,797	21.1%	8,266	7.0%
Coal Fire Creek	256,680	5,989	2.3%	35,935	14.0%	856	0.3%	0	0.0%	13,690	5.3%	41,069	16.0%	47,914	18.7%	82,993	32.3%	28,235	11.0%
Big Creek	496,358	16,712	3.4%	319,207	64.3%	0	0.0%	0	0.0%	12,534	2.5%	40,945	8.2%	27,575	5.6%	59,329	12.0%	20,055	4.0%
Boguechitto Creek	363,497	15,377	4.2%	192,382	52.9%	0	0.0%	39,262	10.8%	4,908	1.4%	16,032	4.4%	35,008	9.6%	9,161	2.5%	51,367	14.1%
Upper Lubbub Creek	721,920	5,677	0.8%	35,008	4.8%	0	0.0%	510,926	70.8%	14,192	2.0%	46,362	6.4%	27,439	3.8%	59,608	8.3%	22,708	3.1%
Bear Creek	532,828	6,055	1.1%	34,599	6.5%	0	0.0%	307,933	57.8%	12,975	2.4%	41,519	7.8%	26,814	5.0%	80,443	15.1%	22,489	4.2%
Lower Lubbub Creek	355,483	12,127	3.4%	23,497	6.6%	0	0.0%	241,789	68.0%	5,685	1.6%	18,570	5.2%	16,675	4.7%	31,076	8.7%	6,064	1.7%
Fenache Creek	62,175	13,621	21.9%	7,030	11.3%	0	0.0%	0	0.0%	3,076	4.9%	7,909	12.7%	8,349	13.4%	18,455	29.7%	3,735	6.0%
Wilkes Creek	181,893	18,551	10.2%	70,133	38.6%	0	0.0%	0	0.0%	44,795	24.6%	4,977	2.7%	24,886	13.7%	10,407	5.7%	8,144	4.5%
Cypress Swamp	49,569	967	2.0%	7,012	14.1%	0	0.0%	4,997	10.1%	9,027	18.2%	20,069	40.5%	3,788	7.6%	2,015	4.1%	1,693	3.4%
Trussells Creek	340,178	19,307	5.7%	9,194	2.7%	0	0.0%	192,155	56.5%	2,758	0.8%	10,113	3.0%	57,922	17.0%	37,695	11.1%	11,033	3.2%
Factory Creek	570,586	49,052	8.6%	0	0.0%	0	0.0%	50,744	8.9%	172,529	30.2%	245,262	43.0%	24,808	4.3%	18,606	3.3%	9,585	1.7%
Twelve Mile Bend Tributaries	273,788	2,680	1.0%	0	0.0%	0	0.0%	0	0.0%	127,512	46.6%	107,983	39.4%	21,826	8.0%	4,212	1.5%	9,573	3.5%
Taylor Creek	398,002	19,126	4.8%	55,556	14.0%	0	0.0%	218,582	54.9%	5,465	1.4%	10,018	2.5%	51,913	13.0%	29,144	7.3%	8,197	2.1%
New River	498,871	490	0.1%	12,251	2.5%	22,542	4.5%	0	0.0%	26,463	5.3%	60,276	12.1%	2,450	0.5%	4,901	1.0%	369,498	74.1%
Little New River	436,869	325	0.1%	13,967	3.2%	28,908	6.6%	4,872	1.1%	10,394	2.4%	9,744	2.2%	2,923	0.7%	325	0.1%	365,411	83.6%
Studhorse Creek	160,933	4,634	2.9%	10,532	6.5%	6,319	3.9%	0	0.0%	2,106	1.3%	9,690	6.0%	49,291	30.6%	67,406	41.9%	10,954	6.8%
Sipsey River	738,577	24,769	3.4%	19,140	2.6%	19,140	2.6%	323,128	43.8%	2,252	0.3%	10,133	1.4%	141,861	19.2%	173,386	23.5%	24,769	3.4%

Appendix E. Sediment loads from subwatersheds in the Tombigbee River Basin. Percentages reflect the proportion of a particular sediment load source to the total sediment load for a subwatershed. Source of data is ADEM (2003).

		Sediment Loads (tons per year)																	
Subwatershed	**Total Sediment Load**	**Cropland**		**Sand and Gravel Pits**		**Mined Land**		**Developing Urban Land**		**Critical Areas**		**Gullies**		**Stream Banks**		**Dirt Roads and Roadbanks**		**Woodlands**	
Dunn Creek	164,441	4,766	2.9%	13,703	8.3%	0	0.0%	2,979	1.8%	17,874	10.9%	16,682	10.1%	4,766	2.9%	26,215	15.9%	77,454	47.1%
Malone Mill Creek	141,494	3,144	2.2%	6,917	4.9%	0	0.0%	3,773	2.7%	3,144	2.2%	7,546	5.3%	3,144	2.2%	35,845	25.3%	77,979	55.1%
Brush Creek	259,534	16,277	6.3%	24,416	9.4%	0	0.0%	25,320	9.8%	8,139	3.1%	26,225	10.1%	73,248	28.2%	50,641	19.5%	35,268	13.6%
Sipsey River	147,700	9,319	6.3%	10,716	7.3%	0	0.0%	0	0.0%	6,057	4.1%	17,239	11.7%	24,694	16.7%	17,705	12.0%	61,969	42.0%
Noxubee River	906,883	15,868	1.7%	3,593	0.4%	0	0.0%	11,976	1.3%	112,574	12.4%	735,027	81.0%	15,868	1.7%	9,581	1.1%	2,395	0.3%
Woodward Creek	110,266	18,871	17.1%	7,030	6.4%	0	0.0%	0	0.0%	31,267	28.4%	43,662	39.6%	3,515	3.2%	3,885	3.5%	2,035	1.8%
Bodka Creek	588,012	31,229	5.3%	6,985	1.2%	0	0.0%	23,833	4.1%	255,175	43.4%	244,902	41.6%	13,971	2.4%	9,040	1.5%	2,876	0.5%
Lower Tombigbee River Basin:																			
Spring Creek	155,056	2,031	1.3%	118,831	76.6%	0	0.0%	0	0.0%	3,724	2.4%	9,141	5.9%	10,157	6.6%	4,063	2.6%	7,110	4.6%
Cotomauga Creek	36,737	5,701	15.5%	3,484	9.5%	0	0.0%	0	0.0%	1,267	3.4%	7,918	21.6%	2,850	7.8%	7,284	19.8%	8,234	22.4%
Double Creek	322,700	3,879	1.2%	3,879	1.2%	0	0.0%	0	0.0%	14,739	4.6%	36,459	11.3%	210,996	65.4%	34,132	10.6%	18,617	5.8%
Dry Creek	152,685	510	0.3%	0	0.0%	0	0.0%	0	0.0%	11,216	7.3%	12,235	8.0%	102,215	66.9%	13,765	9.0%	12,745	8.3%
Powell Creek	165,093	2,023	1.2%	0	0.0%	0	0.0%	0	0.0%	14,972	9.1%	24,683	15.0%	105,611	64.0%	12,948	7.8%	4,856	2.9%
Upper Chickasaw Bogue	232,439	1,809	0.8%	0	0.0%	0	0.0%	0	0.0%	15,375	6.6%	24,420	10.5%	157,371	67.7%	16,280	7.0%	17,184	7.4%
Lower Chickasaw Bogue	192,820	604	0.3%	3,627	1.9%	0	0.0%	0	0.0%	7,253	3.8%	14,507	7.5%	134,792	69.9%	15,716	8.2%	16,320	8.5%
Tombigbee River	8,376	0	0.0%	0	0.0%	0	0.0%	0	0.0%	299	3.6%	1,047	12.5%	1,496	17.9%	1,197	14.3%	4,338	51.8%
Kinterbish Creek	443,636	17,180	3.9%	8,084	1.8%	0	0.0%	0	0.0%	54,570	12.3%	163,711	36.9%	122,278	27.6%	34,359	7.7%	43,454	9.8%
Beaver Creek	178,741	1,922	1.1%	0	0.0%	0	0.0%	0	0.0%	3,844	2.2%	9,610	5.4%	134,537	75.3%	10,891	6.1%	17,938	10.0%
Upper Tuckabum Creek	3,728,939	2,120	0.1%	1,413	0.0%	0	0.0%	53,705	1.4%	125,075	3.4%	3,263,264	87.5%	217,645	5.8%	5,653	0.2%	60,064	1.6%
Yantley Creek	541,708	2,612	0.5%	3,657	0.7%	0	0.0%	0	0.0%	84,626	15.6%	220,444	40.7%	166,639	30.8%	22,985	4.2%	40,746	7.5%
Lower Tuckabum Creek	825,451	1,509	0.2%	5,129	0.6%	0	0.0%	72,106	8.7%	48,875	5.9%	556,033	67.4%	117,060	14.2%	1,509	0.2%	23,231	2.8%
Landrums Creek	32,795	600	1.8%	0	0.0%	0	0.0%	0	0.0%	600	1.8%	2,400	7.3%	3,599	11.0%	19,997	61.0%	5,599	17.1%
Horse Creek	83,059	2,864	3.4%	1,909	2.3%	0	0.0%	2,864	3.4%	1,909	2.3%	9,547	11.5%	955	1.1%	31,505	37.9%	31,505	37.9%
Wahalak Creek	1,036,627	2,880	0.3%	12,478	1.2%	0	0.0%	186,209	18.0%	165,092	15.9%	429,048	41.4%	160,293	15.5%	1,920	0.2%	78,707	7.6%
Big Bunny Creek	19,073	0	0.0%	567	3.0%	0	0.0%	0	0.0%	1,133	5.9%	2,455	12.9%	0	0.0%	9,631	50.5%	5,288	27.7%
Bashi Creek	132,838	1,630	1.2%	815	0.6%	0	0.0%	12,224	9.2%	12,224	9.2%	7,335	5.5%	20,374	15.3%	16,299	12.3%	61,937	46.6%
Big Tallawampa Creek	444,045	864	0.2%	6,911	1.6%	0	0.0%	0	0.0%	78,615	17.7%	205,608	46.3%	110,147	24.8%	4,320	1.0%	37,580	8.5%
Witch Creek	70,160	731	1.0%	43,119	61.5%	0	0.0%	0	0.0%	1,462	2.1%	0	0.0%	0	0.0%	4,141	5.9%	20,707	29.5%
Upper Okatuppa Creek	419,164	843	0.2%	5,055	1.2%	0	0.0%	0	0.0%	74,986	17.9%	195,891	46.7%	101,105	24.1%	5,055	1.2%	36,229	8.6%
Puss Cuss Creek	346,770	1,010	0.3%	2,020	0.6%	0	0.0%	0	0.0%	59,254	17.1%	156,888	45.2%	101,338	29.2%	7,407	2.1%	18,854	5.4%
Lower Okatuppa Creek	1,280,697	3,245	0.3%	6,490	0.5%	0	0.0%	55,165	4.3%	187,129	14.6%	489,997	38.3%	431,586	33.7%	18,388	1.4%	88,697	6.9%
Turkey Creek	457,418	1,978	0.4%	3,561	0.8%	0	0.0%	49,066	10.7%	67,663	14.8%	176,478	38.6%	110,002	24.0%	7,518	1.6%	41,152	9.0%
Upper Sucarnoochee River	0																		
Ponta Creek	0																		
Lower Sucarnoochee River	968,238	4,491	0.5%	3,593	0.4%	0	0.0%	378,134	39.1%	149,996	15.5%	343,105	35.4%	60,178	6.2%	25,149	2.6%	3,593	0.4%

Appendix E. Sediment loads from subwatersheds in the Tombigbee River Basin. Percentages reflect the proportion of a particular sediment load source to the total sediment load for a subwatershed. Source of data is ADEM (2003).

		Sediment Loads (tons per year)																	
Subwatershed	**Total Sediment Load**	**Cropland**		**Sand and Gravel Pits**		**Mined Land**		**Developing Urban Land**		**Critical Areas**		**Gullies**		**Stream Banks**		**Dirt Roads and Roadbanks**		**Woodlands**	
Alamuchee Creek	840,999	19,860	2.4%	16,041	1.9%	144,368	17.2%	420,118	50.0%	4,583	0.5%	14,513	1.7%	128,327	15.3%	74,857	8.9%	18,332	2.2%
Ponkabia Creek	338,710	14,759	4.4%	31,731	9.4%	0	0.0%	88,552	26.1%	52,393	15.5%	98,145	29.0%	25,090	7.4%	11,069	3.3%	16,972	5.0%
Ulcanush Creek	67,801	506	0.7%	0	0.0%	0	0.0%	47,562	70.1%	4,807	7.1%	0	0.0%	0	0.0%	3,542	5.2%	11,385	16.8%
Seyouyah Creek	166,277	320	0.2%	7,048	4.2%	0	0.0%	0	0.0%	29,956	18.0%	76,411	46.0%	37,324	22.4%	1,121	0.7%	14,097	8.5%
Santa Bogue Creek	579,244	10,447	1.8%	3,482	0.6%	0	0.0%	299,489	51.7%	66,166	11.4%	53,397	9.2%	3,482	0.6%	17,412	3.0%	125,367	21.6%
Satilpa Creek	361,981	1,361	0.4%	1,361	0.4%	0	0.0%	44,907	12.4%	9,526	2.6%	130,640	36.1%	0	0.0%	36,742	10.2%	137,444	38.0%
Tauler Creek	558,776	171,174	30.6%	56,074	10.0%	0	0.0%	172,650	30.9%	103,787	18.6%	0	0.0%	0	0.0%	9,346	1.7%	45,745	8.2%
Salt Gut Slough	8,886	370	4.2%	1,759	19.8%	0	0.0%	0	0.0%	1,481	16.7%	0	0.0%	0	0.0%	1,296	14.6%	3,980	44.8%
Jackson Creek	129,225	1,444	1.1%	13,717	10.6%	0	0.0%	0	0.0%	5,054	3.9%	69,305	53.6%	0	0.0%	9,385	7.3%	30,321	23.5%
Stave Creek	18,979	0	0.0%	3,482	18.3%	0	0.0%	2,960	15.6%	2,089	11.0%	0	0.0%	0	0.0%	1,915	10.1%	8,532	45.0%
East Bassett Creek	2,040,094	0	0.0%	69,472	3.4%	0	0.0%	499,857	24.5%	74,555	3.7%	1,362,322	66.8%	0	0.0%	22,028	1.1%	11,861	0.6%
West Bassett Creek	505,622	2,741	0.5%	13,703	2.7%	0	0.0%	345,303	68.3%	19,184	3.8%	0	0.0%	0	0.0%	10,962	2.2%	113,731	22.5%
Salt Creek	58,432	0	0.0%	38,635	66.1%	0	0.0%	0	0.0%	639	1.1%	0	0.0%	0	0.0%	1,597	2.7%	17,562	30.1%
Lewis Creek	91,465	1,440	1.6%	0	0.0%	0	0.0%	0	0.0%	2,161	2.4%	0	0.0%	0	0.0%	3,601	3.9%	84,263	92.1%
Bilbo Creek	210,713	7,024	3.3%	21,071	10.0%	0	0.0%	0	0.0%	4,214	2.0%	0	0.0%	0	0.0%	23,881	11.3%	154,523	73.3%
Sand Hill Creek	28,963	0	0.0%	0	0.0%	0	0.0%	0	0.0%	6,716	23.2%	8,395	29.0%	0	0.0%	6,296	21.7%	7,556	26.1%

Appendix F - Loading and BMP Load Reduction Modeling Results for the Targeted Subwatersheds

