

***Cahaba River***  
**Basin Management Plan®**

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**A Product of the Cahaba River Basin Clean Water Partnership**

This document and the process that has led to its development is the result of volunteers that have served on the Cahaba River Basin Project Steering Committee. Most of the current members have served since the projects' beginning in 1996.

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*Cover page outline map courtesy of ADEM*

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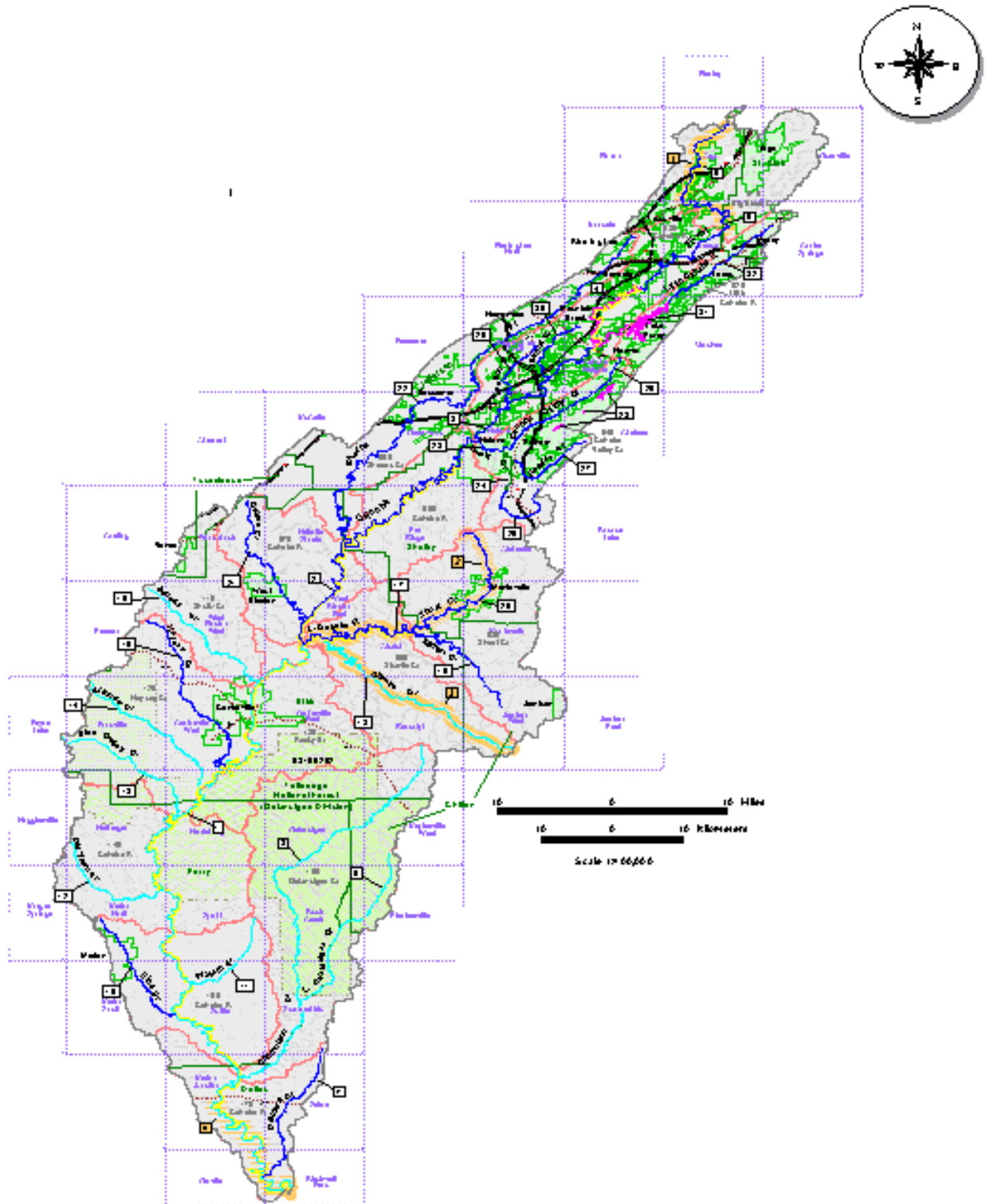
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Cahaba River Basin



<sup>1</sup> Courtesy of ADEM

## I. INTRODUCTION

To commemorate the 25<sup>th</sup> anniversary of the Clean Water Act, the White House asked Federal agencies to develop and implement a comprehensive plan that would help revitalize the Nation's commitment to our valuable water resources. The result was the Clean Water Action Plan, launched in February 1998. The key actions described in this Action Plan focus on achieving cleaner water by strengthening public health protections, targeting watershed protection efforts at high priority areas, and providing communities with new resources to control polluted runoff and enhance natural resource stewardship (The Clean Water Action Plan--Fact Sheet)

The Plan is coordinated in the State of Alabama by the Alabama Department of Environmental Management and the Natural Resources Conservation Service as the *Alabama Clean Water Partnership Project*. One key action of this project is to use the watershed management approach to safeguard water quality. Clean Water Partnership facilitators have been identified to carry out this process, coordinating activities and preparing watershed management plans for all of the major river basins in Alabama (ADEM's *Clean Water Partnership Info. Sheet*).