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Filter Strips for Cropland: Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	6,900	0%	190,970	0%	58,271	0%	31,052	0%
		1,725	25%	167,568	12%	49,456	15%	26,006	16%
		3,450	50%	133,658	30%	39,487	32%	20,960	33%
		5,175	75%	105,002	45%	30,095	48%	15,914	49%
		6,900	100%	62,259	67%	18,393	68%	10,868	65%
Woodward Creek	**Pickens**	4,416	0%	102,290	0%	29,405	0%	13,241	0%
		1,104	25%	87,222	15%	24,677	16%	11,090	16%
		2,208	50%	67,548	34%	19,194	35%	8,938	33%
		3,312	75%	50,177	51%	14,088	52%	6,786	49%
		4,416	100%	32,806	68%	8,982	69%	4,634	65%
Woodward Creek	**Sumter**	1,465	0%	37,736	0%	11,290	0%	5,715	0%
		366	25%	33,221	12%	9,593	15%	4,786	16%
		733	50%	26,486	30%	7,655	32%	3,858	32%
		1,099	75%	20,856	45%	5,836	48%	2,929	49%
		1,465	100%	12,235	68%	3,526	69%	2,000	65%
Sipsey River	**Fayette**	8,440	0%	191,083	0%	55,234	0%	25,308	0%
		2,110	25%	162,889	15%	46,351	16%	21,195	16%
		4,220	50%	126,229	34%	36,080	35%	17,083	33%
		6,330	75%	93,801	51%	26,503	52%	12,970	49%
		8,440	100%	61,374	68%	16,927	69%	8,858	65%
Sipsey River	**Greene**	1,168	0%	23,221	0%	6,384	0%	2,459	0%
		292	25%	19,846	15%	5,359	16%	2,059	16%
		584	50%	15,291	34%	4,141	35%	1,660	33%
		876	75%	11,325	51%	3,020	53%	1,260	49%
		1,168	100%	7,360	68%	1,899	70%	861	65%
Sipsey River	**Pickens**	2,261	0%	52,373	0%	15,055	0%	6,780	0%
		565	25%	43,477	17%	12,441	17%	5,678	16%
		1,131	50%	34,589	34%	9,828	35%	4,577	32%
		1,696	75%	25,693	51%	7,214	52%	3,475	49%
		2,261	100%	16,797	68%	4,599	69%	2,373	65%
Coal Fire Creek	**Fayette**	159	0%	3,604	0%	1,042	0%	478	0%
		40	25%	2,994	17%	862	17%	401	16%
		80	50%	2,385	34%	682	35%	323	32%
		119	75%	1,768	51%	500	52%	245	49%
		159	100%	1,158	68%	319	69%	167	65%
Coal Fire Creek	**Lamar**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Coal Fire Creek	**Pickens**	1,732	0%	52,177	0%	13,907	0%	5,197	0%
		433	25%	44,602	15%	11,608	17%	4,352	16%
		866	50%	37,026	29%	9,308	33%	3,508	33%
		1,299	75%	25,408	51%	6,564	53%	2,663	49%
		1,732	100%	16,485	68%	4,117	70%	1,819	65%
Lower Luxapallila	**Fayette**	1,176	0%	26,642	0%	7,703	0%	3,532	0%
		294	25%	22,711	15%	6,464	16%	2,958	16%
		588	50%	17,600	34%	5,032	35%	2,384	33%
		882	75%	13,079	51%	3,696	52%	1,810	49%
		1,176	100%	8,558	68%	2,361	69%	1,236	65%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Filter Strips for Cropland					
				Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Lower Luxapallila	**Lamar**	328	0%	10,740	0%	2,171	0%	295	0%
		82	25%	8,872	17%	1,773	18%	247	16%
		164	50%	7,005	35%	1,375	37%	199	33%
		246	75%	5,137	52%	977	55%	151	49%
		328	100%	3,269	70%	579	73%	103	65%
Lower Luxapallila	**Pickens**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Upper Luxapallila	**Fayette**	4,472	0%	101,313	0%	29,292	0%	13,430	0%
		1,118	25%	89,709	11%	24,949	15%	11,248	16%
		2,236	50%	71,413	30%	19,870	32%	9,065	33%
		3,354	75%	56,464	44%	15,159	48%	6,883	49%
		4,472	100%	32,543	68%	8,978	69%	4,701	65%
Upper Luxapallila	**Marion**	200	0%	7,110	0%	1,544	0%	362	0%
		50	25%	5,880	17%	1,266	18%	304	16%
		100	50%	4,651	35%	988	36%	245	33%
		150	75%	3,421	52%	709	54%	186	49%
		200	100%	2,191	69%	431	72%	127	65%
Trussells Creek	**Greene**	9,194	0%	182,662	0%	50,202	0%	19,317	0%
		2,299	25%	156,119	15%	42,147	16%	16,178	16%
		4,597	50%	120,276	34%	32,566	35%	13,039	33%
		6,896	75%	89,086	51%	23,749	53%	9,900	49%
		9,194	100%	57,889	68%	14,930	70%	6,761	65%
Buttahatchee River	**Lamar**	2,075	0%	37,177	0%	9,782	0%	3,114	0%
		519	25%	31,844	14%	8,216	16%	2,608	16%
		1,038	50%	24,417	34%	6,306	36%	2,102	32%
		1,556	75%	18,032	51%	4,567	53%	1,596	49%
		2,075	100%	11,651	69%	2,829	71%	1,090	65%
Buttahatchee River	**Marion**	3,900	0%	73,378	0%	19,767	0%	7,008	0%
		975	25%	60,817	17%	16,276	18%	5,870	16%
		1,950	50%	48,257	34%	12,786	35%	4,731	33%
		2,925	75%	35,696	51%	9,295	53%	3,592	49%
		3,900	100%	23,135	68%	5,805	71%	2,453	65%
Upper Buttahatchee River	**Marion**	10,000	0%	207,382	0%	58,088	0%	23,980	0%
		2,500	25%	184,565	11%	49,582	15%	20,083	16%
		5,000	50%	136,717	34%	37,782	35%	16,187	33%
		7,500	75%	101,384	51%	27,629	52%	12,290	49%
		10,000	100%	66,051	68%	17,476	70%	8,393	65%
Upper Sipsey River	**Marion**	4,700	0%	97,521	0%	27,321	0%	11,287	0%
		1,175	25%	83,267	15%	22,933	16%	9,453	16%
		2,350	50%	64,292	34%	17,771	35%	7,619	33%
		3,525	75%	47,677	51%	12,996	52%	5,784	49%
		4,700	100%	31,062	68%	8,221	70%	3,950	65%
Factory Creek	**Sumter**	9,600	0%	297,287	0%	80,934	0%	32,659	0%
		2,400	25%	253,877	15%	67,568	17%	27,352	16%
		4,800	50%	210,468	29%	54,202	33%	22,045	33%
		7,200	75%	167,059	44%	40,836	50%	16,738	49%
		9,600	100%	94,411	68%	24,257	70%	11,431	65%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Filter Strips for Cropland					
				Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Noxubee River	**Sumter**	3,500	0%	96,869	0%	29,558	0%	15,751	0%
		875	25%	84,998	12%	25,086	15%	13,192	16%
		1,750	50%	73,127	25%	20,615	30%	10,632	33%
		2,625	75%	53,262	45%	15,265	48%	8,072	49%
		3,500	100%	31,581	67%	9,330	68%	5,513	65%
Lower Tombigbee									
East Bassett Creek	**Clarke**	220	0%	7,598	0%	1,614	0%	331	0%
		55	25%	6,282	17%	1,321	18%	277	16%
		110	50%	4,965	35%	1,029	36%	223	33%
		165	75%	3,649	52%	737	54%	169	49%
		220	100%	2,332	69%	444	72%	116	65%
Dry Creek	**Marengo**	191	0%	7,230	0%	1,628	0%	458	0%
		48	25%	5,986	17%	1,337	18%	384	16%
		96	50%	4,742	34%	1,047	36%	309	32%
		143	75%	3,486	52%	754	54%	234	49%
		191	100%	2,242	69%	463	72%	160	65%
Powell Creek	**Marengo**	810	0%	30,679	0%	6,909	0%	1,946	0%
		203	25%	25,394	17%	5,675	18%	1,630	16%
		405	50%	20,097	34%	4,438	36%	1,314	33%
		608	75%	14,812	52%	3,204	54%	998	49%
		810	100%	9,515	69%	1,967	72%	681	65%
Upper Chickasaw Bogue	**Marengo**	950	0%	35,987	0%	8,105	0%	2,284	0%
		238	25%	29,786	17%	6,657	18%	1,913	16%
		475	50%	23,574	34%	5,206	36%	1,542	33%
		713	75%	17,374	52%	3,758	54%	1,171	49%
		950	100%	11,161	69%	2,308	72%	799	65%
Bilbo Creek	**Mobile**	265	0%	5,362	0%	1,496	0%	609	0%
		66	25%	4,577	15%	1,255	16%	510	16%
		133	50%	3,537	34%	973	35%	411	32%
		199	75%	2,622	51%	711	52%	312	49%
		265	100%	1,706	68%	449	70%	213	65%
Bilbo Creek	**Washington**	1,000	0%	20,439	0%	5,690	0%	2,298	0%
		250	25%	18,207	11%	4,859	15%	1,925	16%
		500	50%	14,475	29%	3,863	32%	1,551	33%
		750	75%	9,984	51%	2,702	53%	1,178	49%
		1,000	100%	6,499	68%	1,706	70%	804	65%
Alamuchee Creek	**Sumter**	5,528	0%	129,904	0%	37,793	0%	17,661	0%
		1,382	25%	114,908	12%	32,176	15%	14,791	16%
		2,764	50%	85,851	34%	24,709	35%	11,921	33%
		4,146	75%	63,824	51%	18,166	52%	9,051	49%
		5,528	100%	41,797	68%	11,624	69%	6,181	65%
Lower Sucarnoochee River	**Sumter**	9,000	0%	196,256	0%	44,132	0%	4,852	0%
		2,250	25%	168,958	14%	36,760	17%	4,064	16%
		4,500	50%	141,660	28%	29,387	33%	3,275	33%
		6,750	75%	114,362	42%	22,015	50%	2,487	49%
		9,000	100%	59,653	70%	11,631	74%	1,698	65%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Reduced Tillage Systems for Cropland					
				Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	6,900	0%	190,970	0%	58,271	0%	31,052	0%
		1,725	25%	172,906	9%	51,386	12%	25,230	19%
		3,450	50%	139,082	27%	41,961	28%	19,408	38%
		5,175	75%	113,137	41%	33,807	42%	13,585	56%
		6,900	100%	66,063	65%	20,572	65%	7,763	75%
Woodward Creek	**Pickens**	4,416	0%	102,290	0%	29,405	0%	13,241	0%
		1,104	25%	89,562	12%	25,704	13%	10,759	19%
		2,208	50%	69,923	32%	20,342	31%	8,276	38%
		3,312	75%	53,739	47%	15,810	46%	5,793	56%
		4,416	100%	37,556	63%	11,279	62%	3,310	75%
Woodward Creek	**Sumter**	1,465	0%	37,736	0%	11,290	0%	5,715	0%
		366	25%	34,423	9%	10,030	11%	4,643	19%
		733	50%	27,779	26%	8,235	27%	3,572	37%
		1,099	75%	22,795	40%	6,705	41%	2,500	56%
		1,465	100%	13,324	65%	4,097	64%	1,429	75%
Sipsey River	**Fayette**	8,440	0%	191,083	0%	55,234	0%	25,308	0%
		2,110	25%	167,109	13%	48,209	13%	20,563	19%
		4,220	50%	130,437	32%	38,130	31%	15,817	38%
		6,330	75%	100,114	48%	29,577	46%	11,072	56%
		8,440	100%	69,790	63%	21,025	62%	6,327	75%
Sipsey River	**Greene**	1,168	0%	23,221	0%	6,384	0%	2,459	0%
		292	25%	20,520	12%	5,651	11%	1,998	19%
		584	50%	16,049	31%	4,493	30%	1,537	38%
		876	75%	12,462	46%	3,548	44%	1,076	56%
		1,168	100%	8,876	62%	2,602	59%	615	75%
Sipsey River	**Pickens**	2,261	0%	52,373	0%	15,055	0%	6,780	0%
		565	25%	44,085	16%	12,735	15%	5,508	19%
		1,131	50%	35,805	32%	10,416	31%	4,238	37%
		1,696	75%	27,517	47%	8,095	46%	2,966	56%
		2,261	100%	19,229	63%	5,775	62%	1,695	75%
Coal Fire Creek	**Fayette**	159	0%	3,604	0%	1,042	0%	478	0%
		40	25%	3,034	16%	881	15%	389	19%
		80	50%	2,464	32%	721	31%	299	37%
		119	75%	1,886	48%	557	47%	209	56%
		159	100%	1,316	63%	397	62%	120	75%
Coal Fire Creek	**Lamar**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Coal Fire Creek	**Pickens**	1,732	0%	52,177	0%	13,907	0%	5,197	0%
		433	25%	46,193	11%	12,188	12%	4,223	19%
		866	50%	40,209	23%	10,469	25%	3,248	38%
		1,299	75%	28,159	46%	7,773	44%	2,274	56%
		1,732	100%	20,154	61%	5,728	59%	1,299	75%
Lower Luxapallila	**Fayette**	1,176	0%	26,642	0%	7,703	0%	3,532	0%
		294	25%	23,299	13%	6,723	13%	2,870	19%
		588	50%	18,185	32%	5,317	31%	2,207	38%
		882	75%	13,957	48%	4,124	46%	1,545	56%
		1,176	100%	9,729	63%	2,931	62%	883	75%
Lower Luxapallila	**Lamar**	328	0%	10,740	0%	2,171	0%	295	0%
		82	25%	9,216	14%	1,899	13%	240	19%
		164	50%	7,692	28%	1,628	25%	184	38%
		246	75%	6,168	43%	1,356	38%	129	56%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Reduced Tillage Systems for Cropland: Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
		328	100%	4,644	57%	1,085	50%	74	75%
Lower Luxapallila	**Pickens**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Upper Luxapallila	**Fayette**	4,472	0%	101,313	0%	29,292	0%	13,430	0%
		1,118	25%	93,616	8%	26,373	10%	10,912	19%
		2,236	50%	75,883	25%	21,837	25%	8,394	38%
		3,354	75%	63,167	38%	18,110	38%	5,876	56%
		4,472	100%	36,995	63%	11,147	62%	3,358	75%
Upper Luxapallila	**Marion**	200	0%	7,110	0%	1,544	0%	362	0%
		50	25%	6,075	15%	1,337	13%	294	19%
		100	50%	5,039	29%	1,130	27%	227	38%
		150	75%	4,003	44%	923	40%	159	56%
		200	100%	2,968	58%	715	54%	91	75%
Trussells Creek	**Greene**	9,194	0%	182,662	0%	50,202	0%	19,317	0%
		2,299	25%	161,430	12%	44,447	11%	15,695	19%
		4,597	50%	126,249	31%	35,337	30%	12,073	38%
		6,896	75%	98,046	46%	27,905	44%	8,451	56%
		9,194	100%	69,835	62%	20,472	59%	4,829	75%
Buttahatchee River	**Lamar**	2,075	0%	37,177	0%	9,782	0%	3,114	0%
		519	25%	33,139	11%	8,772	10%	2,530	19%
		1,038	50%	25,961	30%	7,007	28%	1,947	37%
		1,556	75%	20,345	45%	5,617	43%	1,362	56%
		2,075	100%	14,737	60%	4,229	57%	779	75%
Buttahatchee River	**Marion**	3,900	0%	73,378	0%	19,767	0%	7,008	0%
		975	25%	62,168	15%	16,895	15%	5,694	19%
		1,950	50%	50,957	31%	14,024	29%	4,380	38%
		2,925	75%	39,746	46%	11,153	44%	3,066	56%
		3,900	100%	28,535	61%	8,281	58%	1,752	75%
Upper Buttahatchee River	**Marion**	10,000	0%	207,382	0%	58,088	0%	23,980	0%
		2,500	25%	193,803	7%	52,960	9%	19,484	19%
		5,000	50%	142,678	31%	40,587	30%	14,988	38%
		7,500	75%	110,326	47%	31,836	45%	10,491	56%
		10,000	100%	77,975	62%	23,085	60%	5,995	75%
Upper Sipsey River	**Marion**	4,700	0%	97,521	0%	27,321	0%	11,287	0%
		1,175	25%	85,847	12%	24,056	12%	9,171	19%
		2,350	50%	67,091	31%	19,088	30%	7,054	38%
		3,525	75%	51,876	47%	14,972	45%	4,938	56%
		4,700	100%	36,661	62%	10,855	60%	2,822	75%
Factory Creek	**Sumter**	9,600	0%	297,287	0%	80,934	0%	32,659	0%
		2,400	25%	262,148	12%	70,578	13%	26,536	19%
		4,800	50%	227,010	24%	60,222	26%	20,412	38%
		7,200	75%	191,872	35%	49,867	38%	14,288	56%
		9,600	100%	112,877	62%	32,443	60%	8,165	75%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Reduced Tillage Systems for Cropland: Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Noxubee River	**Sumter**	3,500	0%	96,869	0%	29,558	0%	15,751	0%
		875	25%	87,706	9%	26,065	12%	12,798	19%
		1,750	50%	78,543	19%	22,573	24%	9,844	38%
		2,625	75%	57,389	41%	17,148	42%	6,891	56%
		3,500	100%	33,510	65%	10,435	65%	3,938	75%
Lower Tombigbee									
East Bassett Creek	**Clarke**	220	0%	7,598	0%	1,614	0%	331	0%
		55	25%	6,500	14%	1,402	13%	269	19%
		110	50%	5,403	29%	1,190	26%	207	38%
		165	75%	4,305	43%	978	39%	145	56%
		220	100%	3,208	58%	765	53%	83	75%
Dry Creek	**Marengo**	191	0%	7,230	0%	1,628	0%	458	0%
		48	25%	6,167	15%	1,403	14%	372	19%
		96	50%	5,103	29%	1,179	28%	286	37%
		143	75%	4,024	44%	950	42%	200	56%
		191	100%	2,961	59%	726	55%	114	75%
Powell Creek	**Marengo**	810	0%	30,679	0%	6,909	0%	1,946	0%
		203	25%	26,157	15%	5,954	14%	1,582	19%
		405	50%	21,620	30%	4,995	28%	1,216	38%
		608	75%	17,098	44%	4,040	42%	852	56%
		810	100%	12,560	59%	3,081	55%	487	75%
Upper Chickasaw Bogue	**Marengo**	950	0%	35,987	0%	8,105	0%	2,284	0%
		238	25%	30,681	15%	6,984	14%	1,856	19%
		475	50%	25,359	30%	5,859	28%	1,428	38%
		713	75%	20,053	44%	4,738	42%	1,000	56%
		950	100%	14,732	59%	3,614	55%	571	75%
Bilbo Creek	**Mobile**	265	0%	5,362	0%	1,496	0%	609	0%
		66	25%	4,721	12%	1,318	12%	495	19%
		133	50%	3,696	31%	1,048	30%	381	37%
		199	75%	2,860	47%	823	45%	267	56%
		265	100%	2,023	62%	598	60%	152	75%
Bilbo Creek	**Washington**	1,000	0%	20,439	0%	5,690	0%	2,298	0%
		250	25%	19,141	6%	5,201	9%	1,867	19%
		500	50%	15,592	24%	4,348	24%	1,436	38%
		750	75%	10,905	47%	3,133	45%	1,005	56%
		1,000	100%	7,727	62%	2,280	60%	575	75%
Alamuchee Creek	**Sumter**	5,528	0%	129,904	0%	37,793	0%	17,661	0%
		1,382	25%	119,762	8%	33,945	10%	14,350	19%
		2,764	50%	88,529	32%	26,026	31%	11,038	38%
		4,146	75%	67,841	48%	20,142	47%	7,727	56%
		5,528	100%	47,154	64%	14,259	62%	4,415	75%
Lower Sucarnoochee River	**Sumter**	9,000	0%	196,256	0%	44,132	0%	4,852	0%
		2,250	25%	178,773	9%	40,375	9%	3,942	19%
		4,500	50%	161,291	18%	36,619	17%	3,033	38%
		6,750	75%	143,808	27%	32,862	26%	2,123	56%
		9,000	100%	85,210	57%	22,479	49%	1,213	75%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Streambank Stabilization and Fencing for Cropland: Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	6,900	0%	190,970	0%	58,271	0%	31,052	0%
		1,725	25%	162,476	15%	48,499	17%	25,230	19%
		3,450	50%	125,226	34%	37,574	36%	19,408	38%
		5,175	75%	92,354	52%	27,225	53%	13,585	56%
		6,900	100%	47,743	75%	14,568	75%	7,763	75%
Woodward Creek	**Pickens**	4,416	0%	102,290	0%	29,405	0%	13,241	0%
		1,104	25%	85,030	17%	24,269	17%	10,759	19%
		2,208	50%	63,931	38%	18,378	38%	8,276	38%
		3,312	75%	44,752	56%	12,865	56%	5,793	56%
		4,416	100%	25,572	75%	7,351	75%	3,310	75%
Woodward Creek	**Sumter**	1,465	0%	37,736	0%	11,290	0%	5,715	0%
		366	25%	32,210	15%	9,417	17%	4,643	19%
		733	50%	24,835	34%	7,302	35%	3,572	37%
		1,099	75%	18,381	51%	5,308	53%	2,500	56%
		1,465	100%	9,434	75%	2,822	75%	1,429	75%
Sipsey River	**Fayette**	8,440	0%	191,083	0%	55,234	0%	25,308	0%
		2,110	25%	158,782	17%	45,572	17%	20,563	19%
		4,220	50%	119,427	38%	34,521	38%	15,817	38%
		6,330	75%	83,599	56%	24,165	56%	11,072	56%
		8,440	100%	47,771	75%	13,809	75%	6,327	75%
Sipsey River	**Greene**	1,168	0%	23,221	0%	6,384	0%	2,459	0%
		292	25%	19,359	17%	5,284	17%	1,998	19%
		584	50%	14,513	38%	3,990	38%	1,537	38%
		876	75%	10,159	56%	2,793	56%	1,076	56%
		1,168	100%	5,805	75%	1,596	75%	615	75%
Sipsey River	**Pickens**	2,261	0%	52,373	0%	15,055	0%	6,780	0%
		565	25%	42,552	19%	12,232	19%	5,508	19%
		1,131	50%	32,736	37%	9,410	37%	4,238	37%
		1,696	75%	22,915	56%	6,587	56%	2,966	56%
		2,261	100%	13,093	75%	3,764	75%	1,695	75%
Coal Fire Creek	**Fayette**	159	0%	3,604	0%	1,042	0%	478	0%
		40	25%	2,930	19%	847	19%	389	19%
		80	50%	2,256	37%	652	37%	299	37%
		119	75%	1,575	56%	456	56%	209	56%
		159	100%	901	75%	261	75%	120	75%
Coal Fire Creek	**Lamar**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Coal Fire Creek	**Pickens**	1,732	0%	52,177	0%	13,907	0%	5,197	0%
		433	25%	43,517	17%	11,448	18%	4,223	19%
		866	50%	34,857	33%	8,988	35%	3,248	38%
		1,299	75%	22,827	56%	6,084	56%	2,274	56%
		1,732	100%	13,044	75%	3,477	75%	1,299	75%
Lower Luxapallila	**Fayette**	1,176	0%	26,642	0%	7,703	0%	3,532	0%
		294	25%	22,138	17%	6,355	17%	2,870	19%
		588	50%	16,651	38%	4,814	38%	2,207	38%
		882	75%	11,656	56%	3,370	56%	1,545	56%
		1,176	100%	6,661	75%	1,926	75%	883	75%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Streambank Stabilization and Fencing for Cropland					
				Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Lower Luxapallila	**Lamar**	328	0%	10,740	0%	2,171	0%	295	0%
		82	25%	8,726	19%	1,764	19%	240	19%
		164	50%	6,713	38%	1,357	38%	184	38%
		246	75%	4,699	56%	950	56%	129	56%
		328	100%	2,685	75%	543	75%	74	75%
Lower Luxapallila	**Pickens**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Upper Luxapallila	**Fayette**	4,472	0%	101,313	0%	29,292	0%	13,430	0%
		1,118	25%	86,974	14%	24,535	16%	10,912	19%
		2,236	50%	67,059	34%	19,043	35%	8,394	38%
		3,354	75%	49,931	51%	13,918	52%	5,876	56%
		4,472	100%	25,328	75%	7,323	75%	3,358	75%
Upper Luxapallila	**Marion**	200	0%	7,110	0%	1,544	0%	362	0%
		50	25%	5,777	19%	1,255	19%	294	19%
		100	50%	4,444	38%	965	38%	227	38%
		150	75%	3,111	56%	676	56%	159	56%
		200	100%	1,778	75%	386	75%	91	75%
Trussells Creek	**Greene**	9,194	0%	182,662	0%	50,202	0%	19,317	0%
		2,299	25%	152,288	17%	41,552	17%	15,695	19%
		4,597	50%	114,164	38%	31,376	38%	12,073	38%
		6,896	75%	79,917	56%	21,964	56%	8,451	56%
		9,194	100%	45,666	75%	12,551	75%	4,829	75%
Buttahatchee River	**Lamar**	2,075	0%	37,177	0%	9,782	0%	3,114	0%
		519	25%	31,080	16%	8,120	17%	2,530	19%
		1,038	50%	23,238	37%	6,114	37%	1,947	37%
		1,556	75%	16,264	56%	4,279	56%	1,362	56%
		2,075	100%	9,294	75%	2,446	75%	779	75%
Buttahatchee River	**Marion**	3,900	0%	73,378	0%	19,767	0%	7,008	0%
		975	25%	59,620	19%	16,060	19%	5,694	19%
		1,950	50%	45,861	38%	12,354	38%	4,380	38%
		2,925	75%	32,103	56%	8,648	56%	3,066	56%
		3,900	100%	18,345	75%	4,942	75%	1,752	75%
Upper Buttahatchee River	**Marion**	10,000	0%	207,382	0%	58,088	0%	23,980	0%
		2,500	25%	178,928	14%	48,843	16%	19,484	19%
		5,000	50%	129,614	38%	36,305	38%	14,988	38%
		7,500	75%	90,730	56%	25,414	56%	10,491	56%
		10,000	100%	51,845	75%	14,522	75%	5,995	75%
Upper Sipsey River	**Marion**	4,700	0%	97,521	0%	27,321	0%	11,287	0%
		1,175	25%	81,203	17%	22,585	17%	9,171	19%
		2,350	50%	60,951	38%	17,076	38%	7,054	38%
		3,525	75%	42,665	56%	11,953	56%	4,938	56%
		4,700	100%	24,380	75%	6,830	75%	2,822	75%
Factory Creek	**Sumter**	9,600	0%	297,287	0%	80,934	0%	32,659	0%
		2,400	25%	247,637	17%	66,562	18%	26,536	19%
		4,800	50%	197,987	33%	52,190	36%	20,412	38%
		7,200	75%	148,337	50%	37,818	53%	14,288	56%
		9,600	100%	74,322	75%	20,233	75%	8,165	75%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Streambank Stabilization and Fencing for Cropland					
				Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Noxubee River	**Sumter**	3,500	0%	96,869	0%	29,558	0%	15,751	0%
		875	25%	82,415	15%	24,601	17%	12,798	19%
		1,750	50%	67,962	30%	19,645	34%	9,844	38%
		2,625	75%	46,846	52%	13,810	53%	6,891	56%
		3,500	100%	24,217	75%	7,389	75%	3,938	75%
Lower Tombigbee									
East Bassett Creek	**Clarke**	220	0%	7,598	0%	1,614	0%	331	0%
		55	25%	6,173	19%	1,311	19%	269	19%
		110	50%	4,749	38%	1,009	38%	207	38%
		165	75%	3,324	56%	706	56%	145	56%
		220	100%	1,900	75%	403	75%	83	75%
Dry Creek	**Marengo**	191	0%	7,230	0%	1,628	0%	458	0%
		48	25%	5,877	19%	1,323	19%	372	19%
		96	50%	4,524	37%	1,018	37%	286	37%
		143	75%	3,161	56%	712	56%	200	56%
		191	100%	1,808	75%	407	75%	114	75%
Powell Creek	**Marengo**	810	0%	30,679	0%	6,909	0%	1,946	0%
		203	25%	24,932	19%	5,615	19%	1,582	19%
		405	50%	19,174	38%	4,318	38%	1,216	38%
		608	75%	13,427	56%	3,024	56%	852	56%
		810	100%	7,670	75%	1,727	75%	487	75%
Upper Chickasaw Bogue	**Marengo**	950	0%	35,987	0%	8,105	0%	2,284	0%
		238	25%	29,244	19%	6,586	19%	1,856	19%
		475	50%	22,492	38%	5,066	38%	1,428	38%
		713	75%	15,749	56%	3,547	56%	1,000	56%
		950	100%	8,997	75%	2,026	75%	571	75%
Bilbo Creek	**Mobile**	265	0%	5,362	0%	1,496	0%	609	0%
		66	25%	4,464	17%	1,237	17%	495	19%
		133	50%	3,354	37%	936	37%	381	37%
		199	75%	2,347	56%	655	56%	267	56%
		265	100%	1,340	75%	374	75%	152	75%
Bilbo Creek	**Washington**	1,000	0%	20,439	0%	5,690	0%	2,298	0%
		250	25%	17,651	14%	4,788	16%	1,867	19%
		500	50%	13,613	33%	3,721	35%	1,436	38%
		750	75%	8,942	56%	2,489	56%	1,005	56%
		1,000	100%	5,110	75%	1,423	75%	575	75%
Alamuchee Creek	**Sumter**	5,528	0%	129,904	0%	37,793	0%	17,661	0%
		1,382	25%	111,406	14%	31,632	16%	14,350	19%
		2,764	50%	81,190	38%	23,621	38%	11,038	38%
		4,146	75%	56,833	56%	16,534	56%	7,727	56%
		5,528	100%	32,476	75%	9,448	75%	4,415	75%
Lower Sucarnoochee River	**Sumter**	9,000	0%	196,256	0%	44,132	0%	4,852	0%
		2,250	25%	165,168	16%	36,610	17%	3,942	19%
		4,500	50%	134,081	32%	29,088	34%	3,033	38%
		6,750	75%	102,993	48%	21,567	51%	2,123	56%
		9,000	100%	49,064	75%	11,033	75%	1,213	75%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Terraces for Cropland: Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	6,900	0%	190,970	0%	58,271	0%	31,052	0%
		1,725	25%	188,675	1%	48,024	18%	24,454	21%
		3,450	50%	158,361	17%	36,392	38%	17,855	43%
		5,175	75%	142,057	26%	25,453	56%	11,256	64%
		6,900	100%	88,187	54%	11,743	80%	4,658	85%
Woodward Creek	**Pickens**	4,416	0%	102,290	0%	29,405	0%	13,241	0%
		1,104	25%	96,433	6%	24,100	18%	10,428	21%
		2,208	50%	78,290	23%	17,889	39%	7,614	43%
		3,312	75%	66,290	35%	12,132	59%	4,800	64%
		4,416	100%	54,290	47%	6,374	78%	1,986	85%
Woodward Creek	**Sumter**	1,465	0%	37,736	0%	11,290	0%	5,715	0%
		366	25%	37,839	0%	9,344	17%	4,500	21%
		733	50%	32,016	15%	7,106	37%	3,286	42%
		1,099	75%	29,147	23%	5,012	56%	2,072	64%
		1,465	100%	18,302	51%	2,331	79%	857	85%
Sipsey River	**Fayette**	8,440	0%	191,083	0%	55,234	0%	25,308	0%
		2,110	25%	179,656	6%	45,232	18%	19,930	21%
		4,220	50%	145,655	24%	33,564	39%	14,552	43%
		6,330	75%	122,940	36%	22,729	59%	9,174	64%
		8,440	100%	100,226	48%	11,893	78%	3,796	85%
Sipsey River	**Greene**	1,168	0%	23,221	0%	6,384	0%	2,459	0%
		292	25%	22,356	4%	5,269	17%	1,937	21%
		584	50%	18,342	21%	3,922	39%	1,414	43%
		876	75%	15,902	32%	2,692	58%	891	64%
		1,168	100%	13,462	42%	1,461	77%	369	85%
Sipsey River	**Pickens**	2,261	0%	52,373	0%	15,055	0%	6,780	0%
		565	25%	46,226	12%	12,107	20%	5,339	21%
		1,131	50%	40,091	23%	9,160	39%	3,899	42%
		1,696	75%	33,944	35%	6,212	59%	2,458	64%
		2,261	100%	27,797	47%	3,264	78%	1,017	85%
Coal Fire Creek	**Fayette**	159	0%	3,604	0%	1,042	0%	478	0%
		40	25%	3,178	12%	838	20%	377	21%
		80	50%	2,752	24%	634	39%	275	42%
		119	75%	2,315	36%	428	59%	173	64%
		159	100%	1,889	48%	224	78%	72	85%
Coal Fire Creek	**Lamar**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Coal Fire Creek	**Pickens**	1,732	0%	52,177	0%	13,907	0%	5,197	0%
		433	25%	50,460	3%	11,411	18%	4,093	21%
		866	50%	48,743	7%	8,915	36%	2,988	43%
		1,299	75%	36,243	31%	5,886	58%	1,884	64%
		1,732	100%	30,932	41%	3,212	77%	780	85%
Lower Luxapallila	**Fayette**	1,176	0%	26,642	0%	7,703	0%	3,532	0%
		294	25%	25,046	6%	6,308	18%	2,781	21%
		588	50%	20,305	24%	4,681	39%	2,031	43%
		882	75%	17,136	36%	3,169	59%	1,280	64%
		1,176	100%	13,968	48%	1,658	78%	530	85%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Terraces for Cropland					
				Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Lower Luxapallila	**Lamar**	328	0%	10,740	0%	2,171	0%	295	0%
		82	25%	10,050	6%	1,777	18%	232	21%
		164	50%	9,359	13%	1,384	36%	170	43%
		246	75%	8,669	19%	990	54%	107	64%
		328	100%	7,978	26%	597	73%	44	85%
Lower Luxapallila	**Pickens**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Upper Luxapallila	**Fayette**	4,472	0%	101,313	0%	29,292	0%	13,430	0%
		1,118	25%	104,166	-3%	24,428	17%	10,576	21%
		2,236	50%	89,176	12%	18,681	36%	7,722	43%
		3,354	75%	83,107	18%	13,376	54%	4,868	64%
		4,472	100%	53,115	48%	6,306	78%	2,015	85%
Upper Luxapallila	**Marion**	200	0%	7,110	0%	1,544	0%	362	0%
		50	25%	6,566	8%	1,257	19%	285	21%
		100	50%	6,022	15%	970	37%	208	43%
		150	75%	5,478	23%	683	56%	131	64%
		200	100%	4,934	31%	396	74%	54	85%
Trussells Creek	**Greene**	9,194	0%	182,662	0%	50,202	0%	19,317	0%
		2,299	25%	175,882	4%	41,439	17%	15,212	21%
		4,597	50%	144,306	21%	30,847	39%	11,107	43%
		6,896	75%	125,134	31%	21,169	58%	7,003	64%
		9,194	100%	105,950	42%	11,491	77%	2,898	85%
Buttahatchee River	**Lamar**	2,075	0%	37,177	0%	9,782	0%	3,114	0%
		519	25%	36,493	2%	8,133	17%	2,452	21%
		1,038	50%	30,226	19%	6,071	38%	1,791	42%
		1,556	75%	26,740	28%	4,215	57%	1,129	64%
		2,075	100%	23,264	37%	2,359	76%	467	85%
Buttahatchee River	**Marion**	3,900	0%	73,378	0%	19,767	0%	7,008	0%
		975	25%	66,065	10%	15,984	19%	5,519	21%
		1,950	50%	58,752	20%	12,201	38%	4,030	43%
		2,925	75%	51,439	30%	8,418	57%	2,541	64%
		3,900	100%	44,125	40%	4,635	77%	1,051	85%
Upper Buttahatchee River	**Marion**	10,000	0%	207,382	0%	58,088	0%	23,980	0%
		2,500	25%	217,918	-5%	48,791	16%	18,884	21%
		5,000	50%	161,704	22%	35,541	39%	13,789	43%
		7,500	75%	138,865	33%	24,268	58%	8,693	64%
		10,000	100%	116,027	44%	12,995	78%	3,597	85%
Upper Sipsey River	**Marion**	4,700	0%	97,521	0%	27,321	0%	11,287	0%
		1,175	25%	93,071	5%	22,483	18%	8,888	21%
		2,350	50%	76,031	22%	16,716	39%	6,490	43%
		3,525	75%	65,285	33%	11,413	58%	4,091	64%
		4,700	100%	54,540	44%	6,111	78%	1,693	85%
Factory Creek	**Sumter**	9,600	0%	297,287	0%	80,934	0%	32,659	0%
		2,400	25%	284,931	4%	66,225	18%	25,719	21%
		4,800	50%	272,576	8%	51,517	36%	18,779	43%
		7,200	75%	260,221	12%	36,809	55%	11,839	64%
		9,600	100%	169,898	43%	18,245	77%	4,899	85%