A steering committee comprised of stakeholders representing basin-wide interests was created within each river basin to facilitate communication and the exchange of information, and to provide vision for the protection and restoration of Alabama's rivers. The basin-wide approach is important to ensure that individual efforts are in accord with one another. For planning purposes, the river basin is further defined into smaller geographical areas based on physiographic and demographic differences by river section.

The Cahaba River Basin Clean Water Partnership (Cahaba River Basin CWP) was formed in 2002 and is a continuation of the Cahaba River Basin Project formed in 1996. It is comprised of stakeholders representing a variety of interest groups within the Cahaba River Basin. One task of the Cahaba River Basin CWP is to identify environmental problems in the Cahaba River Basin and discuss improvement measures to help alleviate these problems. Environmental problems are varied and may be the result of multiple impacts from multiple sources. Therefore a priority-based approach is typical when addressing environmental problems. The Cahaba River Basin CWP utilized a technique known as Comparative Risk Assessment (CRA) to determine priority rankings of problems and subsequently aid in the development of action strategies to implement environmental improvement measures. CRA is an overall environmental priority-setting process that assesses environmental problems based on consensus among diverse stakeholders. The CRA guides stakeholders in the evaluation and ranking of issues in terms of human health, ecological health, and quality of life. As a result, stakeholders are encouraged to consider effects of environmental impacts from at least three viewpoints. Final determinations incorporate the effects of environmental impacts, the feasibility of improvement measures, and the associated consequences to the local community of both impacts and improvements.

Prioritization of environmental issues has long been associated with the Cahaba River Basin Project. Stakeholders generated a prioritized list of concerns at the first general stakeholders meeting held in August 1996. Soon after this meeting, the Cahaba River Basin CWP was formed. One of its first activities was to conduct an initial CRA to determine the initial opinions of the interests represented by the Committee before resource data was obtained and reviewed. This CRA prioritized issues relative to impacts on Human Health, Ecological Health, and Quality of Life. Scores for the issues were consolidated to yield an overall priority ranking. Technical Subcommittees then collected information pertinent to ascertaining the status of the Cahaba Basin from an environmental perspective. The subcommittees were guided by the issues developed in the CRA in the areas of Water Quality, Water Quantity,

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Natural Resources and Conservation, Economic Development, and Education. Reports from the subcommittees aided the Cahaba River Basin CWP in focusing on specific environmental concerns.

In January 2001, based on information from the Technical Subcommittees and CRA priority rankings, the Cahaba River Basin CWP began to look at the environmental concerns in the context of environmental stressors, and the related sources of the stressors. Eight major stressors were identified by the group. A subsequent CRA prioritized these stressors as well as the associated sources of the stressors, in terms of Human Health, Ecological Health, and Quality of Life. Upon review of the results of this CRA, the Cahaba River Basin CWP directed the Technical Subcommittee Chairpersons to perform a more detailed evaluation. Of particular concern was the apparent shift in stressor prioritization from the upper regions to the lower regions of the basin. The Technical Subcommittee Chairpersons were directed to evaluate ways to subdivide the basin in order to provide a more consistent prioritization within designated portions of the basin defined by similar characteristics, primarily land use. The Technical Subcommittee Chairpersons were also directed to consolidate the priority rankings in the categories Human Health, Ecological Health, and Quality of Life into a general priority ranking to be reviewed by the Cahaba River Basin CWP and provide the basis for Watershed Restoration Action Strategies (WRAS).

After reviewing the Cahaba River Basin CWP prioritization of stressors/sources of stressors, the Technical Subcommittee Chairpersons proposed a subdivision of the Cahaba Basin in the context of Hydrologic Unit Codes (HUCs) in light of the current trend by governmental agencies to utilize HUCs in this manner. Three sub-basins could be identified along the boundaries of aggregates of HUCs that have distinctly similar land use characteristics. These sub-basins were identified as (1) Upper Basin, HUCs 010-060, (2) Middle Basin, HUCs 070-130, and (3) Lower Basin, HUCs 140-170. Delineation of sub-basins via HUCs would facilitate evaluation of recent and new environmental data. Based on knowledge of the technical subcommittee reports, a general priority ranking of stressors/sources of stressors was made for each of the sub-basins. On March 26, 2001, the Cahaba River Basin CWP approved the three sub-basin general priority rankings as the initial priorities to be addressed by the Committee. The CRA work group was directed to make a detailed review of these rankings to determine a final "top-priority" list for each sub-basin. These top-priority lists would be the focus of improvement strategies to be recommended by the Cahaba River Basin CWP and used as a basis for developing the WRAS.

The detailed review began by focusing on simplification of the general priority lists in order to provide a manageable priority list of environmental improvement measures. Further analysis by the CRA workgroup revealed that water quality impacts throughout the basin are most likely associated with three major stressor or pollutant categories: (1) sediment, (2) nutrients, and (3) toxic substances/pathogens. These stressors affect the floral and faunal ecology of the watershed most importantly by disturbing and/or altering the physical aquatic habitats within the watershed. The stressors are significant in the context of the human ecology of the watershed in that their presence can result in limitations of desired uses and, in some cases, the loss of desired uses of watershed streams.

In November of 1999, Region 4 of the Environmental Protection Agency (EPA) added around 80 miles of the Cahaba River main stem to Alabama's 303 (d) list of impaired waters. These are stream segments that fail to meet water quality standards. For the Cahaba, the cause of the impairment was attributed to habitat impairment due to excessive amounts of sediment and excessive amounts of nutrients. The EPA determined this designation to be necessary on the basis of information in Federal Register notices published by the United States Fish and

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Wildlife Service listing endangered aquatic species. The notices indicated that nutrients and sediment were contributing factors to the decline or extirpation of these species. A combination of voluntary projects, stronger regulations, and/or better enforcement may be necessary to meet current water quality standards.

## II. DESCRIPTION OF THE WATERSHED

The Cahaba River is an important resource for the state from a variety of viewpoints. It is a major municipal water supply for the Birmingham metropolitan area, and is also used for the disposal of domestic and industrial wastewater. The Cahaba is used for recreation by canoeists and fishermen, and is probably the most floated stream in Alabama (Foshee, 1975). The Cahaba River also provides important habitat for a rich assemblage of plants and animals. Continued maintenance of the Cahaba's water quality for human health reasons and for maintenance of biological integrity is a worthy goal, particularly in light of the fact that the rate of population growth in the Cahaba River basin is the highest in Alabama.

### A. LOCATION

The Cahaba River is the third largest tributary to the Alabama River in the Mobile River basin. It extends for 191 miles from its headwaters in St. Clair County northeast of Birmingham to its confluence with the Alabama River southwest of Selma. The drainage area lies entirely within the state of Alabama, and encompasses approximately 1,818 square miles including portions of St. Clair, Jefferson, Shelby, Bibb, Tuscaloosa, Perry, Chilton, and Dallas Counties. Elevation in the watershed ranges from 1,100 feet in Shelby County to 100 feet at the confluence with the Alabama River.

### B. ENVIRONMENTAL IMPORTANCE

American Rivers reported the Cahaba to be one of the ten most endangered rivers in North America. The Nature Conservancy's freshwater report ranks the Cahaba Watershed as the 29<sup>th</sup> most critical out of 2000 total watersheds in the United States. The Cahaba River contains one of the greatest occurrences of fish diversity per mile for any river in the United States. The uniqueness and diversity of biological communities inhabiting the Cahaba River drainage has been documented by several studies. Pierson and others (1989) reported 131 fish species in the Cahaba including 18 species known only to occur in the Mobile River drainage. Mayden and Kuhajda (1989) noted that the Cahaba is the most ichthyologically diverse free-flowing river for its size in North America. Harris and others (1984) reported 146 species of caddisflies from the Cahaba River system and noted that the Cahaba supported a particularly rich fauna compared to other large southeastern rivers. The Cahaba once harbored a rich mussel fauna consisting of 43 species (van der Schalie, 1938) but surveys 30 years later found only 38 species (Baldwin, 1973) and very recent surveys have found only 33 species (Shepard and others, 1994; McGregor and O'Neil, 1994). The biota of the Cahaba River watershed includes numerous species that are considered rare and/or listed for protection by the U.S. Fish and Wildlife Service, The Nature Conservancy, and the State of Alabama.

### C. CLIMATE

The climate of the Cahaba River basin is mainly influenced by frontal systems moving from the northwest to the southeast, and temperatures change rapidly from warm to cold due to the in-flow of northern air. The average annual temperature is 64°F. The average daily temperature varies from 80°F in July to 47°F in December. Summer temperatures usually reach 90°F or higher about 70 days per year, but temperatures above 100°F are relatively rare. Freezing



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temperatures are common but are usually of short duration. During the winter extreme lows of 32°F or less occur about 65 times. Snowfall is rare and averages only about one inch per year in the northern portion of the basin. (Alabama River Basin Cooperative Study, April 1977)

Average annual rainfall is about 54 inches and varies from 52 inches in the northern portion, to 60 inches in the southern portion of the basin. The nearness of the Gulf of Mexico is a major reason for plentiful rainfall in the basin. Climatic forces change with seasons but the direction and velocity of the winds do not vary greatly during the year. The more intense rains usually occur during the warmer months.

Flood producing storms over the Cahaba River basin are usually of the frontal type. They usually occur in the winter and spring and last from 2 to 4 days. Normally 5 to 6 inches of intense or general rainfall will cause widespread flooding, but on many smaller streams, 3 to 4 inches of rainfall are sufficient to produce significant flooding. During the last 37 years, 80% of the flood-producing storms occurred during winter and spring months, and 25-30% of these storms occurred in March. Occasionally, several wet years or dry years occur in series; however, annual rainfall records indicate no patterns. The greatest probability of drought is in May and October. (Alabama River Basin Cooperative Study, April 1977)

Wind in the basin is normally less than 10 miles per hour. During the passage of cyclonic disturbances over and to the north of the basin, there have been destructive local windstorms with some developing into tornadoes. The southern portion of the basin occasionally experiences high winds when hurricanes move inland from the Gulf of Mexico.