SubWatershed	County	Acres of Cropland	Percent of Acres Put in BMP	BMP - Terraces for Cropland: Nitrogen Load from Cropland- With Percent Reductions		Phosphorus Load from Cropland- With Percent Reductions		Sediment Load from Cropland- With Percent Reductions	
Noxubee River	**Sumter**	3,500	0%	96,869	0%	29,558	0%	15,751	0%
		875	25%	95,705	1%	24,360	18%	12,404	21%
		1,750	50%	94,541	2%	19,163	35%	9,057	43%
		2,625	75%	72,058	26%	12,911	56%	5,710	64%
		3,500	100%	44,733	54%	5,956	80%	2,363	85%
Lower Tombigbee									
East Bassett Creek	**Clarke**	220	0%	7,598	0%	1,614	0%	331	0%
		55	25%	7,046	7%	1,316	18%	260	21%
		110	50%	6,495	15%	1,019	37%	190	43%
		165	75%	5,943	22%	721	55%	120	64%
		220	100%	5,391	29%	423	74%	50	85%
Dry Creek	**Marengo**	191	0%	7,230	0%	1,628	0%	458	0%
		48	25%	6,637	8%	1,322	19%	361	21%
		96	50%	6,044	16%	1,017	38%	263	42%
		143	75%	5,425	25%	709	56%	166	64%
		191	100%	4,832	33%	404	75%	69	85%
Powell Creek	**Marengo**	810	0%	30,679	0%	6,909	0%	1,946	0%
		203	25%	28,146	8%	5,611	19%	1,533	21%
		405	50%	25,587	17%	4,311	38%	1,119	43%
		608	75%	23,054	25%	3,013	56%	706	64%
		810	100%	20,495	33%	1,713	75%	292	85%
Upper Chickasaw Bogue	**Marengo**	950	0%	35,987	0%	8,105	0%	2,284	0%
		238	25%	33,012	8%	6,582	19%	1,799	21%
		475	50%	30,012	17%	5,057	38%	1,313	43%
		713	75%	27,038	25%	3,534	56%	828	64%
		950	100%	24,038	33%	2,009	75%	343	85%
Bilbo Creek	**Mobile**	265	0%	5,362	0%	1,496	0%	609	0%
		66	25%	5,123	4%	1,231	18%	480	21%
		133	50%	4,198	22%	917	39%	350	42%
		199	75%	3,610	33%	627	58%	221	64%
		265	100%	3,023	44%	336	78%	91	85%
Bilbo Creek	**Washington**	1,000	0%	20,439	0%	5,690	0%	2,298	0%
		250	25%	21,564	-6%	4,786	16%	1,810	21%
		500	50%	18,688	9%	3,684	35%	1,321	43%
		750	75%	13,788	33%	2,384	58%	833	64%
		1,000	100%	11,571	43%	1,282	77%	345	85%
Alamuchee Creek	**Sumter**	5,528	0%	129,904	0%	37,793	0%	17,661	0%
		1,382	25%	132,973	-2%	31,473	17%	13,908	21%
		2,764	50%	98,546	24%	22,934	39%	10,155	43%
		4,146	75%	82,867	36%	15,504	59%	6,402	64%
		5,528	100%	67,188	48%	8,074	79%	2,649	85%
Lower Sucarnoochee River	**Sumter**	9,000	0%	196,256	0%	44,132	0%	4,852	0%
		2,250	25%	202,193	-3%	37,088	16%	3,821	21%
		4,500	50%	208,131	-6%	30,045	32%	2,790	43%
		6,750	75%	214,069	-9%	23,001	48%	1,759	64%
		9,000	100%	146,912	25%	12,343	72%	728	85%

SubWatershed	County	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Streambank Protection and Fencing for Pastureland					
				Nitrogen Load from Pastureland - With Percent Reductions		Phosphorus Load from Pastureland - With Percent Reductions		Sediment Load from Pastureland - With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	19,191	0%	211,723	0%	26,172	0%	10,376	0%
		4,798	25%	178,721	16%	21,767	17%	8,430	19%
		9,596	50%	145,718	31%	17,362	34%	6,485	37%
		14,393	75%	112,711	47%	12,956	50%	4,539	56%
		19,191	100%	79,709	62%	8,551	67%	2,594	75%
Woodward Creek	**Pickens**	3,766	0%	39,407	0%	4,046	0%	1,100	0%
		942	25%	33,366	15%	3,389	16%	893	19%
		1,883	50%	27,321	31%	2,731	33%	687	38%
		2,825	75%	21,280	46%	2,073	49%	481	56%
		3,766	100%	15,235	61%	1,415	65%	275	75%
Woodward Creek	**Sumter**	5,320	0%	59,801	0%	7,682	0%	3,223	0%
		1,330	25%	50,444	16%	6,381	17%	2,618	19%
		2,660	50%	41,087	31%	5,080	34%	2,014	38%
		3,990	75%	31,730	47%	3,778	51%	1,410	56%
		5,320	100%	22,373	63%	2,477	68%	806	75%
Sipsey River	**Fayette**	11,816	0%	146,992	0%	23,173	0%	12,246	0%
		2,954	25%	123,473	16%	19,131	17%	9,950	19%
		5,908	50%	99,955	32%	15,089	35%	7,654	38%
		8,862	75%	76,437	48%	11,048	52%	5,358	56%
		11,816	100%	52,918	64%	7,006	70%	3,062	75%
Sipsey River	**Greene**	4,907	0%	49,860	0%	5,201	0%	1,473	0%
		1,227	25%	42,205	15%	4,353	16%	1,197	19%
		2,454	50%	34,550	31%	3,505	33%	921	37%
		3,680	75%	26,892	46%	2,656	49%	644	56%
		4,907	100%	19,237	61%	1,808	65%	368	75%
Sipsey River	**Pickens**	697	0%	7,479	0%	821	0%	262	0%
		174	25%	6,325	15%	685	16%	213	19%
		349	50%	5,175	31%	550	33%	164	37%
		523	75%	4,021	46%	415	49%	114	56%
		697	100%	2,866	62%	280	66%	65	75%
Coal Fire Creek	**Fayette**	265	0%	3,332	0%	533	0%	286	0%
		66	25%	2,797	16%	440	18%	232	19%
		133	50%	2,266	32%	347	35%	179	37%
		199	75%	1,731	48%	254	52%	125	56%
		265	100%	1,196	64%	161	70%	71	75%
Coal Fire Creek	**Lamar**	325	0%	3,492	0%	420	0%	159	0%
		81	25%	2,948	16%	349	17%	129	19%
		163	50%	2,408	31%	279	33%	100	37%
		244	75%	1,864	47%	209	50%	70	56%
		325	100%	1,320	62%	138	67%	40	75%
Coal Fire Creek	**Pickens**	1,464	0%	15,777	0%	1,749	0%	570	0%
		366	25%	13,342	15%	1,460	17%	463	19%
		732	50%	10,907	31%	1,172	33%	356	38%
		1,098	75%	8,472	46%	883	50%	250	56%
		1,464	100%	6,037	62%	594	66%	143	75%
Lower Luxapallila	**Fayette**	1,841	0%	23,494	0%	3,838	0%	2,093	0%
		460	25%	19,718	16%	3,166	18%	1,700	19%
		921	50%	15,946	32%	2,494	35%	1,308	37%
		1,381	75%	12,169	48%	1,821	53%	916	56%
		1,841	100%	8,393	64%	1,149	70%	523	75%

SubWatershed	County	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Streambank Protection and Fencing for Pastureland					
				Nitrogen Load from Pastureland - With Percent Reductions		Phosphorus Load from Pastureland - With Percent Reductions		Sediment Load from Pastureland - With Percent Reductions	
Lower Luxapallila	**Lamar**	5,160	0%	51,101	0%	4,994	0%	1,171	0%
		1,290	25%	43,295	15%	4,191	16%	951	19%
		2,580	50%	35,490	31%	3,388	32%	732	38%
		3,870	75%	27,684	46%	2,584	48%	512	56%
		5,160	100%	19,878	61%	1,781	64%	293	75%
Lower Luxapallila	**Pickens**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Upper Luxapallila	**Fayette**	5,178	0%	66,079	0%	10,796	0%	5,887	0%
		1,295	25%	55,463	16%	8,905	18%	4,783	19%
		2,589	50%	44,843	32%	7,013	35%	3,679	38%
		3,884	75%	34,227	48%	5,122	53%	2,576	56%
		5,178	100%	23,606	64%	3,230	70%	1,472	75%
Upper Luxapallila	**Marion**	3,200	0%	37,275	0%	5,285	0%	2,510	0%
		800	25%	31,383	16%	4,376	17%	2,039	19%
		1,600	50%	25,490	32%	3,468	34%	1,569	38%
		2,400	75%	19,598	47%	2,559	52%	1,098	56%
		3,200	100%	13,705	63%	1,650	69%	627	75%
Trussells Creek	**Greene**	42,000	0%	433,962	0%	47,286	0%	14,858	0%
		10,500	25%	367,085	15%	39,507	16%	12,072	19%
		21,000	50%	300,208	31%	31,727	33%	9,286	38%
		31,500	75%	233,330	46%	23,948	49%	6,500	56%
		42,000	100%	166,453	62%	16,169	66%	3,714	75%
Buttahatchee River	**Lamar**	1,821	0%	18,881	0%	2,088	0%	678	0%
		455	25%	15,966	15%	1,744	17%	551	19%
		911	50%	13,056	31%	1,399	33%	424	37%
		1,366	75%	10,141	46%	1,055	49%	297	56%
		1,821	100%	7,227	62%	710	66%	169	75%
Buttahatchee River	**Marion**	2,400	0%	27,806	0%	3,906	0%	1,835	0%
		600	25%	23,415	16%	3,235	17%	1,491	19%
		1,200	50%	19,023	32%	2,565	34%	1,147	38%
		1,800	75%	14,632	47%	1,894	52%	803	56%
		2,400	100%	10,241	63%	1,223	69%	459	75%
Upper Buttahatchee River	**Marion**	17,000	0%	216,155	0%	35,058	0%	18,999	0%
		4,250	25%	181,452	16%	28,922	18%	15,436	19%
		8,500	50%	146,749	32%	22,785	35%	11,874	38%
		12,750	75%	112,046	48%	16,649	53%	8,312	56%
		17,000	100%	77,343	64%	10,512	70%	4,750	75%
Upper Sipsey River	**Marion**	6,500	0%	85,211	0%	14,392	0%	8,065	0%
		1,625	25%	71,461	16%	11,860	18%	6,553	19%
		3,250	50%	57,712	32%	9,329	35%	5,041	38%
		4,875	75%	43,962	48%	6,798	53%	3,529	56%
		6,500	100%	30,213	65%	4,266	70%	2,016	75%
Factory Creek	**Sumter**	31,932	0%	366,460	0%	49,004	0%	21,693	0%
		7,983	25%	308,888	16%	40,651	17%	17,626	19%
		15,966	50%	251,316	31%	32,298	34%	13,558	38%
		23,949	75%	193,743	47%	23,946	51%	9,491	56%
		31,932	100%	136,171	63%	15,593	68%	5,423	75%

SubWatershed	County	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Streambank Protection and Fencing for Pastureland					
				Nitrogen Load from Pastureland - With Percent Reductions		Phosphorus Load from Pastureland - With Percent Reductions		Sediment Load from Pastureland - With Percent Reductions	
Noxubee River	**Sumter**	14,390	0%	158,756	0%	19,624	0%	7,780	0%
		3,598	25%	134,011	16%	16,322	17%	6,321	19%
		7,195	50%	109,262	31%	13,018	34%	4,862	38%
		10,793	75%	84,517	47%	9,715	50%	3,404	56%
		14,390	100%	59,768	62%	6,412	67%	1,945	75%
Lower Tombigbee									
East Bassett Creek	**Clarke**	18,440	0%	180,593	0%	17,331	0%	3,817	0%
		4,610	25%	153,046	15%	14,555	16%	3,101	19%
		9,220	50%	125,499	31%	11,779	32%	2,386	38%
		13,830	75%	97,952	46%	9,003	48%	1,670	56%
		18,440	100%	70,405	61%	6,227	64%	954	75%
Dry Creek	**Marengo**	16,829	0%	186,065	0%	23,187	0%	9,307	0%
		4,207	25%	157,037	16%	19,279	17%	7,562	19%
		8,415	50%	128,014	31%	15,371	34%	5,817	37%
		12,622	75%	98,986	47%	11,463	51%	4,072	56%
		16,829	100%	69,959	62%	7,555	67%	2,327	75%
Powell Creek	**Marengo**	21,057	0%	232,914	0%	29,053	0%	11,677	0%
		5,264	25%	196,574	16%	24,155	17%	9,488	19%
		10,529	50%	160,239	31%	19,258	34%	7,298	37%
		15,793	75%	123,900	47%	14,361	51%	5,109	56%
		21,057	100%	87,560	62%	9,463	67%	2,919	75%
Upper Chickasaw Bogue	**Marengo**	36,655	0%	384,903	0%	42,665	0%	13,908	0%
		9,164	25%	325,500	15%	35,623	17%	11,300	19%
		18,328	50%	266,096	31%	28,580	33%	8,693	37%
		27,491	75%	206,689	46%	21,538	50%	6,085	56%
		36,655	100%	147,285	62%	14,496	66%	3,477	75%
Bilbo Creek	**Mobile**	265	0%	2,821	0%	347	0%	137	0%
		66	25%	2,380	16%	289	17%	111	19%
		133	50%	1,944	31%	231	34%	85	37%
		199	75%	1,503	47%	172	50%	60	56%
		265	100%	1,063	62%	114	67%	34	75%
Bilbo Creek	**Washington**	1,500	0%	18,386	0%	2,822	0%	1,455	0%
		375	25%	15,454	16%	2,332	17%	1,182	19%
		750	50%	12,521	32%	1,841	35%	909	38%
		1,125	75%	9,589	48%	1,350	52%	636	56%
		1,500	100%	6,656	64%	860	70%	364	75%
Alamuchee Creek	**Sumter**	5,347	0%	61,364	0%	8,206	0%	3,633	0%
		1,337	25%	51,724	16%	6,807	17%	2,951	19%
		2,674	50%	42,085	31%	5,409	34%	2,270	37%
		4,010	75%	32,441	47%	4,010	51%	1,589	56%
		5,347	100%	22,802	63%	2,611	68%	908	75%
Lower Sucarnoochee River	**Sumter**	56,538	0%	546,676	0%	47,430	0%	6,482	0%
		14,135	25%	463,899	15%	40,017	16%	5,266	19%
		28,269	50%	381,118	30%	32,602	31%	4,051	38%
		42,404	75%	298,340	45%	25,189	47%	2,836	56%
		56,538	100%	215,559	61%	17,774	63%	1,620	75%

SubWatershed	County	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Terraces for Pastureland					
				Nitrogen Load from Pastureland - With Percent Reductions		Phosphorus Load from Pastureland - With Percent Reductions		Sediment Load from Pastureland - With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	19,191	0%	211,723	0%	26,172	0%	10,376	0%
		4,798	25%	197,528	7%	23,960	8%	9,286	10%
		9,596	50%	183,332	13%	21,747	17%	8,197	21%
		14,393	75%	169,129	20%	19,534	25%	7,107	32%
		19,191	100%	154,933	27%	17,322	34%	6,018	42%
Woodward Creek	**Pickens**	3,766	0%	39,407	0%	4,046	0%	1,100	0%
		942	25%	36,889	6%	3,729	8%	984	10%
		1,883	50%	34,362	13%	3,412	16%	869	21%
		2,825	75%	31,843	19%	3,095	24%	753	31%
		3,766	100%	29,316	26%	2,778	31%	638	42%
Woodward Creek	**Sumter**	5,320	0%	59,801	0%	7,682	0%	3,223	0%
		1,330	25%	55,749	7%	7,024	9%	2,884	11%
		2,660	50%	51,697	14%	6,366	17%	2,546	21%
		3,990	75%	47,644	20%	5,708	26%	2,207	32%
		5,320	100%	43,592	27%	5,049	34%	1,869	42%
Sipsey River	**Fayette**	11,816	0%	146,992	0%	23,173	0%	12,246	0%
		2,954	25%	136,409	7%	21,063	9%	10,961	11%
		5,908	50%	125,826	14%	18,953	18%	9,675	21%
		8,862	75%	115,243	22%	16,844	27%	8,389	32%
		11,816	100%	104,660	29%	14,734	36%	7,103	42%
Sipsey River	**Greene**	4,907	0%	49,860	0%	5,201	0%	1,473	0%
		1,227	25%	46,658	6%	4,790	8%	1,318	10%
		2,454	50%	43,456	13%	4,380	16%	1,164	21%
		3,680	75%	40,247	19%	3,969	24%	1,009	32%
		4,907	100%	37,045	26%	3,558	32%	854	42%
Sipsey River	**Pickens**	697	0%	7,479	0%	821	0%	262	0%
		174	25%	6,991	7%	754	8%	234	11%
		349	50%	6,511	13%	688	16%	207	21%
		523	75%	6,022	19%	622	24%	179	31%
		697	100%	5,534	26%	556	32%	152	42%
Coal Fire Creek	**Fayette**	265	0%	3,332	0%	533	0%	286	0%
		66	25%	3,089	7%	484	9%	256	11%
		133	50%	2,854	14%	436	18%	226	21%
		199	75%	2,611	22%	387	27%	196	31%
		265	100%	2,368	29%	338	37%	166	42%
Coal Fire Creek	**Lamar**	325	0%	3,492	0%	420	0%	159	0%
		81	25%	3,257	7%	384	8%	142	11%
		163	50%	3,031	13%	350	17%	126	21%
		244	75%	2,797	20%	315	25%	109	31%
		325	100%	2,562	27%	279	33%	92	42%
Coal Fire Creek	**Pickens**	1,464	0%	15,777	0%	1,749	0%	570	0%
		366	25%	14,748	7%	1,607	8%	510	11%
		732	50%	13,719	13%	1,465	16%	451	21%
		1,098	75%	12,690	20%	1,324	24%	391	32%
		1,464	100%	11,662	26%	1,182	32%	331	42%
Lower Luxapallila	**Fayette**	1,841	0%	23,494	0%	3,838	0%	2,093	0%
		460	25%	21,781	7%	3,485	9%	1,873	11%
		921	50%	20,076	15%	3,134	18%	1,654	21%
		1,381	75%	18,363	22%	2,781	28%	1,434	31%
		1,841	100%	16,650	29%	2,428	37%	1,214	42%