#### **D. SOILS**

Kaufman and Wise (1978) described the soil resources of the Cahaba for a Wild and Scenic River Study Report and part of their report is presented here. The major soils of the Cahaba River system were formed from sedimentary rocks deposited during the Pennsylvanian and Cretaceous Ages. Soil provinces generally correspond to the physiographic layout and climatic conditions in the Cahaba basin. Generally five major soil provinces are represented in the basin; soils of the limestone valleys and uplands, soils of the Appalachian Plateau, soils of the Coastal Plain, soils of the Black Belt, and soils of the flood plains and terraces.

Soils of the limestone valleys and uplands were formed from the weathering of pure and cherty limestone. Soils in valleys formed from pure limestone while soils on the uplands formed from cherty limestone. These soils are typically red clay loams where plants are cultivated on the gentle slopes while steeper slopes are wooded. The Minvale-Bodine-Fullerton association is commonly found in the limestone valleys and uplands. Appalachian Plateau soils are dominated by the Montevallo-Townley-Enders association and were formed principally from sandstone and shale and occur most frequently in mountainous regions in the folded valleys and ridges. Sandy loams are found on the sandstone plateaus.

Coastal Plain soils were formed from erosion of sediments of the Appalachian Plateau region to the north. The Luverne-Smithdale-Boswell association is

representative of soils in the Coastal Plain. These well-drained soils are found in gently rolling to hilly woodlands that support pine mixed with hardwoods and large open areas of crop or pasture. The Cahaba-Chewacla-Myatt soil association is a major component of flood plains and terraces along the main stem of the Cahaba. These soils are typical of bottomland hardwoods, fields, and along streams in the Coastal Plain. Cahaba soils are deep, well drained, and found along terraces of larger streams. The Chewacla and Myatt soils are deep but poorly drained and occupy level flood plains and low terraces. The remaining soil province is found in the Black Belt. The topography of these soils is rolling with some steep hills and level fields and prairies. A large portion of the Black Belt is grassland with pine occurring on more acid soils. The soils in the Black Belt are represented by the Sumter-Oktribbeha-Leeper association, which are moderately deep to deep and well drained. They have neutral and calcareous subsoils with some being highly calcareous in the surface layers. Clayey soils with a high shrink/swell potential are common.

## **E. PHYSICAL AND GEOLOGIC FEATURES**

The Alabama Valley and Ridge consists of a series of folded and faulted parallel ridges and valleys that trend northeast-southwest with elevations ranging from 600 to 2,100 feet. Ridges are made of sandstone and chert while valleys are generally developed on limestone and shale. Seven districts are described in the Alabama Valley and Ridge and the Cahaba River drains two of these, the Cahaba Valley and the Cahaba Ridges.

The Cahaba Valley district lies between the Cahaba Ridges and Coosa Ridges districts and extends for approximately 75 miles across Bibb, Jefferson, Chilton, Shelby, and St. Clair Counties. It averages about ten miles wide and is developed on weathered, soluble limestones and dolomites, erodible shales, and resistant chert beds. The principle streams that drain the Cahaba Valley and flow into the Cahaba River include the upper Little Cahaba River and Lake Purdy, Cahaba Valley Creek, Buck Creek, and the lower Little Cahaba River near Centreville. The Cahaba Valley is within the Appalachian foreland fold and thrust belt and is underlain by Paleozoic sedimentary rocks ranging in age from early Cambrian to Late Mississippian.

The Cahaba Ridges district lies between the Cahaba Valley and the Birmingham-Big Canoe Valley and is about 65 miles long and five miles wide. It is characterized by several parallel northeast-southwest trending ridges formed by massive sandstone and conglomerate beds of the Pottsville and Parkwood Formations that rise 200 to 500 feet above the surrounding valleys. The Cahaba Ridges forms a structural barrier to the flow of the Cahaba River, which has adapted by developing a trellised drainage pattern with the main river channel meandering back and forth through the ridges.

The East Gulf Coastal Plain section in Alabama is characterized by gently rolling hills, sharp ridges, prairies, and broad alluvial flood plains. Rocks underlying the Coastal Plains are of sedimentary origin and consist of sand, gravel, porous limestone, chalk, marl, and clay. These strata dip underground to the southwest at approximately 20 to 40 feet per mile and strike generally in east-west belts. Some of the strata are more resistant to erosion and underlie broad saw-toothed ridges known as *cuestas* that slope gently to the south with steep north-facing slopes. The East Gulf Coastal Plain comprises over 50 percent of the land area in Alabama and occurs south and southwest of the Fall

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Line. Eight physiographic districts are delineated in the East Gulf Coastal Plain. Two of these districts, the Fall Line Hills and the Black Belt, are found in the lower Cahaba River basin.

The Fall Line Hills district is a wide crescent-shaped band extending from the Tennessee River in northwest Alabama, traversing the middle portion of the Mobile basin, and ending near the Chattahoochee River in east Alabama. The Fall Line Hills form a major boundary to the Highland Rim, Cumberland Plateau, Alabama Valley and Ridge, and the Piedmont Upland. Streams draining the Fall Line Hills are well sustained, even in the driest years, because of extensive sand and gravel aquifers. Topography can be fairly rugged with steep slopes, particularly near streams. In the western portion of the district the Fall Line exists as an irregularly shaped transition belt about 15 miles wide where rocks of the Cumberland Plateau and Coastal Plain commingle. This is in contrast to the eastern portion of the district where the Fall Line is a sharp transition between coastal sediments and Piedmont rocks. Streams that drain the Fall Line Hills in the lower Cahaba basin are Haysop Creek, Affonee Creek, Oakmulgee Creek, Mill Creek, Goose Creek, Sandy Creek, and Rice Creek.

The Black Belt district is found in the extreme southern part of the Cahaba River watershed. It is an undulating, deeply weathered plain developed primarily on chalk and marl characterized by concentrations of soft, white-grey limestone. This bedrock material weathers into fertile soils that bake hard in summer heat and become adhesive when wet making them difficult to cultivate in places. Because of thin soils and impermeable rocks, the Black Belt represents a unique and clearly defined hydrologic region in the state. Many streams have eroded to chalk bedrock and are noted for high rates of runoff and variability of flow during storm events. Small streams quite often go dry while flow in larger streams is significantly reduced. The Black Belt is a significant distributional barrier to plants and animals because of hydrologic and water-quality reasons and several species that are widespread in the Mobile basin are absent in the Black Belt.

The Fall Line divides Alabama into two distinct physical regions, the upland and lowland, and is the most significant physical feature in Alabama affecting the distribution of plants and animals. It is the zone of contact between the harder rocks of the Appalachians and Interior Plateau with the softer unconsolidated sediments of the Coastal Plain. Because of limitations due to life-history traits, morphological adaptations, or lack of invasion routes, many species are limited to either above or below the Fall Line while other species are more cosmopolitan in distribution, unrestricted by this natural barrier. Streams above the Fall Line are generally swift with higher gradient reflecting the harder base rocks and higher elevations, whereas streams below the Fall Line are generally slower, more sinuous, have muddy or sandy bottoms, and have lower gradients indicative of flat topography.

## **F. LAND USE AND POPULATION GROWTH**

The upper Cahaba River drainage has been one of the most rapidly developed urban areas in the state of Alabama over the past two decades due to the expansion of the Birmingham metropolitan area to the south and southeast. Completion of Interstate Highway 65 south of the city, and the Interstate

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Highway 459 bypass to the south and east has facilitated the growth and development of suburban communities such as Cahaba Heights, Riverchase, Vestavia Hills, Inverness, Pelham, and Homewood. Population growth in the upper Cahaba River drainage has been accompanied by increased impacts to the river from both point and non-point sources. Water quality and habitat degradation in addition to faunal declines in the Cahaba River are symptomatic of the pollution problems the Cahaba River has experienced both in the past and the present. Rapid urbanization and commercial development in the Jefferson-Shelby-St. Clair County area is the primary force shaping water quality conditions and biological communities both directly in the upper Cahaba River drainage and indirectly in the lower Cahaba River drainage through material and pollutant transport.

In stark contrast, the lower Cahaba River system has not experienced the swift urban expansion of the upper system. The towns of Centreville and Marion are the largest urban areas in the lower basin. Centreville's economy is based around the forest products industry, small manufacturing companies, and support of surrounding farm businesses. The Talladega National Forest, Oakmulgee Division, is located south of Centreville and occupies much of the watershed in this area. The economy of Marion is based on small manufacturing, education (Marion Institute and Judson College), and farming. Farming and animal production are the major land use features in the lower Cahaba basin from Marion south.

Total land area in the Cahaba River basin is approximately 1,163,574 acres or 1,818 square miles. Almost all of Bibb County is in the Cahaba basin (91 percent) followed by Perry County (56 percent) and Shelby County (34 percent). Approximately 31 percent of the basin lies in Bibb County, 22 percent in Perry County, 15 percent in Jefferson County and 15 percent in Shelby County.

General land use in the project area is summarized in Appendix A. The majority of the land in the Cahaba River basin is dedicated to forestry (65%). Fifteen percent of the land in the basin is designated as urban and almost thirteen percent of the land in the basin is used for pasture.

## **G. ECONOMIC DEVELOPMENT**

The most recent economic census data available for the Cahaba River Basin is from 1997, with the exception of the agricultural data which is from 2002. Table 1 lists receipts for major economic sectors for counties within the Cahaba River Basin. Manufacturing is the largest economic sector for the majority of the counties in the Watershed. Manufacturing is defined as establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. Establishments in the manufacturing sector are often described as plants, factories, or mills and characteristically use power-driven machines and materials-handling equipment. Manufacturing establishments may process materials or may contract with other establishments to process their materials for them. Both types of establishments are included in manufacturing.