SubWatershed	County	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Terraces for Pastureland					
				Nitrogen Load from Pastureland - With Percent Reductions		Phosphorus Load from Pastureland - With Percent Reductions		Sediment Load from Pastureland - With Percent Reductions	
Lower Luxapallila	**Lamar**	5,160	0%	51,101	0%	4,994	0%	1,171	0%
		1,290	25%	47,866	6%	4,612	8%	1,048	11%
		2,580	50%	44,632	13%	4,229	15%	925	21%
		3,870	75%	41,397	19%	3,847	23%	802	32%
		5,160	100%	38,162	25%	3,465	31%	679	42%
Lower Luxapallila	**Pickens**	0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
		0	0%	0	0%	0	0%	0	0%
Upper Luxapallila	**Fayette**	5,178	0%	66,079	0%	10,796	0%	5,887	0%
		1,295	25%	61,271	7%	9,804	9%	5,269	10%
		2,589	50%	56,454	15%	8,812	18%	4,651	21%
		3,884	75%	51,646	22%	7,821	28%	4,033	31%
		5,178	100%	46,829	29%	6,828	37%	3,414	42%
Upper Luxapallila	**Marion**	3,200	0%	37,275	0%	5,285	0%	2,510	0%
		800	25%	34,677	7%	4,818	9%	2,246	11%
		1,600	50%	32,079	14%	4,351	18%	1,983	21%
		2,400	75%	29,481	21%	3,884	27%	1,719	32%
		3,200	100%	26,883	28%	3,416	35%	1,456	42%
Trussells Creek	**Greene**	42,000	0%	433,962	0%	47,286	0%	14,858	0%
		10,500	25%	405,785	6%	43,480	8%	13,298	11%
		21,000	50%	377,608	13%	39,675	16%	11,738	21%
		31,500	75%	349,430	19%	35,869	24%	10,178	32%
		42,000	100%	321,253	26%	32,063	32%	8,618	42%
Buttahatchee River	**Lamar**	1,821	0%	18,881	0%	2,088	0%	678	0%
		455	25%	17,648	7%	1,919	8%	607	11%
		911	50%	16,423	13%	1,750	16%	536	21%
		1,366	75%	15,191	20%	1,581	24%	464	31%
		1,821	100%	13,959	26%	1,412	32%	393	42%
Buttahatchee River	**Marion**	2,400	0%	27,806	0%	3,906	0%	1,835	0%
		600	25%	25,873	7%	3,562	9%	1,642	11%
		1,200	50%	23,940	14%	3,217	18%	1,450	21%
		1,800	75%	22,008	21%	2,873	26%	1,257	32%
		2,400	100%	20,075	28%	2,529	35%	1,064	42%
Upper Buttahatchee River	**Marion**	17,000	0%	216,155	0%	35,058	0%	18,999	0%
		4,250	25%	200,450	7%	31,843	9%	17,004	11%
		8,500	50%	184,745	15%	28,628	18%	15,009	21%
		12,750	75%	169,040	22%	25,413	28%	13,014	32%
		17,000	100%	153,335	29%	22,198	37%	11,019	42%
Upper Sipsey River	**Marion**	6,500	0%	85,211	0%	14,392	0%	8,065	0%
		1,625	25%	78,937	7%	13,059	9%	7,218	11%
		3,250	50%	72,663	15%	11,726	19%	6,372	21%
		4,875	75%	66,389	22%	10,393	28%	5,525	32%
		6,500	100%	60,115	29%	9,060	37%	4,678	42%
Factory Creek	**Sumter**	31,932	0%	366,460	0%	49,004	0%	21,693	0%
		7,983	25%	341,349	7%	44,750	9%	19,415	11%
		15,966	50%	316,237	14%	40,495	17%	17,138	21%
		23,949	75%	291,126	21%	36,241	26%	14,860	32%
		31,932	100%	266,014	27%	31,987	35%	12,582	42%

SubWatershed	County	Acres of Pasture-land	Percent of Acres Put in BMP	BMP - Terraces for Pastureland					
				Nitrogen Load from Pastureland - With Percent Reductions		Phosphorus Load from Pastureland - With Percent Reductions		Sediment Load from Pastureland - With Percent Reductions	
Noxubee River	**Sumter**	14,390	0%	158,756	0%	19,624	0%	7,780	0%
		3,598	25%	148,115	7%	17,966	8%	6,963	10%
		7,195	50%	137,465	13%	16,307	17%	6,146	21%
		10,793	75%	126,823	20%	14,648	25%	5,329	31%
		14,390	100%	116,174	27%	12,989	34%	4,512	42%
Lower Tombigbee									
East Bassett Creek	**Clarke**	18,440	0%	180,593	0%	17,331	0%	3,817	0%
		4,610	25%	169,208	6%	16,016	8%	3,416	11%
		9,220	50%	157,822	13%	14,702	15%	3,015	21%
		13,830	75%	146,437	19%	13,387	23%	2,615	32%
		18,440	100%	135,052	25%	12,073	30%	2,214	42%
Dry Creek	**Marengo**	16,829	0%	186,065	0%	23,187	0%	9,307	0%
		4,207	25%	173,558	7%	21,221	8%	8,330	11%
		8,415	50%	161,060	13%	19,256	17%	7,353	21%
		12,622	75%	148,554	20%	17,290	25%	6,375	31%
		16,829	100%	136,048	27%	15,324	34%	5,398	42%
Powell Creek	**Marengo**	21,057	0%	232,914	0%	29,053	0%	11,677	0%
		5,264	25%	217,255	7%	26,588	8%	10,451	11%
		10,529	50%	201,605	13%	24,125	17%	9,225	21%
		15,793	75%	185,947	20%	21,661	25%	7,999	31%
		21,057	100%	170,288	27%	19,197	34%	6,773	42%
Upper Chickasaw Bogue	**Marengo**	36,655	0%	384,903	0%	42,665	0%	13,908	0%
		9,164	25%	359,808	7%	39,206	8%	12,448	10%
		18,328	50%	334,713	13%	35,748	16%	10,988	21%
		27,491	75%	309,610	20%	32,289	24%	9,527	32%
		36,655	100%	284,515	26%	28,830	32%	8,067	42%
Bilbo Creek	**Mobile**	265	0%	2,821	0%	347	0%	137	0%
		66	25%	2,630	7%	318	9%	122	11%
		133	50%	2,447	13%	289	17%	108	21%
		199	75%	2,256	20%	259	25%	94	31%
		265	100%	2,065	27%	230	34%	79	42%
Bilbo Creek	**Washington**	1,500	0%	18,386	0%	2,822	0%	1,455	0%
		375	25%	17,074	7%	2,567	9%	1,302	11%
		750	50%	15,761	14%	2,312	18%	1,149	21%
		1,125	75%	14,448	21%	2,057	27%	996	32%
		1,500	100%	13,136	29%	1,802	36%	844	42%
Alamuchee Creek	**Sumter**	5,347	0%	61,364	0%	8,206	0%	3,633	0%
		1,337	25%	57,161	7%	7,494	9%	3,251	10%
		2,674	50%	52,958	14%	6,781	17%	2,870	21%
		4,010	75%	48,747	21%	6,068	26%	2,488	32%
		5,347	100%	44,544	27%	5,356	35%	2,107	42%
Lower Sucarnoochee River	**Sumter**	56,538	0%	546,676	0%	47,430	0%	6,482	0%
		14,135	25%	512,946	6%	44,028	7%	5,801	10%
		28,269	50%	479,208	12%	40,626	14%	5,120	21%
		42,404	75%	445,478	19%	37,224	22%	4,440	31%
		56,538	100%	411,740	25%	33,821	29%	3,759	42%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Steep Slope Seeder/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	10,000	0%	12,846	0%	5,329	0%	2,974	0%
		2,500	25%	10,919	15%	4,587	14%	2,371	20%
		5,000	50%	8,992	30%	3,845	28%	1,769	41%
		7,500	75%	7,065	45%	3,103	42%	1,167	61%
		10,000	100%	5,138	60%	2,361	56%	565	81%
Woodward Creek	**Pickens**	208	0%	217	0%	92	0%	46	0%
		52	25%	187	14%	80	12%	36	20%
		104	50%	158	27%	69	25%	27	41%
		156	75%	128	41%	58	37%	18	61%
		208	100%	99	54%	46	50%	9	81%
Woodward Creek	**Sumter**	2,207	0%	2,874	0%	1,191	0%	668	0%
		552	25%	2,441	15%	1,024	14%	533	20%
		1,104	50%	2,008	30%	858	28%	398	40%
		1,655	75%	1,574	45%	691	42%	262	61%
		2,207	100%	1,141	60%	524	56%	127	81%
Sipsey River	**Fayette**	83,418	0%	110,211	0%	45,561	0%	25,937	0%
		20,855	25%	93,404	15%	39,090	14%	20,685	20%
		41,709	50%	76,597	30%	32,619	28%	15,432	41%
		62,564	75%	59,790	46%	26,149	43%	10,180	61%
		83,418	100%	42,982	61%	19,678	57%	4,928	81%
Sipsey River	**Greene**	16,358	0%	21,098	0%	8,742	0%	4,911	0%
		4,090	25%	17,916	15%	7,517	14%	3,916	20%
		8,179	50%	14,734	30%	6,292	28%	2,922	41%
		12,269	75%	11,552	45%	5,067	42%	1,927	61%
		16,358	100%	8,370	60%	3,842	56%	933	81%
Sipsey River	**Pickens**	20,135	0%	25,020	0%	10,424	0%	5,669	0%
		5,034	25%	21,346	15%	9,010	14%	4,521	20%
		10,068	50%	17,673	29%	7,595	27%	3,373	40%
		15,101	75%	13,999	44%	6,181	41%	2,225	61%
		20,135	100%	10,326	59%	4,767	54%	1,077	81%
Coal Fire Creek	**Fayette**	6,399	0%	8,158	0%	3,381	0%	1,897	0%
		1,600	25%	6,929	15%	2,908	14%	1,513	20%
		3,200	50%	5,700	30%	2,435	28%	1,129	40%
		4,799	75%	4,470	45%	1,961	42%	745	61%
		6,399	100%	3,241	60%	1,488	56%	360	81%
Coal Fire Creek	**Lamar**	4,738	0%	7,124	0%	2,922	0%	1,740	0%
		1,185	25%	5,997	16%	2,488	15%	1,388	20%
		2,369	50%	4,869	32%	2,053	30%	1,035	41%
		3,554	75%	3,741	47%	1,619	45%	683	61%
		4,738	100%	2,613	63%	1,185	59%	331	81%
Coal Fire Creek	**Pickens**	68,058	0%	89,008	0%	36,942	0%	20,548	0%
		17,015	25%	75,693	15%	31,816	14%	16,387	20%
		34,029	50%	62,378	30%	26,690	28%	12,226	41%
		51,044	75%	49,063	45%	21,563	42%	8,065	61%
		68,058	100%	35,747	60%	16,437	56%	3,904	81%
Lower Luxapallila	**Fayette**	21,591	0%	28,644	0%	11,838	0%	6,750	0%
		5,398	25%	24,270	15%	10,154	14%	5,383	20%
		10,796	50%	19,896	31%	8,470	28%	4,016	40%
		16,193	75%	15,522	46%	6,786	43%	2,649	61%
		21,591	100%	11,148	61%	5,102	57%	1,283	81%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Steep Slope Seeder/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Lower Luxapallila	**Lamar**	60,746	0%	53,021	0%	22,706	0%	10,338	0%
		15,187	25%	46,323	13%	20,127	11%	8,244	20%
		30,373	50%	39,624	25%	17,548	23%	6,151	41%
		45,560	75%	32,925	38%	14,969	34%	4,058	61%
		60,746	100%	26,226	51%	12,390	45%	1,964	81%
Lower Luxapallila	**Pickens**	7,500	0%	5,314	0%	2,341	0%	860	0%
		1,875	25%	4,803	10%	2,144	8%	700	19%
		3,750	50%	4,244	20%	1,929	18%	525	39%
		5,625	75%	3,669	31%	1,707	27%	346	60%
		7,500	100%	3,085	42%	1,483	37%	163	81%
Upper Luxapallila	**Fayette**	34,056	0%	45,181	0%	18,672	0%	10,647	0%
		8,514	25%	38,282	15%	16,016	14%	8,491	20%
		17,028	50%	31,382	31%	13,360	28%	6,335	41%
		25,542	75%	24,483	46%	10,704	43%	4,179	61%
		34,056	100%	17,583	61%	8,047	57%	2,023	81%
Upper Luxapallila	**Marion**	21,558	0%	47,622	0%	19,145	0%	12,680	0%
		5,390	25%	39,406	17%	15,981	17%	10,113	20%
		10,779	50%	31,188	35%	12,818	33%	7,545	41%
		16,169	75%	22,972	52%	9,654	50%	4,977	61%
		21,558	100%	14,755	69%	6,491	66%	2,409	81%
Trussells Creek	**Greene**	36,776	0%	47,491	0%	19,676	0%	11,058	0%
		9,194	25%	40,326	15%	16,917	14%	8,819	20%
		18,388	50%	33,160	30%	14,159	28%	6,580	41%
		27,582	75%	25,994	45%	11,400	42%	4,340	61%
		36,776	100%	18,828	60%	8,641	56%	2,101	81%
Buttahatchee River	**Lamar**	26,913	0%	32,875	0%	13,673	0%	7,513	0%
		6,728	25%	28,006	15%	11,798	14%	5,991	20%
		13,457	50%	23,139	30%	9,924	27%	4,470	40%
		20,185	75%	18,270	44%	8,050	41%	2,949	61%
		26,913	100%	13,402	59%	6,176	55%	1,427	81%
Buttahatchee River	**Marion**	37,185	0%	80,393	0%	32,349	0%	21,325	0%
		9,296	25%	66,574	17%	27,028	16%	17,007	20%
		18,593	50%	52,756	34%	21,708	33%	12,689	40%
		27,889	75%	38,937	52%	16,388	49%	8,370	61%
		37,185	100%	25,118	69%	11,068	66%	4,052	81%
Upper Buttahatchee River	**Marion**	107,295	0%	322,847	0%	128,328	0%	89,932	0%
		26,824	25%	264,571	18%	105,892	17%	71,721	20%
		53,648	50%	206,295	36%	83,456	35%	53,510	40%
		80,471	75%	148,019	54%	61,020	52%	35,298	61%
		107,295	100%	89,743	72%	38,583	70%	17,087	81%
Upper Sipsey River	**Marion**	36,419	0%	120,355	0%	47,706	0%	33,892	0%
		9,105	25%	98,394	18%	39,250	18%	27,029	20%
		18,210	50%	76,432	36%	30,795	35%	20,166	40%
		27,314	75%	54,470	55%	22,340	53%	13,302	61%
		36,419	100%	32,508	73%	13,884	71%	6,439	81%
Factory Creek	**Sumter**	5,600	0%	10,995	0%	4,448	0%	2,853	0%
		1,400	25%	9,146	17%	3,736	16%	2,275	20%
		2,800	50%	7,298	34%	3,024	32%	1,698	41%
		4,200	75%	5,449	50%	2,312	48%	1,120	61%
		5,600	100%	3,600	67%	1,600	64%	542	81%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Steep Slope Seeder/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Noxubee River	**Sumter**	8,000	0%	10,277	0%	4,263	0%	2,379	0%
		2,000	25%	8,735	15%	3,669	14%	1,897	20%
		4,000	50%	7,193	30%	3,076	28%	1,415	41%
		6,000	75%	5,652	45%	2,482	42%	934	61%
		8,000	100%	4,110	60%	1,889	56%	452	81%
Lower Tombigbee									
East Bassett Creek	**Clarke**	144,659	0%	83,166	0%	37,451	0%	11,229	0%
		36,165	25%	75,890	9%	34,649	7%	8,955	20%
		72,330	50%	68,613	17%	31,848	15%	6,681	40%
		108,494	75%	61,337	26%	29,046	22%	4,407	61%
		144,659	100%	54,060	35%	26,245	30%	2,134	81%
Dry Creek	**Marengo**	7,745	0%	12,854	0%	5,245	0%	3,212	0%
		1,936	25%	10,772	16%	4,443	15%	2,562	20%
		3,873	50%	8,691	32%	3,642	31%	1,911	40%
		5,809	75%	6,609	49%	2,841	46%	1,261	61%
		7,745	100%	4,528	65%	2,039	61%	610	81%
Powell Creek	**Marengo**	16,186	0%	21,178	0%	8,772	0%	4,937	0%
		4,047	25%	17,980	15%	7,541	14%	3,937	20%
		8,093	50%	14,780	30%	6,309	28%	2,937	41%
		12,140	75%	11,581	45%	5,078	42%	1,938	61%
		16,186	100%	8,382	60%	3,846	56%	938	81%
Upper Chickasaw Bogue	**Marengo**	51,017	0%	71,160	0%	29,347	0%	16,938	0%
		12,754	25%	60,185	15%	25,121	14%	13,508	20%
		25,509	50%	49,209	31%	20,896	29%	10,078	40%
		38,263	75%	38,233	46%	16,670	43%	6,648	61%
		51,017	100%	27,257	62%	12,444	58%	3,218	81%
Bilbo Creek	**Mobile**	4,609	0%	5,853	0%	2,424	0%	1,366	0%
		1,152	25%	4,968	15%	2,083	14%	1,090	20%
		2,305	50%	4,083	30%	1,742	28%	813	40%
		3,457	75%	3,197	45%	1,401	42%	536	61%
		4,609	100%	2,312	61%	1,060	56%	260	81%
Bilbo Creek	**Washington**	127,328	0%	525,737	0%	207,203	0%	151,266	0%
		31,832	25%	427,717	19%	169,465	18%	120,635	20%
		63,664	50%	329,696	37%	131,727	36%	90,003	41%
		95,496	75%	231,676	56%	93,989	55%	59,372	61%
		127,328	100%	133,655	75%	56,251	73%	28,741	81%
Alamuchee Creek	**Sumter**	61,690	0%	80,893	0%	33,506	0%	18,859	0%
		15,423	25%	68,673	15%	28,802	14%	15,040	20%
		30,845	50%	56,452	30%	24,096	28%	11,221	41%
		46,268	75%	44,231	45%	19,392	42%	7,402	61%
		61,690	100%	32,010	60%	14,686	56%	3,583	81%
Lower Sucarnoochee River	**Sumter**	10,780	0%	6,556	0%	2,937	0%	927	0%
		2,695	25%	5,955	9%	2,706	8%	739	20%
		5,390	50%	5,355	18%	2,474	16%	551	41%
		8,085	75%	4,754	27%	2,243	24%	364	61%
		10,780	100%	4,153	37%	2,012	31%	176	81%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Straw/Crimp Seed/ Fertilizer/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	10,000	0%	12,846	0%	5,329	0%	2,974	0%
		2,500	25%	10,586	18%	4,458	16%	2,267	24%
		5,000	50%	8,326	35%	3,588	33%	1,561	48%
		7,500	75%	6,066	53%	2,718	49%	855	71%
		10,000	100%	3,806	70%	1,848	65%	149	95%
Woodward Creek	**Pickens**	208	0%	217	0%	92	0%	46	0%
		52	25%	182	16%	78	15%	35	24%
		104	50%	148	32%	65	29%	24	48%
		156	75%	113	48%	52	44%	13	71%
		208	100%	78	64%	38	58%	2	95%
Woodward Creek	**Sumter**	2,207	0%	2,874	0%	1,191	0%	668	0%
		552	25%	2,366	18%	995	16%	510	24%
		1,104	50%	1,858	35%	800	33%	351	47%
		1,655	75%	1,350	53%	604	49%	192	71%
		2,207	100%	842	71%	409	66%	33	95%
Sipsey River	**Fayette**	83,418	0%	110,211	0%	45,561	0%	25,937	0%
		20,855	25%	90,499	18%	37,972	17%	19,777	24%
		41,709	50%	70,787	36%	30,382	33%	13,617	48%
		62,564	75%	51,075	54%	22,793	50%	7,457	71%
		83,418	100%	31,363	72%	15,204	67%	1,297	95%
Sipsey River	**Greene**	16,358	0%	21,098	0%	8,742	0%	4,911	0%
		4,090	25%	17,366	18%	7,305	16%	3,744	24%
		8,179	50%	13,634	35%	5,868	33%	2,578	48%
		12,269	75%	9,902	53%	4,431	49%	1,412	71%
		16,358	100%	6,170	71%	2,995	66%	246	95%
Sipsey River	**Pickens**	20,135	0%	25,020	0%	10,424	0%	5,669	0%
		5,034	25%	20,711	17%	8,765	16%	4,322	24%
		10,068	50%	16,403	34%	7,106	32%	2,976	47%
		15,101	75%	12,095	52%	5,448	48%	1,630	71%
		20,135	100%	7,787	69%	3,789	64%	283	95%
Coal Fire Creek	**Fayette**	6,399	0%	8,158	0%	3,381	0%	1,897	0%
		1,600	25%	6,717	18%	2,826	16%	1,447	24%
		3,200	50%	5,275	35%	2,271	33%	996	47%
		4,799	75%	3,833	53%	1,716	49%	545	71%
		6,399	100%	2,391	71%	1,161	66%	95	95%
Coal Fire Creek	**Lamar**	4,738	0%	7,124	0%	2,922	0%	1,740	0%
		1,185	25%	5,802	19%	2,413	17%	1,327	24%
		2,369	50%	4,479	37%	1,903	35%	914	48%
		3,554	75%	3,157	56%	1,394	52%	500	71%
		4,738	100%	1,834	74%	885	70%	87	95%
Coal Fire Creek	**Pickens**	68,058	0%	89,008	0%	36,942	0%	20,548	0%
		17,015	25%	73,392	18%	30,930	16%	15,668	24%
		34,029	50%	57,775	35%	24,918	33%	10,788	48%
		51,044	75%	42,159	53%	18,905	49%	5,908	71%
		68,058	100%	26,542	70%	12,893	65%	1,027	95%
Lower Luxapallila	**Fayette**	21,591	0%	28,644	0%	11,838	0%	6,750	0%
		5,398	25%	23,514	18%	9,863	17%	5,147	24%
		10,796	50%	18,384	36%	7,888	33%	3,544	47%
		16,193	75%	13,254	54%	5,913	50%	1,941	71%
		21,591	100%	8,124	72%	3,938	67%	338	95%