Wholesale trade is the second largest economic sector for counties in the watershed and consists of establishments engaged in wholesaling merchandise, generally without transformation, and rendering services

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incidental to the sale of merchandise. The wholesale sector includes: merchant wholesalers who buy and take title to the goods they sell, manufacturers sales branches and offices who sell products manufactured domestically by their own company, and agents and brokers who collect a commission or fee for arranging the sale of merchandise owned by others.

The retail trade sector comprises establishments engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. This sector includes automotive supplies dealers, computer and peripheral equipment merchants, office supplies dealers, farm supplies dealers, and building materials dealers.

The agricultural sector category represents revenue from forestry, farming and other farm income, such as catfish, fruit, pecans, and sod. This figure also includes government payments. While the counties in the Cahaba River Basin are not major forces as far as revenue generated from farming is concerned, Dallas and Perry Counties rank third and fourth, respectively, in catfish sales.

**Table 1**

Receipts for Major Economic Sectors for Counties within the Cahaba River Basin (1997 Economic Census, Alabama Agricultural Statistics, 2002-Bulletin 44)

<b>County</b>	<b>Manufacturing</b>	<b>Wholesale Trade</b>	<b>Retail Trade</b>	<b>Agriculture</b>
<b>Bibb</b>	\$244,267	\$53,218	\$77,189	\$14,892
<b>Chilton</b>	\$162,096	\$64,229	\$246,640	\$27,476
<b>Dallas</b>	\$1,064,846	\$213,191	\$338,967	\$49,349
<b>Jefferson</b>	\$7,475,584	\$14,471,162	\$7,636,774	\$12,929
<b>Perry</b>	\$96,222	D	\$31,723	\$33,854
<b>Shelby</b>	\$876,618	\$3,529,022	\$891,296	\$18,546
<b>St. Clair</b>	\$480,163	D	\$270,618	\$50,880
<b>Tuscaloosa</b>	\$2,557,859	\$858,110	\$1,543,208	\$42,317

**III. DISCUSSION & PRIORITIZATION OF ISSUES  
USING THE COMPARATIVE RISK ASSESSMENT METHOD**

**UPPER BASIN: HUC Codes 010 - 060**

**Sediment**

Rapid development and associated construction activities led the committee to place stormwater runoff from construction activities as the **Priority 1** sediment source. Efforts are underway to create awareness of this problem, and many types of construction activities are regulated in accordance with the CWA. Provisions regarding construction activities are found in the current Stormwater Phase I and Phase II regulations, and more specifically in local stormwater ordinances enacted by the Jefferson County Stormwater Management Authority and other local regulatory entities.

The Jefferson County Stormwater Management Authority has responsibility for runoff from a large part of the upper basin. In addition to the current regulations concerning runoff from construction activities, several public education efforts are underway. These include training programs for those involved in the construction industry. Programs certify individuals as being

trained in application and maintenance of appropriate BMPs for sediment control. Other efforts such as Nonpoint Source Education for Municipal Officials (NEMO) and Alabama Water Watch (AWW) are currently underway throughout the state.

The committee recognizes the existing regulatory structure and when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.) The committee also recommends continued support of training and certification programs for the construction industry, along with distribution of public education materials regarding water quality problems associated with sediment.

Removal of riparian vegetation, stream bank modifications, and bank erosion are listed as **Priorities 2, 3, and 4**, respectively. Construction, development, and urbanization are the most likely activities associated with these issues. Urban land use covers 38% of the upper basin (Natural Resources/Conservation Subcommittee Report) and is expected to continue to increase. Commercial, recreational, and residential construction are the primary activities associated with the removal of riparian vegetation and stream bank modifications. Therefore, Priority 2 and Priority 3 are viewed as subsets of Priority 1, construction runoff.

**Priority 4**, bank erosion, is a general problem that can contribute sediment directly from the stream corridor. Extreme bank erosion typically results from large volumes of stormwater runoff and the resultant high flow velocities eroding away the banks along the stream channel. Stream flow, in this case, is the mechanism that brings adjacent soil into the watershed streams. Bank erosion is a natural occurrence that can impact overall stream health when accelerated by man's activities. Such problems are associated with various hydrologic alterations that result in increased in-stream flow velocities. High runoff velocities (such as rapid stormwater runoff) from hard-packed or impervious surfaces and poor drainage system design can be the underlying cause. These watershed alterations cause decreased infiltration rates. Controlling and reducing large volumes and velocities of stormwater runoff can be affected by the use of BMPs associated with the various activities heretofore identified as sources of sediment. The committee acknowledges that bank erosion can be addressed through the priorities previously discussed.

Residential runoff, the **Priority 5** activity for sediment contributions in the upper basin, is also viewed as part of the general construction activity category. Residential runoff is a problem most likely during the residential construction process. Therefore, the committee suggests that this activity is addressed sufficiently in Priority 1, construction runoff.

## **UPPER BASIN**

### **Nutrients**

The **Priority 1** activity listed for nutrient concerns in the upper basin is turf management practices. Fertilizer applications on various commercial and residential turf grasses can be a source of nutrients to the watershed. Based on land use information, turf management land use can be estimated to occur in approximately 38% of the land area in the upper basin. The committee recommends public education information be distributed to communities and commercial property owners regarding soil testing and the proper rates of application of fertilizers, as well as information pertaining to impacts from nuisance levels of nutrients in watershed streams.