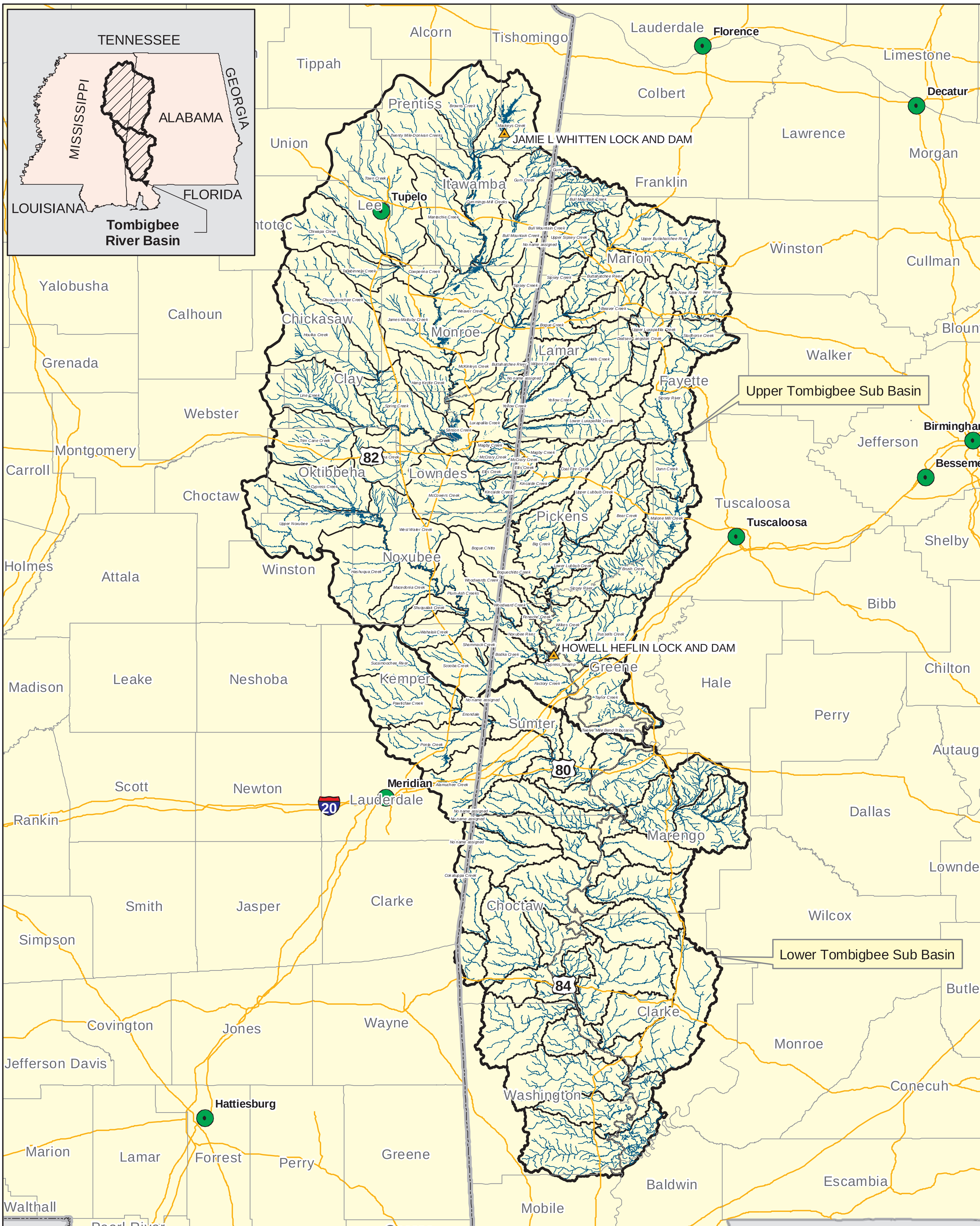
SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Straw/Crimp Seed/ Fertilizer/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Lower Luxapallila	**Lamar**	60,746	0%	53,021	0%	22,706	0%	10,338	0%
		15,187	25%	45,165	15%	19,682	13%	7,883	24%
		30,373	50%	37,308	30%	16,657	27%	5,427	48%
		45,560	75%	29,451	44%	13,632	40%	2,972	71%
		60,746	100%	21,595	59%	10,607	53%	517	95%
Lower Luxapallila	**Pickens**	7,500	0%	5,314	0%	2,341	0%	860	0%
		1,875	25%	4,673	12%	2,094	11%	659	23%
		3,750	50%	4,019	24%	1,842	21%	455	47%
		5,625	75%	3,361	37%	1,589	32%	249	71%
		7,500	100%	2,700	49%	1,334	43%	43	95%
Upper Luxapallila	**Fayette**	34,056	0%	45,181	0%	18,672	0%	10,647	0%
		8,514	25%	37,089	18%	15,557	17%	8,119	24%
		17,028	50%	28,997	36%	12,442	33%	5,590	48%
		25,542	75%	20,905	54%	9,326	50%	3,061	71%
		34,056	100%	12,813	72%	6,211	67%	532	95%
Upper Luxapallila	**Marion**	21,558	0%	47,622	0%	19,145	0%	12,680	0%
		5,390	25%	37,985	20%	15,435	19%	9,669	24%
		10,779	50%	28,348	40%	11,724	39%	6,657	48%
		16,169	75%	18,711	61%	8,014	58%	3,646	71%
		21,558	100%	9,074	81%	4,304	78%	634	95%
Trussells Creek	**Greene**	36,776	0%	47,491	0%	19,676	0%	11,058	0%
		9,194	25%	39,087	18%	16,441	16%	8,432	24%
		18,388	50%	30,683	35%	13,205	33%	5,806	48%
		27,582	75%	22,278	53%	9,969	49%	3,179	71%
		36,776	100%	13,874	71%	6,733	66%	553	95%
Buttahatchee River	**Lamar**	26,913	0%	32,875	0%	13,673	0%	7,513	0%
		6,728	25%	27,165	17%	11,475	16%	5,728	24%
		13,457	50%	21,456	35%	9,276	32%	3,944	47%
		20,185	75%	15,746	52%	7,078	48%	2,160	71%
		26,913	100%	10,036	69%	4,880	64%	376	95%
Buttahatchee River	**Marion**	37,185	0%	80,393	0%	32,349	0%	21,325	0%
		9,296	25%	64,185	20%	26,109	19%	16,260	24%
		18,593	50%	47,979	40%	19,869	39%	11,196	47%
		27,889	75%	31,771	60%	13,629	58%	6,131	71%
		37,185	100%	15,564	81%	7,390	77%	1,066	95%
Upper Buttahatchee River	**Marion**	107,295	0%	322,847	0%	128,328	0%	89,932	0%
		26,824	25%	254,499	21%	102,014	21%	68,573	24%
		53,648	50%	186,150	42%	75,700	41%	47,214	47%
		80,471	75%	117,802	64%	49,386	62%	25,855	71%
		107,295	100%	49,453	85%	23,072	82%	4,497	95%
Upper Sipsey River	**Marion**	36,419	0%	120,355	0%	47,706	0%	33,892	0%
		9,105	25%	94,598	21%	37,789	21%	25,842	24%
		18,210	50%	68,840	43%	27,872	42%	17,793	47%
		27,314	75%	43,082	64%	17,955	62%	9,744	71%
		36,419	100%	17,324	86%	8,039	83%	1,695	95%
Factory Creek	**Sumter**	5,600	0%	10,995	0%	4,448	0%	2,853	0%
		1,400	25%	8,827	20%	3,613	19%	2,176	24%
		2,800	50%	6,658	39%	2,778	38%	1,498	48%
		4,200	75%	4,490	59%	1,943	56%	820	71%
		5,600	100%	2,321	79%	1,108	75%	143	95%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/Straw/Crimp Seed/ Fertilizer/Transplant: Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Noxubee River	**Sumter**	8,000	0%	10,277	0%	4,263	0%	2,379	0%
		2,000	25%	8,469	18%	3,567	16%	1,814	24%
		4,000	50%	6,661	35%	2,871	33%	1,249	48%
		6,000	75%	4,853	53%	2,175	49%	684	71%
		8,000	100%	3,045	70%	1,479	65%	119	95%
Lower Tombigbee									
East Bassett Creek	**Clarke**	144,659	0%	83,166	0%	37,451	0%	11,229	0%
		36,165	25%	74,632	10%	34,165	9%	8,562	24%
		72,330	50%	66,098	21%	30,880	18%	5,895	47%
		108,494	75%	57,564	31%	27,594	26%	3,228	71%
		144,659	100%	49,030	41%	24,308	35%	561	95%
Dry Creek	**Marengo**	7,745	0%	12,854	0%	5,245	0%	3,212	0%
		1,936	25%	10,413	19%	4,305	18%	2,449	24%
		3,873	50%	7,972	38%	3,365	36%	1,687	47%
		5,809	75%	5,530	57%	2,425	54%	924	71%
		7,745	100%	3,089	76%	1,485	72%	161	95%
Powell Creek	**Marengo**	16,186	0%	21,178	0%	8,772	0%	4,937	0%
		4,047	25%	17,427	18%	7,328	16%	3,764	24%
		8,093	50%	13,674	35%	5,883	33%	2,592	48%
		12,140	75%	9,923	53%	4,439	49%	1,419	71%
		16,186	100%	6,170	71%	2,994	66%	247	95%
Upper Chickasaw Bogue	**Marengo**	51,017	0%	71,160	0%	29,347	0%	16,938	0%
		12,754	25%	58,287	18%	24,391	17%	12,915	24%
		25,509	50%	45,415	36%	19,435	34%	8,892	47%
		38,263	75%	32,542	54%	14,479	51%	4,870	71%
		51,017	100%	19,669	72%	9,523	68%	847	95%
Bilbo Creek	**Mobile**	4,609	0%	5,853	0%	2,424	0%	1,366	0%
		1,152	25%	4,815	18%	2,024	16%	1,042	24%
		2,305	50%	3,777	35%	1,624	33%	717	47%
		3,457	75%	2,738	53%	1,225	49%	393	71%
		4,609	100%	1,700	71%	825	66%	68	95%
Bilbo Creek	**Washington**	127,328	0%	525,737	0%	207,203	0%	151,266	0%
		31,832	25%	410,775	22%	162,942	21%	115,341	24%
		63,664	50%	295,812	44%	118,682	43%	79,415	48%
		95,496	75%	180,850	66%	74,421	64%	43,489	71%
		127,328	100%	65,888	87%	30,161	85%	7,563	95%
Alamuchee Creek	**Sumter**	61,690	0%	80,893	0%	33,506	0%	18,859	0%
		15,423	25%	66,560	18%	27,988	16%	14,380	24%
		30,845	50%	52,227	35%	22,470	33%	9,901	48%
		46,268	75%	37,894	53%	16,952	49%	5,422	71%
		61,690	100%	23,561	71%	11,434	66%	943	95%
Lower Sucarnoochee River	**Sumter**	10,780	0%	6,556	0%	2,937	0%	927	0%
		2,695	25%	5,851	11%	2,666	9%	707	24%
		5,390	50%	5,147	21%	2,394	18%	487	48%
		8,085	75%	4,443	32%	2,123	28%	266	71%
		10,780	100%	3,738	43%	1,852	37%	46	95%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/ Straw/Net/Seed/Fertilizer/Transplant — Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Upper Tombigbee									
Bodka Creek	**Sumter**	10,000	0%	12,846	0%	5,329	0%	2,974	0%
		2,500	25%	10,871	15%	4,568	14%	2,357	21%
		5,000	50%	8,897	31%	3,808	29%	1,740	42%
		7,500	75%	6,922	46%	3,048	43%	1,123	62%
		10,000	100%	4,948	61%	2,288	57%	506	83%
Woodward Creek	**Pickens**	208	0%	217	0%	92	0%	46	0%
		52	25%	187	14%	80	13%	36	21%
		104	50%	156	28%	68	25%	27	42%
		156	75%	126	42%	57	38%	17	62%
		208	100%	96	56%	45	51%	8	83%
Woodward Creek	**Sumter**	2,207	0%	2,874	0%	1,191	0%	668	0%
		552	25%	2,430	15%	1,020	14%	530	21%
		1,104	50%	1,987	31%	849	29%	391	41%
		1,655	75%	1,542	46%	678	43%	252	62%
		2,207	100%	1,099	62%	507	57%	114	83%
Sipsey River	**Fayette**	83,418	0%	110,211	0%	45,561	0%	25,937	0%
		20,855	25%	92,989	16%	38,930	15%	20,555	21%
		41,709	50%	75,767	31%	32,300	29%	15,173	42%
		62,564	75%	58,545	47%	25,669	44%	9,791	62%
		83,418	100%	41,323	63%	19,039	58%	4,409	83%
Sipsey River	**Greene**	16,358	0%	21,098	0%	8,742	0%	4,911	0%
		4,090	25%	17,837	15%	7,487	14%	3,892	21%
		8,179	50%	14,577	31%	6,231	29%	2,873	42%
		12,269	75%	11,316	46%	4,976	43%	1,854	62%
		16,358	100%	8,055	62%	3,721	57%	835	83%
Sipsey River	**Pickens**	20,135	0%	25,020	0%	10,424	0%	5,669	0%
		5,034	25%	21,256	15%	8,975	14%	4,492	21%
		10,068	50%	17,492	30%	7,526	28%	3,316	41%
		15,101	75%	13,727	45%	6,076	42%	2,140	62%
		20,135	100%	9,963	60%	4,627	56%	964	83%
Coal Fire Creek	**Fayette**	6,399	0%	8,158	0%	3,381	0%	1,897	0%
		1,600	25%	6,899	15%	2,896	14%	1,503	21%
		3,200	50%	5,639	31%	2,411	29%	1,110	41%
		4,799	75%	4,379	46%	1,926	43%	716	62%
		6,399	100%	3,120	62%	1,441	57%	323	83%
Coal Fire Creek	**Lamar**	4,738	0%	7,124	0%	2,922	0%	1,740	0%
		1,185	25%	5,969	16%	2,477	15%	1,379	21%
		2,369	50%	4,813	32%	2,032	30%	1,018	42%
		3,554	75%	3,658	49%	1,587	46%	657	62%
		4,738	100%	2,502	65%	1,142	61%	296	83%
Coal Fire Creek	**Pickens**	68,058	0%	89,008	0%	36,942	0%	20,548	0%
		17,015	25%	75,365	15%	31,690	14%	16,285	21%
		34,029	50%	61,720	31%	26,437	28%	12,021	42%
		51,044	75%	48,076	46%	21,184	43%	7,757	62%
		68,058	100%	34,432	61%	15,931	57%	3,493	83%
Lower Luxapallila	**Fayette**	21,591	0%	28,644	0%	11,838	0%	6,750	0%
		5,398	25%	24,162	16%	10,112	15%	5,350	21%
		10,796	50%	19,680	31%	8,387	29%	3,949	41%
		16,193	75%	15,198	47%	6,661	44%	2,548	62%
		21,591	100%	10,716	63%	4,936	58%	1,148	83%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/ Straw/Net/Seed/Fertilizer/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Lower Luxapallila	**Lamar**	60,746	0%	53,021	0%	22,706	0%	10,338	0%
		15,187	25%	46,157	13%	20,064	12%	8,193	21%
		30,373	50%	39,293	26%	17,421	23%	6,048	42%
		45,560	75%	32,429	39%	14,778	35%	3,903	62%
		60,746	100%	25,564	52%	12,135	47%	1,757	83%
Lower Luxapallila	**Pickens**	7,500	0%	5,314	0%	2,341	0%	860	0%
		1,875	25%	4,785	10%	2,137	9%	694	19%
		3,750	50%	4,212	21%	1,916	18%	515	40%
		5,625	75%	3,625	32%	1,690	28%	332	61%
		7,500	100%	3,030	43%	1,461	38%	146	83%
Upper Luxapallila	**Fayette**	34,056	0%	45,181	0%	18,672	0%	10,647	0%
		8,514	25%	38,111	16%	15,951	15%	8,438	21%
		17,028	50%	31,042	31%	13,229	29%	6,229	42%
		25,542	75%	23,972	47%	10,507	44%	4,019	62%
		34,056	100%	16,902	63%	7,785	58%	1,810	83%
Upper Luxapallila	**Marion**	21,558	0%	47,622	0%	19,145	0%	12,680	0%
		5,390	25%	39,203	18%	15,903	17%	10,049	21%
		10,779	50%	30,783	35%	12,662	34%	7,418	42%
		16,169	75%	22,363	53%	9,420	51%	4,787	62%
		21,558	100%	13,943	71%	6,178	68%	2,156	83%
Trussells Creek	**Greene**	36,776	0%	47,491	0%	19,676	0%	11,058	0%
		9,194	25%	40,149	15%	16,849	14%	8,764	21%
		18,388	50%	32,806	31%	14,022	29%	6,469	42%
		27,582	75%	25,463	46%	11,195	43%	4,175	62%
		36,776	100%	18,120	62%	8,368	57%	1,880	83%
Buttahatchee River	**Lamar**	26,913	0%	32,875	0%	13,673	0%	7,513	0%
		6,728	25%	27,886	15%	11,752	14%	5,954	21%
		13,457	50%	22,898	30%	9,832	28%	4,395	41%
		20,185	75%	17,910	46%	7,911	42%	2,836	62%
		26,913	100%	12,921	61%	5,991	56%	1,277	83%
Buttahatchee River	**Marion**	37,185	0%	80,393	0%	32,349	0%	21,325	0%
		9,296	25%	66,233	18%	26,897	17%	16,900	21%
		18,593	50%	52,073	35%	21,446	34%	12,475	41%
		27,889	75%	37,913	53%	15,994	51%	8,050	62%
		37,185	100%	23,753	70%	10,542	67%	3,625	83%
Upper Buttahatchee River	**Marion**	107,295	0%	322,847	0%	128,328	0%	89,932	0%
		26,824	25%	263,132	18%	105,338	18%	71,271	21%
		53,648	50%	203,417	37%	82,348	36%	52,610	41%
		80,471	75%	143,702	55%	59,358	54%	33,949	62%
		107,295	100%	83,987	74%	36,368	72%	15,288	83%
Upper Sipsey River	**Marion**	36,419	0%	120,355	0%	47,706	0%	33,892	0%
		9,105	25%	97,851	19%	39,042	18%	26,859	21%
		18,210	50%	75,348	37%	30,378	36%	19,827	41%
		27,314	75%	52,843	56%	21,713	54%	12,794	62%
		36,419	100%	30,339	75%	13,049	73%	5,762	83%
Factory Creek	**Sumter**	5,600	0%	10,995	0%	4,448	0%	2,853	0%
		1,400	25%	9,101	17%	3,718	16%	2,261	21%
		2,800	50%	7,206	34%	2,989	33%	1,669	42%
		4,200	75%	5,312	52%	2,259	49%	1,077	62%
		5,600	100%	3,417	69%	1,530	66%	485	83%

SubWatershed	County	Acres of Forest Land	Percent of Acres Put in BMP	BMP - Forestry: Site Preparation/ Straw/Net/Seed/Fertilizer/Transplant					
				Nitrogen Load from Forest Land - With Percent Reductions		Phosphorus Load from Forest Land - With Percent Reductions		Sediment Load from Forest Land - With Percent Reductions	
Noxubee River	**Sumter**	8,000	0%	10,277	0%	4,263	0%	2,379	0%
		2,000	25%	8,697	15%	3,655	14%	1,885	21%
		4,000	50%	7,117	31%	3,047	29%	1,392	42%
		6,000	75%	5,538	46%	2,438	43%	898	62%
		8,000	100%	3,958	61%	1,830	57%	404	83%
Lower Tombigbee									
East Bassett Creek	**Clarke**	144,659	0%	83,166	0%	37,451	0%	11,229	0%
		36,165	25%	75,710	9%	34,580	8%	8,899	21%
		72,330	50%	68,254	18%	31,710	15%	6,569	41%
		108,494	75%	60,798	27%	28,839	23%	4,239	62%
		144,659	100%	53,342	36%	25,968	31%	1,909	83%
Dry Creek	**Marengo**	7,745	0%	12,854	0%	5,245	0%	3,212	0%
		1,936	25%	10,721	17%	4,424	16%	2,546	21%
		3,873	50%	8,588	33%	3,603	31%	1,879	41%
		5,809	75%	6,455	50%	2,781	47%	1,213	62%
		7,745	100%	4,322	66%	1,960	63%	546	83%
Powell Creek	**Marengo**	16,186	0%	21,178	0%	8,772	0%	4,937	0%
		4,047	25%	17,901	15%	7,511	14%	3,913	21%
		8,093	50%	14,622	31%	6,248	29%	2,888	42%
		12,140	75%	11,344	46%	4,986	43%	1,864	62%
		16,186	100%	8,066	62%	3,724	58%	839	83%
Upper Chickasaw Bogue	**Marengo**	51,017	0%	71,160	0%	29,347	0%	16,938	0%
		12,754	25%	59,913	16%	25,017	15%	13,423	21%
		25,509	50%	48,667	32%	20,687	30%	9,909	41%
		38,263	75%	37,420	47%	16,357	44%	6,394	62%
		51,017	100%	26,173	63%	12,027	59%	2,879	83%
Bilbo Creek	**Mobile**	4,609	0%	5,853	0%	2,424	0%	1,366	0%
		1,152	25%	4,946	16%	2,074	14%	1,083	21%
		2,305	50%	4,039	31%	1,725	29%	799	41%
		3,457	75%	3,132	46%	1,376	43%	516	62%
		4,609	100%	2,224	62%	1,027	58%	232	83%
Bilbo Creek	**Washington**	127,328	0%	525,737	0%	207,203	0%	151,266	0%
		31,832	25%	425,296	19%	168,533	19%	119,878	21%
		63,664	50%	324,856	38%	129,863	37%	88,491	42%
		95,496	75%	224,415	57%	91,193	56%	57,103	62%
		127,328	100%	123,974	76%	52,524	75%	25,715	83%
Alamuchee Creek	**Sumter**	61,690	0%	80,893	0%	33,506	0%	18,859	0%
		15,423	25%	68,371	15%	28,685	14%	14,946	21%
		30,845	50%	55,848	31%	23,864	29%	11,033	42%
		46,268	75%	43,326	46%	19,043	43%	7,119	62%
		61,690	100%	30,803	62%	14,222	58%	3,206	83%
Lower Sucarnoochee River	**Sumter**	10,780	0%	6,556	0%	2,937	0%	927	0%
		2,695	25%	5,940	9%	2,700	8%	735	21%
		5,390	50%	5,325	19%	2,463	16%	542	42%
		8,085	75%	4,710	28%	2,226	24%	350	62%
		10,780	100%	4,094	38%	1,989	32%	158	83%



Dams

Hydrobase Streams

Highways

County Boundaries

State Boundaries

Data made available from ADEM & ESRI
Dam locations derived from National Dam Inventory

TOMBIGBEE RIVER BASIN

Including Sub-Watersheds (HUC-11)

Tombigbee River Basin Managment Plan

20 10 0 20

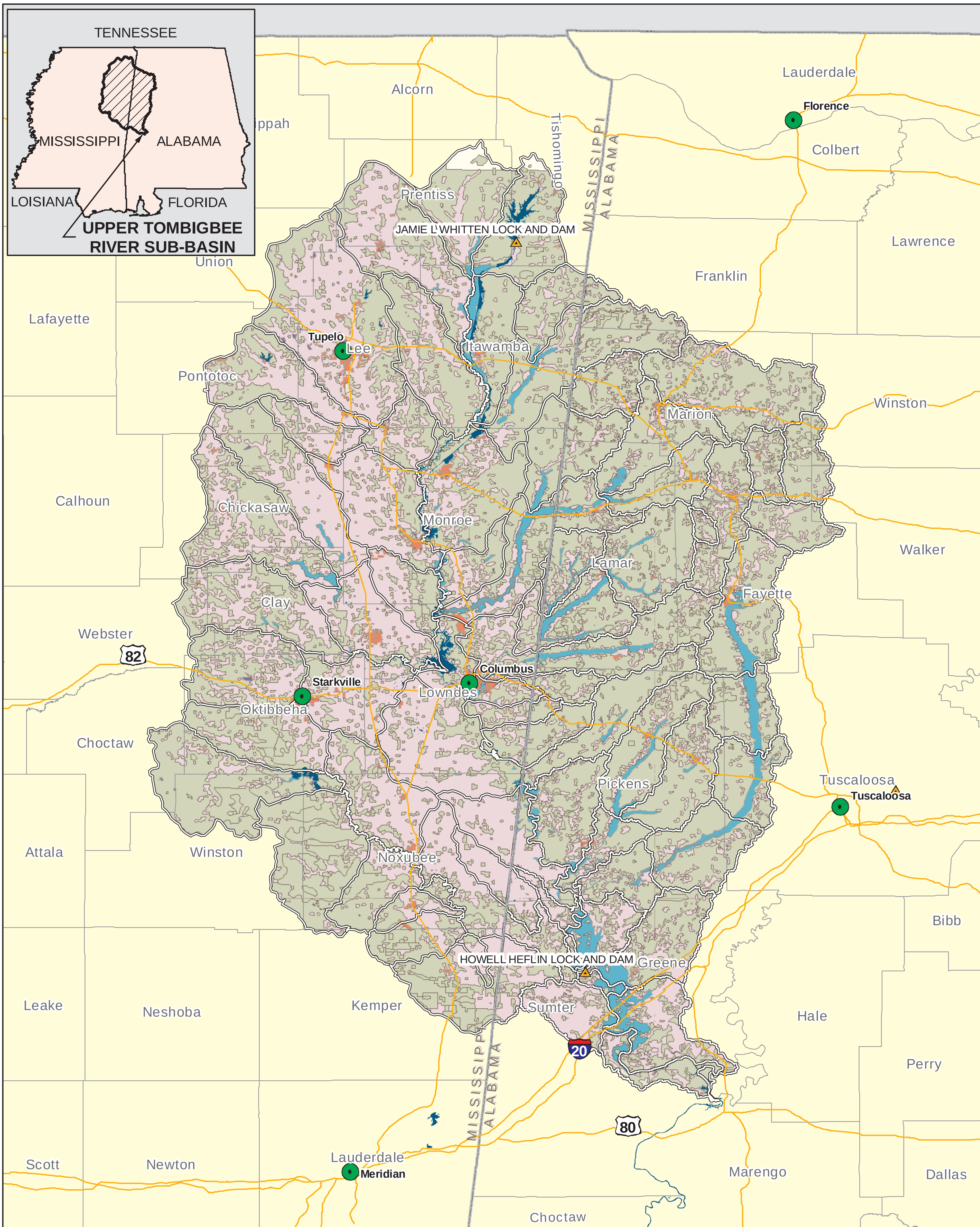
Miles

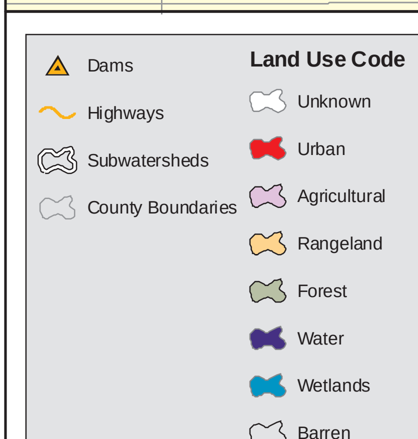
N

Map Number: 1

Map produced for: ALABAMA CLEAN WATER PARTNERSHIP

Map produced by: Kleinschmidt Energy & Water Resource Consultants





LAND USE OF THE UPPER TOMBIGBEE SUB BASIN

Tombigbee River Basin Management Plan

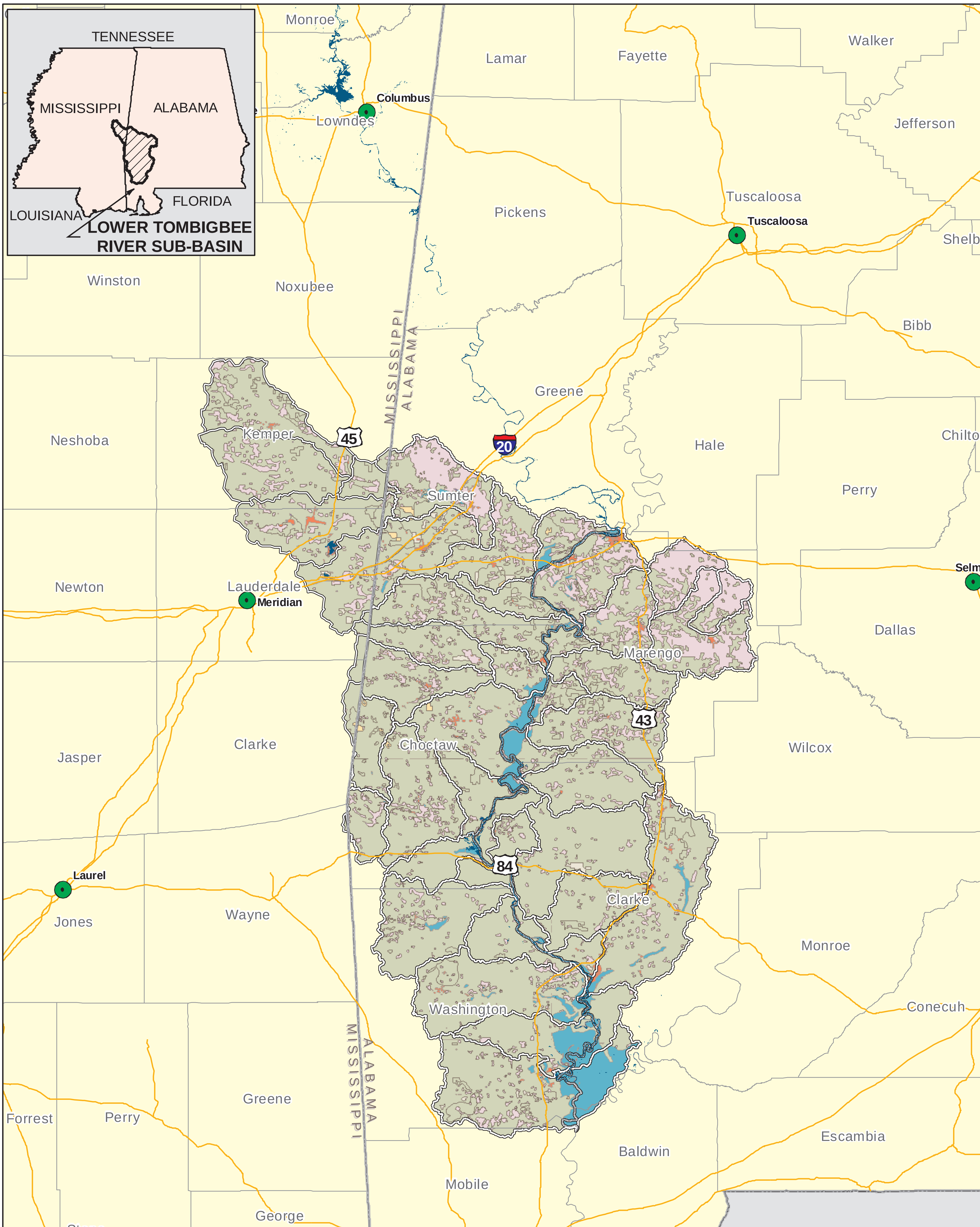
Map Number: 2

Map produced for: CWP Alabama Clean Water Partnership

Land Use data developed by USGS, 1990
Dam locations derived from National Dam Inventory

20 10 0 20
Miles

Map produced by: Kleinschmidt Energy & Water Resource Consultants



Dams	**Land Use Code**
Highways	Unknown
Subwatersheds	Urban
County Boundaries	Agricultural
	Rangeland
	Forest
	Water
	Wetlands
	Barren

LAND USE

Tombigbee River Basin Management Plan

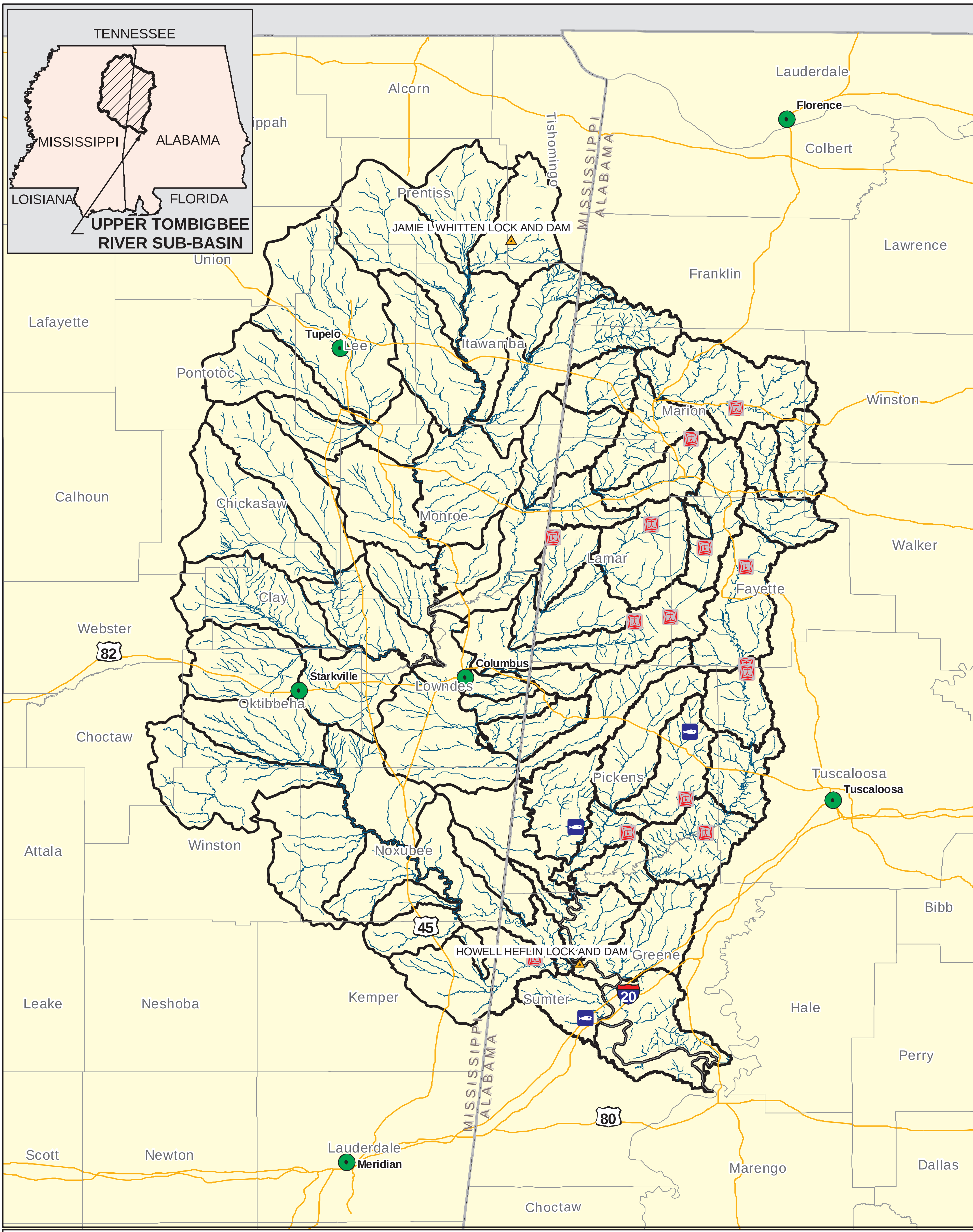
Map Number: 3

Map produced for: Alabama Clean Water Partnership

20 10 0 20
Miles

Land Use data developed by USGS, 1990
Dam locations derived from National Dam Inventory

Map produced by: Kleinschmidt Energy & Water Resource Consultants



- Dams
- 1997-2001 Alabama MAP Stations
- Ecological Reference Sites
- Highways
- Hydrobase Streams
- County Boundaries

Dam locations derived from National Dam Inventory
Data Collection Points from AL Dept. of Environmental Management

UPPER TOMBIGBEE RIVER SUB BASIN DATA COLLECTION POINTS 1990 - 2002

Tombigbee River Basin Management Plan

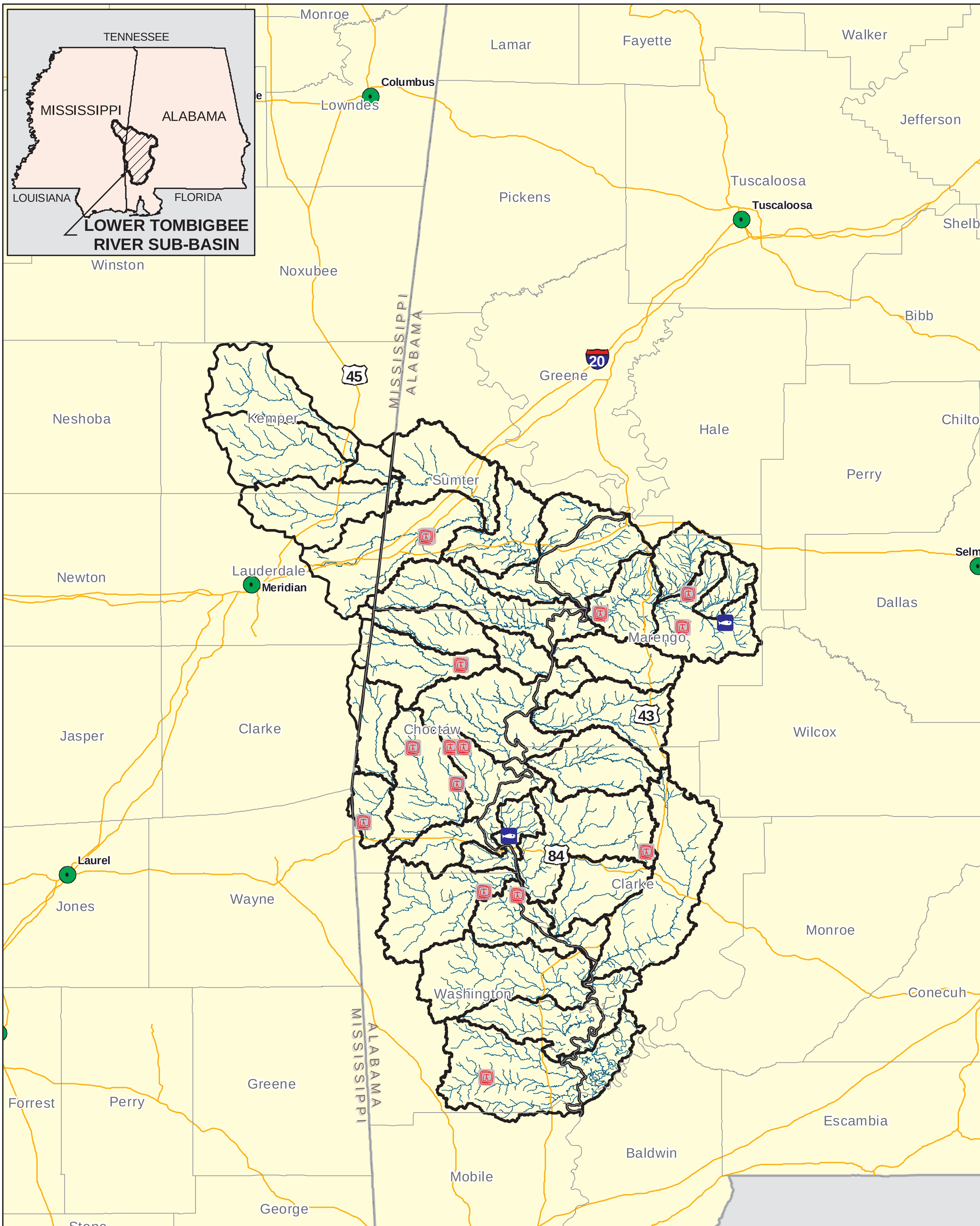
20 10 0 20
Miles

N

Map Number: 4

Map produced for: Alabama Clean Water Partnership (CWP)

Map produced by: Kleinschmidt Energy & Water Resource Consultants



- Dams
- 1997-2001 Alabama MAP Stations
- Ecological Reference Sites
- Highways
- Hydrobase Streams
- Subwatersheds
- County Boundaries

LOWER TOMBIGBEE RIVER SUB BASIN DATA COLLECTION POINTS 1990 - 2002

Map Number: 5

Tombigbee River Basin Management Plan

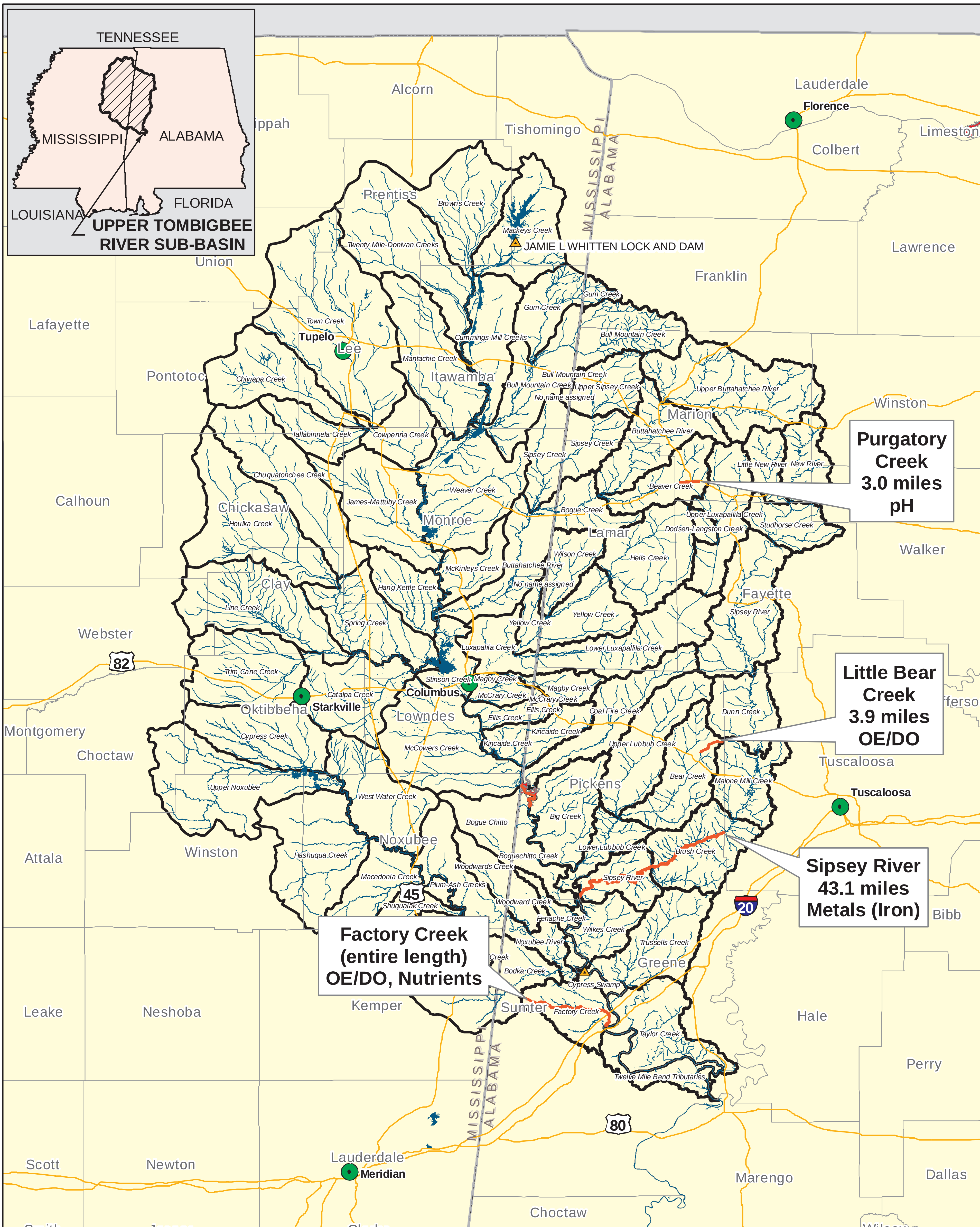
20 10 0 20

Miles

Map produced for: Alabama Clean Water Partnership

Map produced by: Kleinschmidt Energy & Water Resource Consultants

Dam locations derived from National Dam Inventory
Data Collection Points from AL Dept. of Environmental Management



Dams	
Impaired Streams	
Hydrobase Streams	
Subwatersheds	
County Boundaries	

303(d) Streams from ADEM, 2002 and 2004
Estimated by Kleinschmidt Associates
Dam locations derived from National Dam Inventory