**Priority 2** for nutrient contributions in the upper basin is Sanitary Sewer Overflows (SSOs). SSOs occur when wastewater flows out of a sewer line before it reaches the wastewater treatment plant (WWTP). SSOs are products of wastewater treatment/collection systems and therefore regulated under the Clean Water Act. WWTP owner-operators are required by their

discharge permits to develop operation and maintenance plans for sewer lines. The Committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

**Priority 3** regarding nutrient loadings in the upper basin is WWTP discharges. WWTPs can discharge nutrients, particularly in the form of nitrates and phosphates. The Clean Water Act (CWA) contains provisions regulating discharges from WWTPs. In addition, WWTPs are subject to TMDLs in accordance with the CWA. ADEM is currently developing nutrient TMDLs, where appropriate, in the watershed. The Committee takes note of the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance. (It is the primary responsibility of the regulated entity to ensure compliance.)

Failed septic tanks were listed as **Priority 4** for nutrient contributions. Septic tank systems are used in areas of the upper basin where sewer service is not available as the typical wastewater treatment method. Proper functioning of septic tanks typically has oversight by the state and/or county health department. The committee takes note of the existing regulatory structure and will facilitate efforts for more effective operation and maintenance of septic tanks through county health departments. The committee recommends developing public education information about septic tank installation and maintenance for distribution in areas where septic tanks are in use. A program has been proposed for the areas significantly impacted by failed septic systems. Local Soil and Water Conservation Districts, health officers, and professional engineers are expected to assist in this effort.

Impervious surface runoff is listed as **Priority 5** under nutrient concerns for the upper basin. Impervious surfaces are associated with approximately 38% of the urban land cover (Natural Resources/Conservation Subcommittee Report). Runoff from impervious surfaces can contain an assemblage of various pollutants, including nutrients. A significant portion of impervious surface runoff is regulated in the upper basin under the Stormwater Phase I program. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. In addition, the committee recommends educational materials that address water quality problems associated with impervious surface runoff be distributed to commercial property owners and developers, and municipalities in the upper basin. Information outlining use of effective BMPs as well as alternative planning and development practices should be presented to designers and developers in workshops and in educational materials.

The committee lists **Priority 6** for nutrient contributions in the upper basin as poultry processing. There is one known poultry processor in the upper basin, and compliance problems with permitted discharge limitations have been noted. Currently legal action is pending to resolve these problems. The committee recognizes the existing regulatory structure and when appropriate, will facilitate measures to ensure compliance practices with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

Atmospheric deposition is listed as the **Priority 7** nutrient contributor in the upper basin. Pollutant particles in the atmosphere can be deposited on the ground surface and ultimately make their way into the watershed streams. This is a cross-cutting issue between the CWA and the Clean Air Act (CAA). The committee remains aware that atmospheric deposition is a potential source for nutrients, but holds the lowest priority in the nutrient category. Public awareness programs regarding atmospheric pollutants are being implemented in the upper basin as a result of the metro-Birmingham compliance goals in accordance with the CAA. The committee suggests that these measures are appropriate in addressing atmospheric deposition in the upper basin. However, opportunities to reforest or afforest vacant, abandoned, and denuded areas of the basin, as a way to improve air quality should be

pursued by the Steering Committee. Establishment of permanent vegetation on denuded areas will also help to alleviate the affects of less-than-optimal land management.

## **UPPER BASIN**

### **Toxic Substances/Pathogens**

Toxic substances and pathogens comprise the third general category of stressors affecting the upper basin. Toxic substances and pathogens can directly affect the physical well being of organisms, including humans. However, their affect differs in the manner upon which they act upon organisms. "Toxic substances" implies a range of effects from a decline in overall organism or individual health to death of the organism or individual. Pathogens may only lead to discomfort and/or sickness. The Committee prioritized activities that can be sources of these stressors separately. The prioritization of activities that have the potential to contribute toxic substances in the upper basin will be presented first, followed by the discussion of pathogen source priorities.

### **Toxic Substances**

**Priority 1** status regarding toxic substances is given to urban runoff. Urban runoff in the upper basin is regulated under the CWA in accordance with the Stormwater Phase I program. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA.

**Priority 2** is identified as turf management practices concerning toxic substances. Land use data indicates that turf management practices occur on approximately 38% of the land area in the upper basin. The committee recognizes that localized impacts can occur from these practices if herbicides and pesticides are not properly applied. The committee recommends that public education information outlining proper chemical application rates, schedules, etc., be distributed to property owners and commercial enterprises that implement turf management practices.