IMPAIRED WATERS OF THE UPPER TOMBIGBEE SUB BASIN

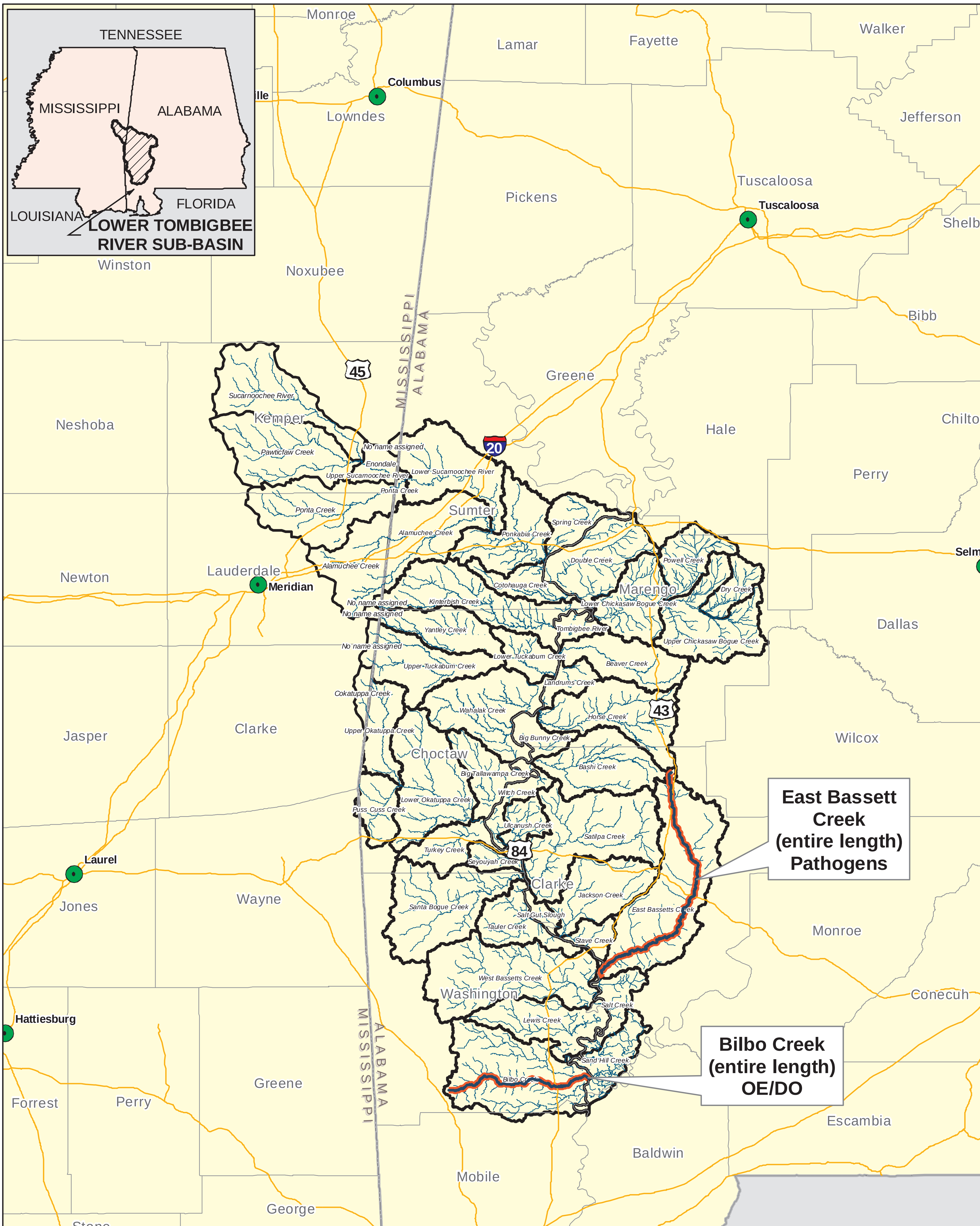
Tombigbee River Basin Management Plan

25 12.5 0 25
Miles

Map Number: 6

Map produced for: Alabama Clean Water Partnership

Map produced by: Kleinschmidt Energy & Water Resource Consultants



Dams

Impaired Streams

Hydrobase Streams

Subwatersheds

County Boundaries

303(d) Streams from ADEM, 2002 and 2004
Estimated by Kleinschmidt Associates
Dam locations derived from National Dam Inventory

IMPAIRED WATERS OF THE LOWER TOMBIGBEE SUB BASIN

Tombigbee River Basin Management Plan

20 10 0 20

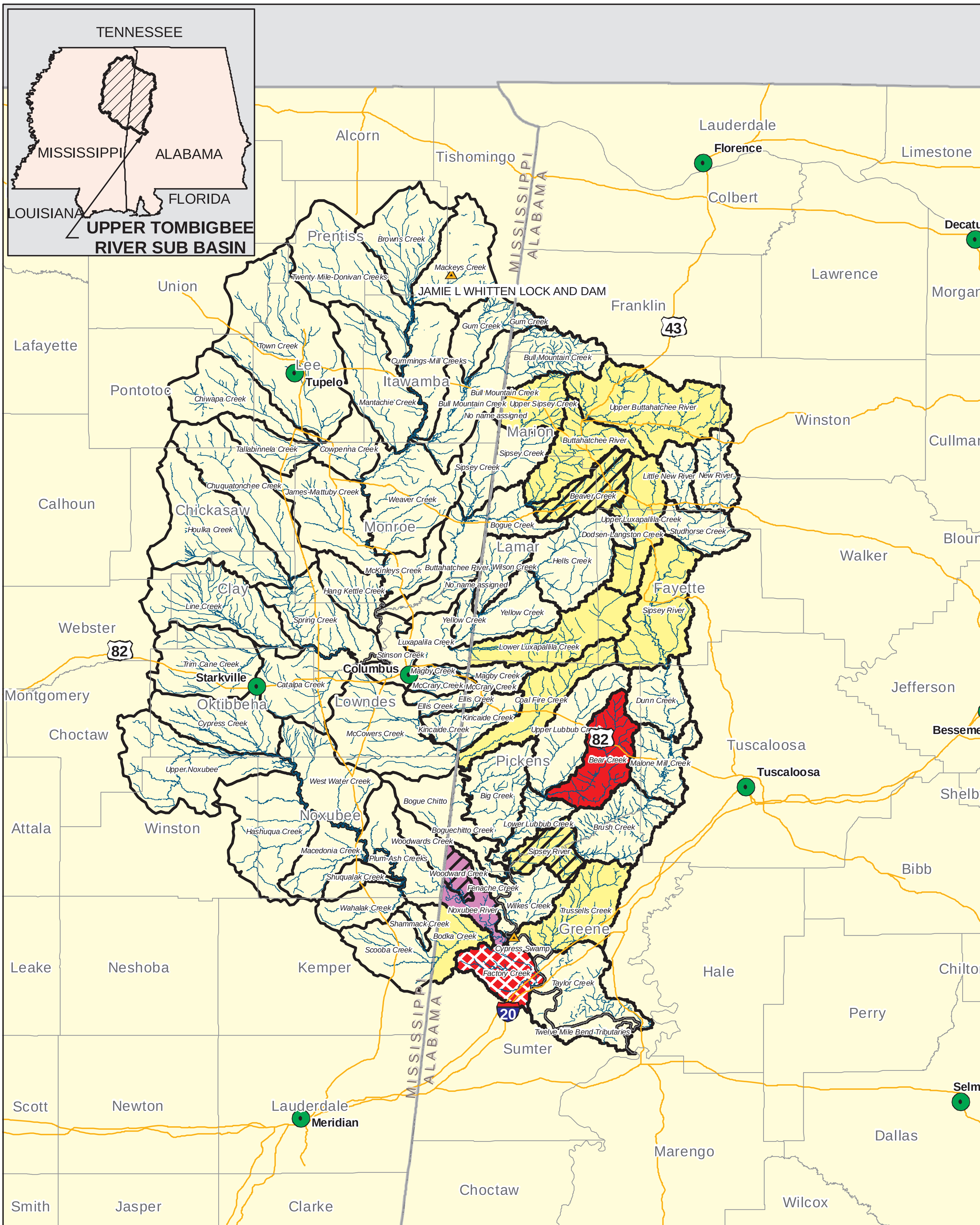
Miles

N

Map Number: 7

Map produced for: Alabama Clean Water Partnership

Map produced by: Kleinschmidt Energy & Water Resource Consultants



Target Subwatersheds

- Dams
- Highways
- Hydrobase Streams
- County Boundaries
- N/A
- 303(d)
- ADEM Priority SW
- ADEM Priority SW; 303(d)
- High NPS Potential
- High NPS Potential; ADEM Priority SW
- High NPS Potential; ADEM Priority SW; 303(d)

TARGET SUBWATERSHEDS UPPER TOMBIGBEE SUB BASIN IN ALABAMA

Tombigbee River Basin Management Plan

Map Number: 8

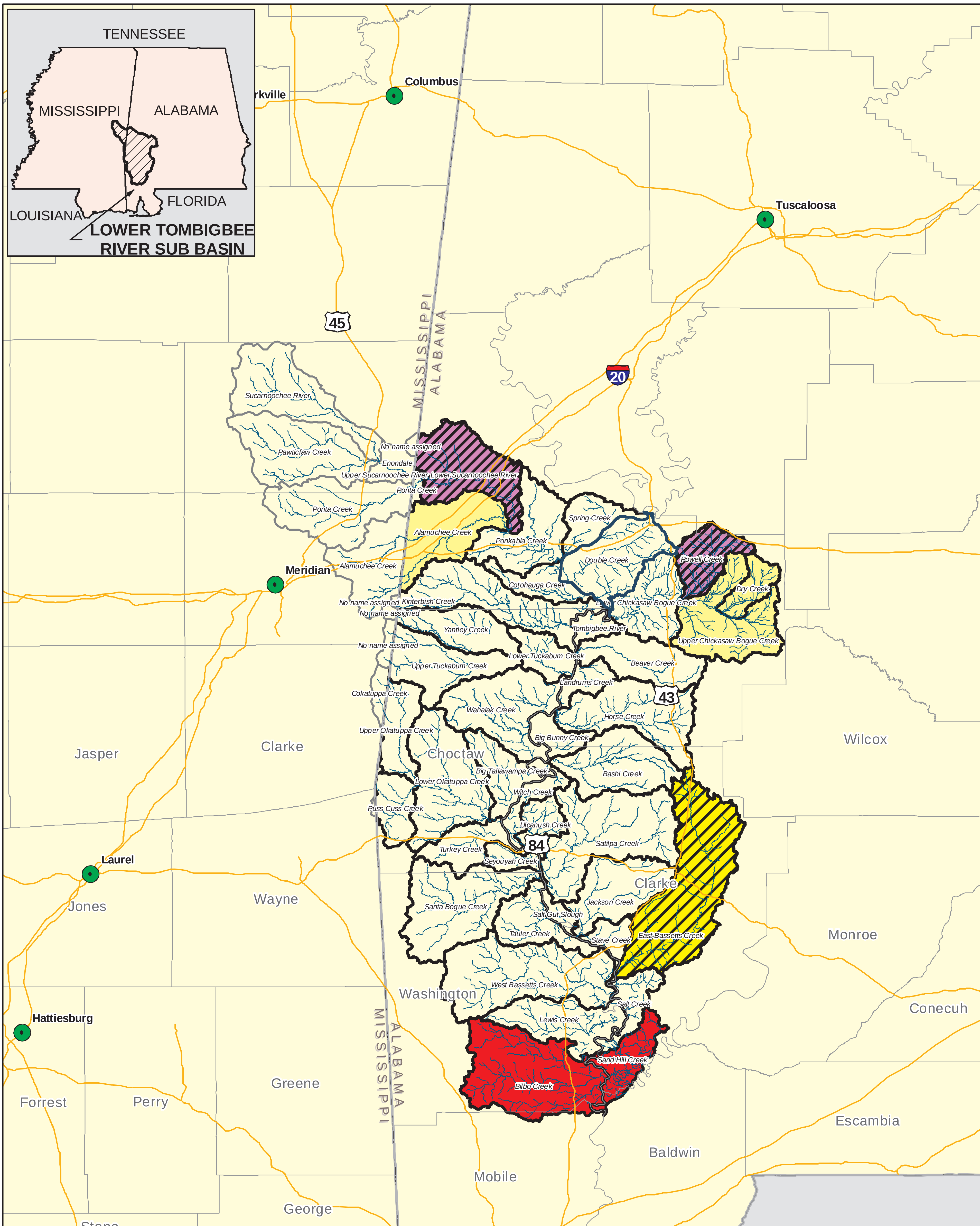
20 10 0 20

Miles

Data made available from ADEM & ESRI
Dam locations derived from National Dam Inventory
Target subwatersheds data from ADEM, 2003

Map produced for: Alabama Clean Water Partnership

Map produced by: Kleinschmidt



Target Subwatersheds

- Dams
- Hydrobase Streams
- Highways
- County Boundaries
- N/A
- 303(d)
- ADEM Priority SW
- ADEM Priority SW; 303(d)
- ADEM Priority SW; High NPS Potential

TARGET SUBWATERSHEDS LOWER TOMBIGBEE SUB BASIN IN ALABAMA

Tombigbee River Basin Management Plan

Map Number: 9

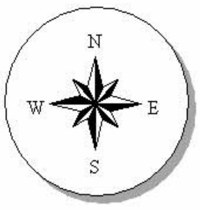
Map produced for: Alabama Clean Water Partnership

Map produced by: Kleinschmidt

20 10 0 20

Miles

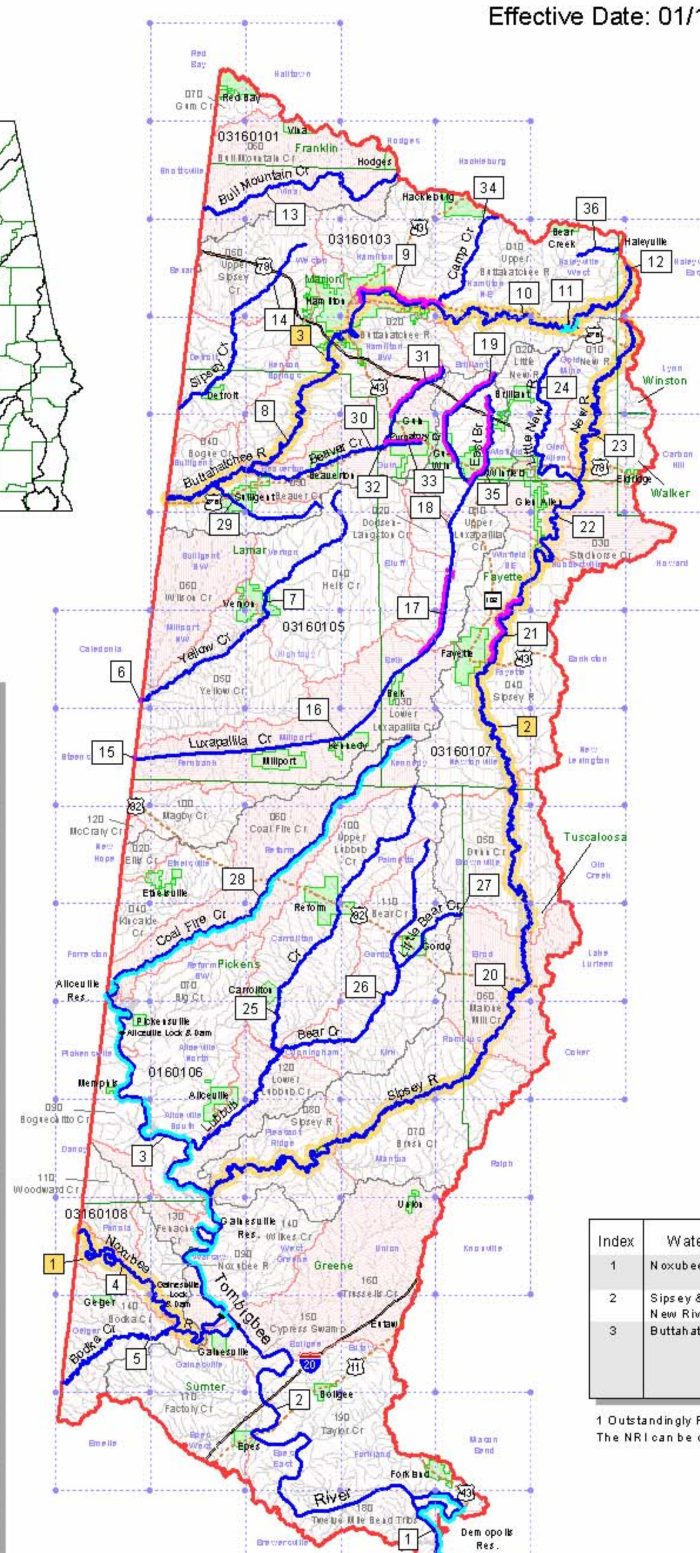
Data made available from ADEM & ESRI
Dam locations derived from National Dam Inventory
Target subwatersheds data from ADEM, 2003



FINAL

Upper Tombigbee River Basin Classified Waters

ADEM Water Division-Water Quality Program
Chapter 335-6-11
Water Use Classifications for Interstate and Intrastate Waters
Effective Date: 01/12/2001



Hydologic Unit Code

Region — Subregion — Accounting Unit — Cataloging Unit: 03160101 – 070 – USDA-NRCS Subwatershed

Highway Symbols

- 65 Interstate Highway
- 31 U.S. Highway
- 10 State Highway

Legend

- Public Water Supply (PWS) Use Classifications
- Swimming (S) Use Classifications
- Fish & Wildlife (F&W) Use Classifications
- Counties
- USDA-NRCS Subwatersheds-11 digits
- National Hydrography Dataset
- Reservoirs
- Cities and Towns
- USGS Cataloging Units-8 digits
- Nationwide Rivers Inventory (NRI) Waters

Major Roads

- Primary road with limited access
- Primary road
- USGS 7.5 Minute Series Quadrangles (1:24,000)

10 0 10 Miles

10 0 10 Kilometers

Scale 1:650,000

Software: ESRI's Arcview ™ 3.2
Extension: RTI's NHD-RIT
Avenue Script: R. Buurman's Graphtab.ave
Projection: Geographic/Unprojected
Datum: NAD83
Date: 12/12/2001
By: Mike Rief-mjr@adem.state.al.us
ADEM Water Quality Branch

USGS Catalog ID	Quad Name	ADEM Map No.
33088-B2	Aliceville North	154NW
33088-A2	Aliceville South	154SW
33087-F6	Bankston	178NW
33088-H1	Beaverton	193NE
33087-F8	Belk	179NW
34088-B2	Bexar	205NW
33087-G8	Bluff	192SW
32088-G1	Boligee	140SE
32088-E1	Brewersville	126SE
34087-A7	Brilliant	204SE
33087-D7	Brownville	166NE
33088-F3	Caledonia	90SE
33087-H5	Carbon Hill	92SE
33088-C1	Carrollton	117SE
33087-B6	Coker	152NW
33088-B1	Cunningham	154NE
33088-A3	Dancy	155SE
32087-E7	Demopolis	125SE
34088-A2	Detroit	205SW
33087-C7	Elrod	166SE
32088-F3	Emelle	127NE
32088-F1	Epes East	126NE
32088-F2	Epes West	126NW
33088-D2	Ethelsville	167NW
32087-G8	Eutaw	139SW
33087-F7	Fayette	179NE
33088-E2	Fernbank	180SW
32087-F8	Forkland	125NW
33088-C3	Forreston	168SE
32088-G2	Gainesville	140SW
32088-G3	Geiger	141SE
33087-D6	Gin Creek	165NW
33087-H6	Glen Allen	191NW
34087-A6	Gold Mine	203SW
33087-C8	Gordo	166SW
33087-H8	Guin	192NW
34087-C7	Hackleburg	216SE
34087-B5	Haleyville East	203NE
34087-B6	Haleyville West	203NW
34088-D1	Halltown	217NE
34087-B8	Hamilton	204NW
34087-B7	Hamilton NE	204NE
34087-A8	Hamilton SW	204SW
34088-A1	Henson Springs	205SE
33088-F1	Hightogy	180NE
34087-C8	Hodges	216SW
33087-G5	Howard	191SE
33087-G6	Hubbertville	191SW
33087-E8	Kennedy	179SW
33087-B8	Kirk	153NW
32087-H7	Knoxville	139NE
33087-C6	Lake Lurleen	165SW
34087-A5	Lynn	203SE
33087-A8	Mantua	153SW
32087-F7	Mason Bend	125NE
32087-E8	McDowell	125SW
33088-E1	Millport	180SE
33088-F2	Millport NW	180NW
33088-D3	New Hope	221SW
33087-E6	New Lexington	178SW
33087-E7	Newtonville	179SE
33087-D8	Palmetto	166NW
32088-H3	Panola	141NE
33088-B3	Pickensville	155NE
33088-A1	Pleasant Ridge	154SE
33087-A7	Ralph	153SE
34088-D2	Red Bay	217NW
33088-D1	Reform	167NE
33088-C2	Reform SW	167SW
33087-B7	Romulus	153NE
34088-C2	Shottsville	217SW
33088-E3	Steens	181SE
33088-H2	Sulligent	193NW
33088-G2	Sulligent SW	193SW
32087-H8	Union	139NW
33088-G1	Vernon	193SE
34088-C1	Vina	217SE
32088-H2	Warsaw	140NW
32088-H1	West Greene	140NE
34088-B1	Weston	205NE
33087-H7	Winfield	192NE
33087-G7	Winfield SE	192SE

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1-3 Nationwide Rivers Inventory (NRI)

Index	Waterbody	Location	ORVs[1]	Comments
1	Noxubee River	From the Tombigbee River To the AL/MS stateline	R, F, W, H, C	Numerous archaeological and historical sites in corridor area.
2	Sipsey & New River	From the Tombigbee River To headwaters	S, R, F, W, H, C	Excellent example of swamp river.
3	Buttahatchee Creek	From the AL/MS stateline To headwaters	S, R, G, F, W, H, C	Relatively undisturbed stream with numerous shoals and scenic bluffs; popular floating stream with exceptional fishery; sitings of American alligator, ald eagle, Bachman's warbler and Florida panther.

1 Outstandingly Remakable Values > S = Scenery, R = Recreation, G = Geology, F = Fish, W = Wildlife, H = History, C = Cultural
The NRI can be obtained from http://www.nps.gov/rivers

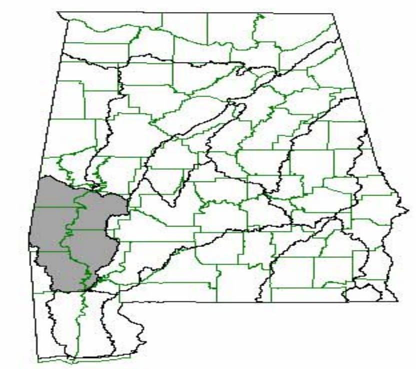
1-36 Upper Tombigbee River Basin Classified Waters

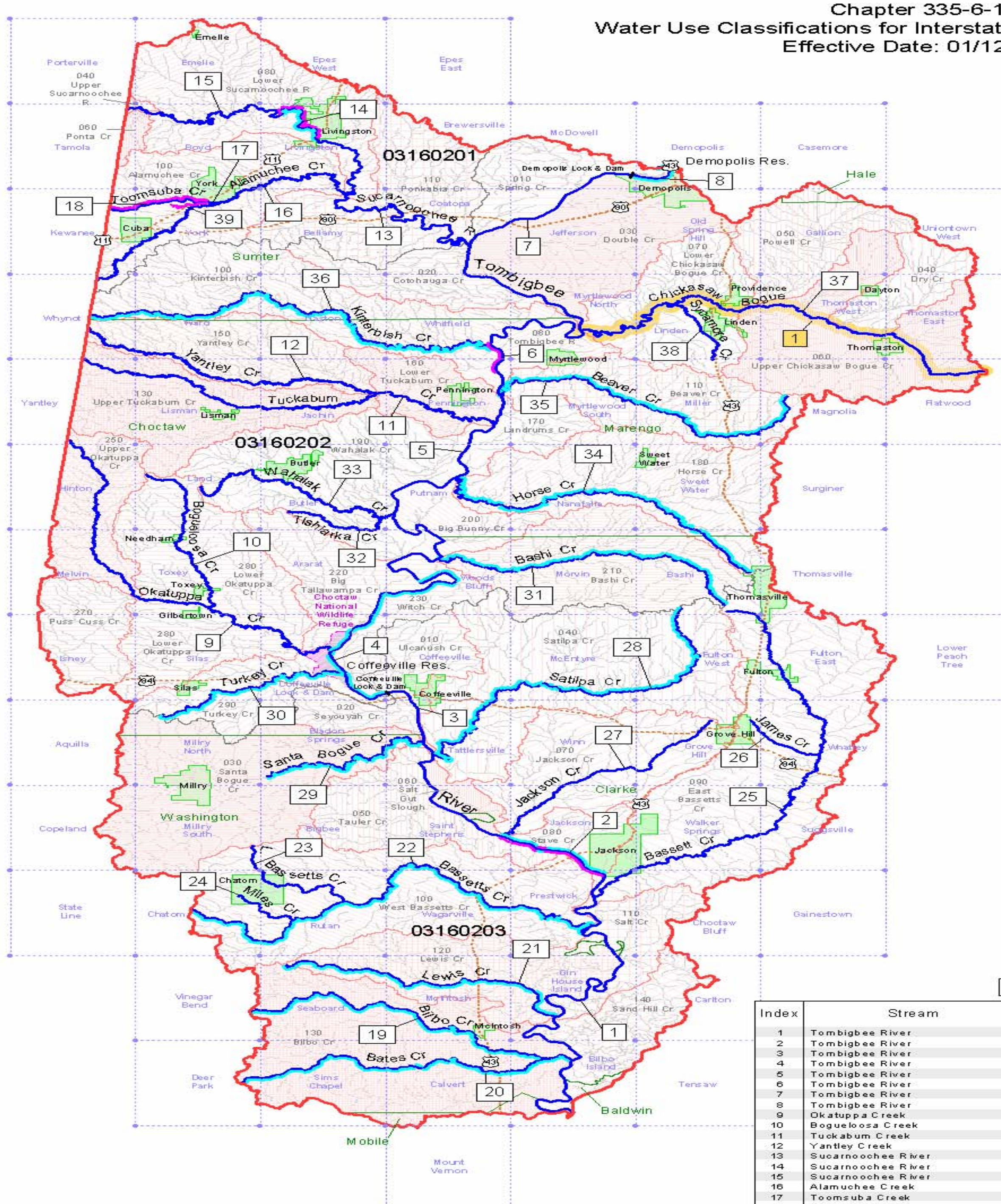
Index	Stream	From	To	Classification
1	TOMBIGBEE RIVER	Junction with WARRIOR RIVER	Cobb Creek (Mcconnico Creek)	S/F&W
2	TOMBIGBEE RIVER	Cobb Creek	Gainesville Lock and Dam	F&W
3	TOMBIGBEE RIVER (Gainesville and Aliceville Lakes)	Gainesville Lock and Dam	Alabama-Mississippi state line	S/F&W
4	Noxubee River	TOMBIGBEE RIVER	Alabama-Mississippi state line	F&W
5	Bodka Creek	Noxubee River	Alabama-Mississippi state line	F&W
6	Yellow Creek	At Alabama-Mississippi state line		PWS
7	Yellow Creek	Alabama-Mississippi state line	Its source	F&W
8	Buttahatchee River	Alabama-Mississippi state line	U.S. Hwy. 278 1 mi. E of junction of U.S. Hwys 43 & 78 in Hamilton	F&W
9	Buttahatchee River	U.S. Hwy. 278 1 mi. E of junction of U.S Hwys 43 & 78 in Hamilton	U.S. Hwy. 278 7 mi. E of junction of U.S. Hwys 43 & 78 in Hamilton	PWS/F&W
10	Buttahatchee River	U.S. Hwy. 278 7 mi. E of junction of U.S. Hwys 43 & 78 in Hamilton	Lake Buttahatchee Dam	F&W
11	Buttahatchee River	Lake Buttahatchee Dam	Head of backwaters of Lake Buttahatchee	S
12	Buttahatchee River	Head of backwaters of Lake Buttahatchee	Its source	F&W
13	Bull Mountain Creek	Alabama-Mississippi state line	Its source	F&W
14	Sipsey Creek	Alabama-Mississippi state line	Its source	F&W
15	Luxapallila Creek	At Alabama-Mississippi state line		PWS
16	Luxapallila Creek	Alabama-Mississippi state line	Fayette County Road 37	F&W
17	Luxapallila Creek	County Road 37	Co. rd crossing approx. 6 mi. US from AL Hwy 18	PWS/F&W
18	Luxapallila Creek	Co. rd crossing approx. 6 mi. US from AL Hwy 18	U.S. Highway 78	F&W
19	Luxapallila Creek	U. S. Highway 78	Its source	PWS/F&W
20	Sipsey River	TOMBIGBEE RIVER	U. S. Highway 43	F&W
21	Sipsey River	U. S. Highway 43	Alabama Highway 102	PWS/F&W
22	Sipsey River	Alabama Highway 102	Its source	F&W
23	New River	Sipsey River	Its source	F&W
24	Little New River	Sipsey River	Its source	F&W
25	Lubbub Creek	TOMBIGBEE RIVER	Its source	F&W
26	Bear Creek	Lubbub Creek	Its source	F&W
27	Little Bear Creek	Bear Creek	Its source	F&W
28	Coal Fire Creek	TOMBIGBEE RIVER	Its source	S/F&W
29	Bogue Creek	Buttahatchee River	Its source	F&W
30	Beaver Creek	Buttahatchee River	U. S. Highway 78	F&W
31	Beaver Creek	U. S. Highway 78	Its source	PWS/F&W
32	Purgatory Creek	Beaver Creek	U. S. Highway 278	F&W
33	Purgatory Creek	U. S. Highway 278	Its source	PWS/F&W
34	Camp Creek	Buttahatchee River	Its source	F&W
35	East Branch Luxapallila Creek	Luxapallila Creek At Winfield	Its source	PWS/F&W
36	Moore Creek	West Branch Buttahatchee River	Its source	F&W

FINAL

Lower Tombigbee River Basin Classified Waters

ADEM Water Division-Water Quality Program
Chapter 335-6-11
Water Use Classifications for Interstate and Intrastate Waters
Effective Date: 01/12/2001





USGS Catalog No.	Quad Name	ADEM Map No.
31088-F4	Aquilla	68NW
31088-H2	Ararat	81NW
31087-H7	Bashi	80NE
32088-D2	Bellamy	111NW
31088-E2	Bigbee	67SW
31087-B8	Bilbo Island	38NW
31088-F2	Bladon Springs	67NW
32088-E3	Boyd	127SE
32088-E1	Brewersville	126SE
32088-A2	Butler	96SW
31088-B1	Calvert	93SE
31087-C7	Carlton	33NE
32087-E6	Casemore	49SE
31088-D3	Chatom	54NE
31087-D7	Choctaw Bluff	52NE
32088-D1	Coatopa	111NE
31088-G1	Coffeeville	81SE
31088-G2	Coffeeville Lock & Dam	81SW
31088-E4	Copeland	68SW
31088-B3	Deer Park	40NE
32087-E7	Demopolis	125SE
32088-F3	Emelle	127NE
32088-F1	Epes East	126NE
32088-F2	Epes West	126NW
32087-B5	Flatwood	94NE
31087-G6	Fulton East	79SW
31087-G7	Fulton West	80SE
31087-D6	Gainestown	51NW
32087-D6	Gallion	109NW
32088-C2	Gaston	111SW
31087-C8	Gin House Island	52SW
31087-F7	Grove Hill	66NE
32088-A4	Hinton	97SW
31088-G4	Isney	82SW
32088-B2	Jachin	96NW
31087-E8	Jackson	66SW
32087-D8	Jefferson	110NW
32088-D4	Kewanee	112NW
32088-A3	Land	97SE
32087-C7	Linden	110SE
32088-B3	Lisman	97NE
32088-E2	Livingston	126SW
31087-G5	Lower Peach Tree	79SE
32087-B6	Magnolia	94NW
32087-E8	McDowell	125SW
31087-G8	McEntyre	80SW
31088-C1	McIntosh	53SE
31088-H4	Melvin	82NW
32087-B7	Miller	95NE
31088-F3	Millry North	68NE
31088-E3	Millry South	68SE
31087-H8	Morvin	80NW
31088-A1	Mount Vernon	39SE
32087-C8	Myrtlewood North	110SW
32087-B8	Myrtlewood South	95NW
32087-A8	Nanafalia	95SW
32087-D7	Old Spring Hill	110NE
32088-B1	Pennington	96NE
32088-F4	Porterville	127NW
31087-D8	Prestwick	52NW
32088-A1	Putnam	96SE
31088-D2	Rutan	53NW
31088-E1	Saint Stephens	67SE
31088-C2	Seaboard	53SW
31088-G3	Silas	82SE
31088-B2	Sims Chapel	39NW
31087-E6	Suggsville	65SW
32087-A6	Surginer	94SW
31088-D4	State Line	54NW
32087-A7	Sweet Water	95SE
32088-E4	Tamola	127SW
31088-F1	Tattlersville	67NE
31087-B7	Tensaw	38NE
32087-C5	Thomaston East	109SE
32087-C6	Thomaston West	109SW
31087-H6	Thomasville	79NW
31088-H3	Toxey	82NE
32087-D5	Uniontown West	109NE
31088-C3	Vinegar Bend	54SE
31087-G3	Vredenburgh	54SE
31088-D1	Wagarville	53NE
31087-E7	Walker Springs	66SE
32088-C3	Ward	112SE
31087-F6	Whatley	65NW
32088-C1	Whitfield	111SE
32088-C4	Whynot	112SW
31087-F8	Winn	66NW
31088-H1	Woods Bluff	81NE
32088-B4	Yantley	97NW
32088-D3	York	112NE

1 Nationwide Rivers Inventory (NRI)

Index	Waterbody	Location	ORVs[1]	Comments
1	Chickasaw Bogue	From the Tombigbee River To headwaters	S, R	One of the most popular canoe streams in the State.

1 Outstandingly Remarkable Values > S=Scenery, R=Recreation
The NRI can be obtained from http://www.nps.gov/rivers

- Public Water Supply (PWS) Usw Classification
- Swimming (S) Use Classification
- Fish & Wildlife (F&W) Use Classification
- Counties
- USDA-NRCS Subwatershed-11 digits
- National Hydrography Dataset
- Cities and Towns
- USGS Cataloging Units-8 digits
- Choctaw National Wildlife Refuge
- Nationwide Rivers Inventory (NRI) Waters
- Primary Roads
- USGS 7.5 Minute Series Quadrangles (1:24,000)

Highway Symbols
31 U.S. Highway

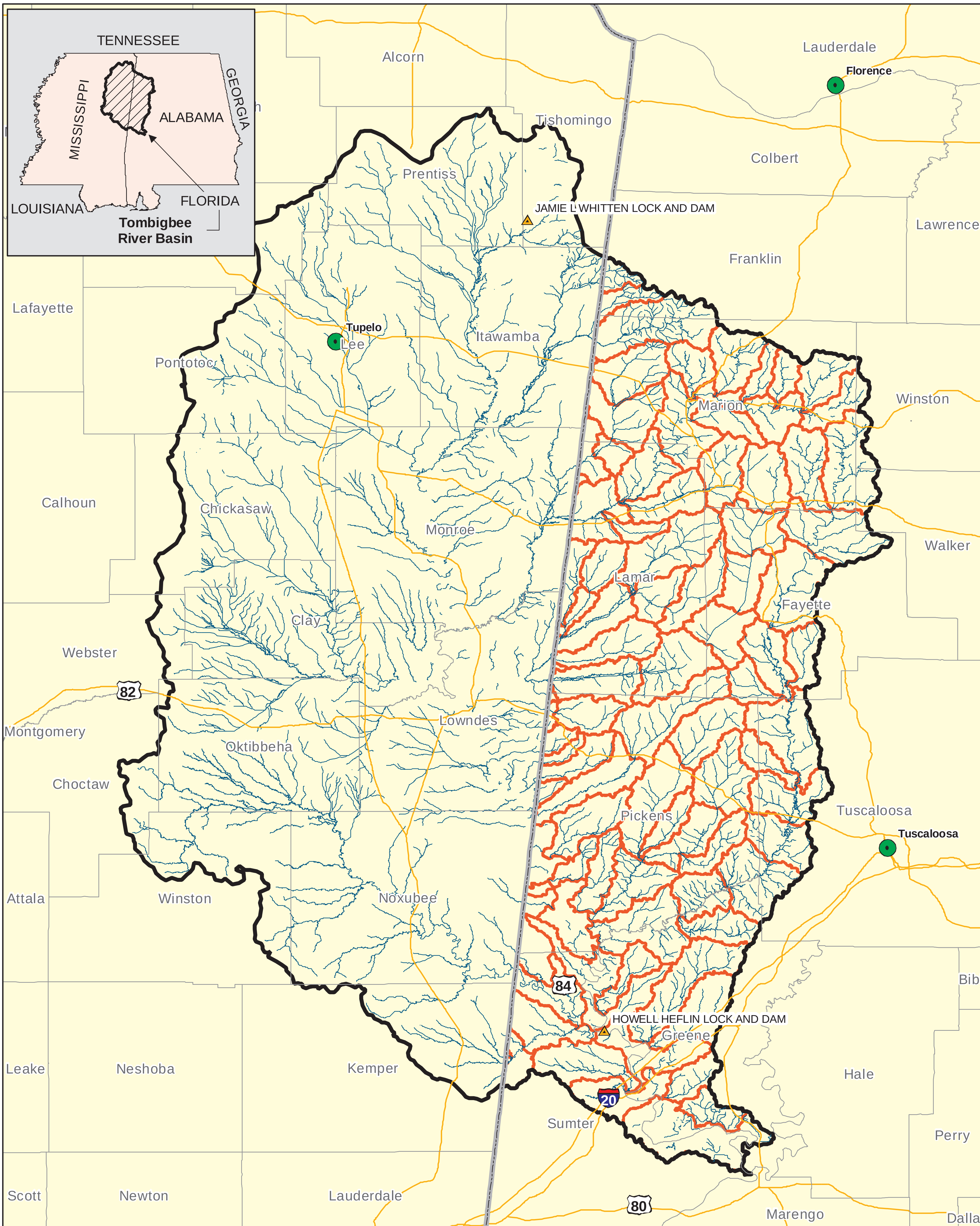
10 0 10 Miles
10 0 10 Kilometers
Scale 1:475,000

1-39 **Lower Tombigbee River Basin Classified Waters**

Index	Stream	From	To	Classification
1	Tombigbee River	MOBILE RIVER	One-half mile downstream from So. RR	F&W
2	Tombigbee River	One-half mile downstream from So. RR	Five miles upstream from U. S. Highway 43	PWS/S/F&W
3	Tombigbee River	Five miles upstream from U. S. Highway 43	Jackson (Coffeeville) Lock and Dam	F&W
4	Tombigbee River	Jackson Lock and Dam	Beach Bluff (River Mile 141)	S/F&W
5	Tombigbee River	Beach Bluff (River Mile 141)	One-half mile downstream from AL Hwy 114	F&W*
6	Tombigbee River	One-half mile downstream from AL Hwy 114	Three miles upstream from AL Hwy 114	PWS/F&W*
7	Tombigbee River	Three miles upstream from AL Hwy 114	Demopolis Lock and Dam	F&W*
8	Tombigbee River	Demopolis Lock and Dam	WARRIOR RIVER	S/F&W
9	Okatuppa Creek	TOMBIGBEE RIVER	Alabama-Mississippi state line	F&W
10	Bogueloosa Creek	Okatuppa Creek	Its source	F&W
11	Tuckabum Creek	TOMBIGBEE RIVER	Alabama-Mississippi state line	F&W
12	Yantley Creek	Tuckabum Creek	Alabama-Mississippi state line	F&W
13	Sucarnoochee River	TOMBIGBEE RIVER	U. S. Highway 11	F&W
14	Sucarnoochee River	U. S. Highway 11	Five miles US from Livingston city limits	PWS/S/F&W
15	Sucarnoochee River	Five miles upstream from U. S. Highway 11	Alabama-Mississippi state line	F&W
16	Alamuchee Creek	Sucarnoochee River	Alabama-Mississippi state line	F&W
17	Toomsuba Creek	Alamuchee Creek	AT&N Railroad	F&W
18	Toomsuba Creek	AT&N Railroad	Alabama-Mississippi state line	PWS/F&W
19	Bilbo Creek	TOMBIGBEE RIVER	Its source	S/F&W
20	Bates Creek	Bilbo Creek	Its source	S/F&W
21	Lewis Creek	TOMBIGBEE RIVER	Its source	S/F&W
22	Bassetts Creek (Washington Co.)	TOMBIGBEE RIVER	Its source	S/F&W
23	Little Bassetts Creek (Washington	Bassetts Creek (Washington Co.)	Its source	F&W
24	Miles Creek	Bassetts Creek (Washington Co.)	Its source	F&W
25	Bassett Creek (Clarke Co.)	TOMBIGBEE RIVER	Its source	F&W
26	James Creek (Clarke Co.)	Bassett Creek	Its source	F&W
27	Jackson Creek	TOMBIGBEE RIVER	Its source	F&W
28	Satilpa Creek	TOMBIGBEE RIVER	Its source	S/F&W
29	Santa Bogue Creek	TOMBIGBEE RIVER	Its source	S/F&W
30	Turkey Creek	TOMBIGBEE RIVER	Its source	S/F&W
31	Bashi Creek	TOMBIGBEE RIVER	Its source	S/F&W
32	Tishlarka Creek	Wahalak Creek	Its source	F&W
33	Wahalak Creek	TOMBIGBEE RIVER	Its source	F&W
34	Horse Creek	TOMBIGBEE RIVER	Its source	S/F&W
35	Beaver Creek	TOMBIGBEE RIVER	Its source	S/F&W
36	Kinterbish Creek	TOMBIGBEE RIVER	Alabama-Mississippi state line	S/F&W
37	Chickasaw Bogue	TOMBIGBEE RIVER	Its source	F&W
38	Sycamore Creek	Chickasaw Bogue	Its source	F&W
39	UT southwest of York (Lake Louise	Toomsuba Creek	Its source	PWS

* Applicable dissolved oxygen level below existing impoundments is 4.0 mg/l.

Software: ESRI's Arcview ™ 3.2
Extension: RTI's NHD-RIT
Avenue Script: R. Buurman's Graphtab.ave
Projection: Geographic/Unprojected
Datum: NAD83
Date: 12/07/2001
By: Mike Rief-mjr@adem.state.al.us
ADEM Water Quality Branch



- Dams
- Highways
- Hydrobase Streams
- County Boundaries
- Watershed (HUC12 Boundary)

Data made available from ADEM & ESRI
Dam locations derived from National Dam Inventory

UPPER TOMBIGBEE RIVER BASIN

Including Sub-Watersheds (HUC-12)

Tombigbee River Basin Managment Plan

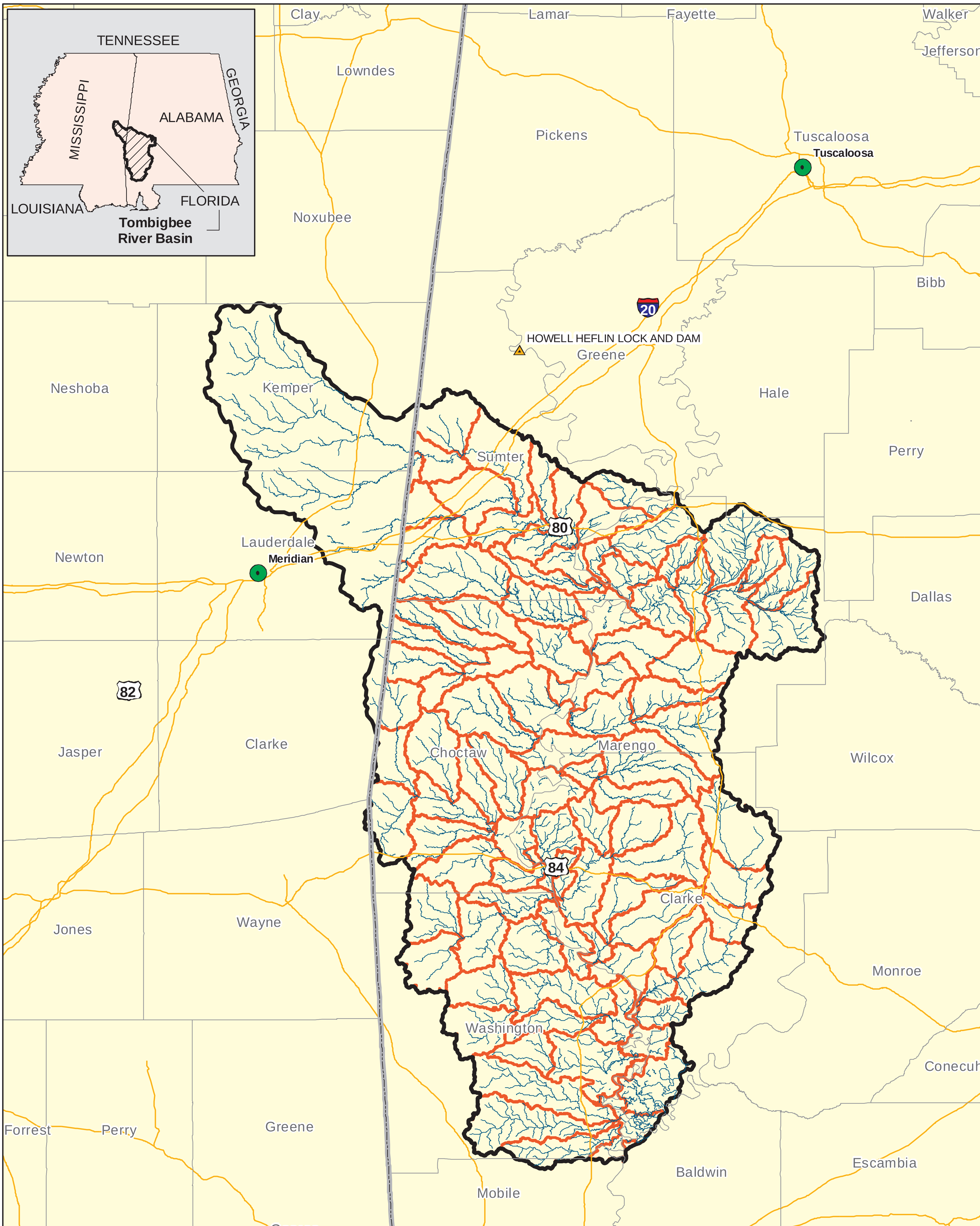
20 10 0 20

Miles

Map Number: 12

Map produced for: ALABAMA CLEAN WATER PARTNERSHIP

Map produced by: Kleinschmidt Energy & Water Resource Consultants



- Dams
- Highways
- Hydrobase Streams
- County Boundaries
- Watershed (HUC12 Boundary)

Data made available from ADEM & ESRI
Dam locations derived from National Dam Inventory

LOWER TOMBIGBEE RIVER BASIN

Including Sub-Watersheds (HUC-12)

Tombigbee River Basin Managment Plan

20 10 0 20
Miles

N

Map Number: 13

Map produced for: CWP ALABAMA CLEAN WATER PARTNERSHIP

Map produced by: Kleinschmidt Energy & Water Resource Consultants