**Priority 3** for toxic substances in the upper basin is listed as industrial sources. Although there are few industrial dischargers in the upper basin, episodic discharges of toxic substances could occur. Without proper containment and treatment (BMPs), discharges from these facilities could cause acute localized problems in the upper basin and perhaps downstream. As point source industrial dischargers, these facilities are regulated under the CWA. The committee recognizes the existing regulatory structure and, where appropriate, will facilitate measures to ensure compliance with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

**Priorities 4 and 5** are listed as WWTPs and landfills, respectively, where toxic substances are of concern. Certain activities associated with these facilities may have the potential to contribute toxic substances. In the case of WWTPs, it would be rare for acutely toxic substances to move through a treatment facility, as domestic WWTPS typically utilize biological treatment. Further, most domestic WWTPs adhere to a regulated schedule for whole effluent toxicity (WET) testing. Generally toxic substances associated with landfills are generated through leachate from the landfills. Landfills that have leachate discharges are regulated under the CWA. The committee recognizes that these facilities are currently regulated under the CWA and, where appropriate, will facilitate practices to ensure compliance. (It is the primary responsibility of the regulated entity to ensure compliance.)

Mineral development is ranked as **Priority 6** in the context of toxic substances. Mineral development can contribute toxic substances to the watershed through materials utilized in the mineral development process (such as fuel, oils, etc) and also from the leaching of naturally



occurring elements from geologic formations (arsenic, salts, and sulfur and iron compounds) as a by-product of the mineral development process. Mineral development activity is currently regulated under the CWA. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices with the CWA. A large number of Acid Mine Drainage sources exist in portions of the Cahaba River Basin. Efforts to identify and address these sources of nonpoint source pollution need to be a part of this Committee's efforts. Existing programs and practices such as the Alabama Department of Industrial Relations - Abandoned Mine Lands program and the Department of the Interior's Appalachian Clean Streams Initiative can be brought to bear on this component of the basin's water quality.

## **UPPER BASIN**

### **Pathogens**

The committee addressed pathogen sources as a separate category. Pathogens are of concern generally in the context of human health. In the upper basin, two prioritized sources of pathogens were identified: (1) septic tanks and (2) SSOs. Stormwater runoff or discharges from each of these sources can contain opportunistic bacteria that could become pathogenic under certain conditions. The following provides a discussion of the prioritized sources or activities associated with pathogens.

Septic tanks were designated as the **Priority 1** source. Proper functioning of septic tanks typically has oversight by the state and/or county health department. The committee takes note of the existing regulatory structure and will facilitate efforts for more effective operation and maintenance of septic tanks through county health departments. The committee recommends developing public education information about septic tank installation and maintenance for distribution to those in the basin who use septic tanks for wastewater treatment.

**Priority 2** regarding pathogen sources are SSOs. As stated earlier in the nutrient discussion, SSOs occur when wastewater flows out of a sewer line before it reaches the WWTP. SSOs are products of wastewater treatment/collection systems and, therefore, regulated under the Clean Water Act. WWTP owner-operators are required by their discharge permits to develop operation and maintenance plans for sewer lines. The Committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

## **MIDDLE BASIN: HUC Codes 070 - 130**

### **Sediment**

Figures given in the Natural Resources/Conservation Subcommittee report indicate that in the middle sub-basin forests cover 70% of the land with agricultural use accounting for another 17% (15% pasture, 2% crop land). Established forests have a positive effect on water quality in the basin. However, activities associated with these land uses can periodically be significant sources of sediment in watershed streams. Best Management Practices (BMPs) that will reduce sediment loads to the watershed can be utilized in association with the silviculture and agriculture production. In general, the committee views implementation of BMPs to control sediment, along with a public awareness program outlining proper implementation of BMPs, as strategies that will significantly reduce sediment loads to the watershed. The committee has prioritized activities that contribute sediment to the middle basin to be addressed in the following sequence.

The middle sub-basin general priority ranking lists unpaved roads as the **Priority 1** contributor of sediment. However, little information has been found to date that quantifies the miles or surface area of unpaved roads in the middle sub-basin. The committee recommends gathering additional information regarding unpaved roads, including the miles of unpaved road construction by public vs. private entities. Public education information regarding unpaved road construction and maintenance methods that minimize sediment runoff is recommended to be distributed to entities maintaining existing or proposing construction of public or private unpaved roads.

Silviculture activities are viewed as **Priority 2** regarding significant contributions of sediment. Removal of riparian canopy and stream bank modifications follow closely as **Priority 3** and **Priority 4**, respectively, in the prioritization regarding sediment. With the major percentage of land cover being forested, it can be assumed that the most likely activity associated with removal of riparian canopy and stream bank modifications is silviculture or forest harvesting activities. The committee recognizes that silviculture-harvesting practices can be carried out in a manner that minimizes sediment loads to the watershed. BMPs such as utilization of stream corridor buffers and select cutting, among others, can control sediment loads and result in a reduction in sediment to the watershed. The committee recommends distribution of public education information and offering materials, workshops, etc., concerning utilization of sediment BMPs to those involved with the forestry industry.

With cropland comprising only 2% of the land cover, **Priority 5**, runoff from agricultural crops, can be assumed to be less of a contributor of sediment. However, impacts associated with agriculture can be significant in site-specific or localized situations. Some crop acreage could be of local concern if adequate BMPs (e.g., grassy swales, terraces, streamside buffers, etc.) are not in place. The committee recommends public education information that describes installation and maintenance of sediment control BMPs be distributed through Soil and Water Conservation Districts to the agriculture constituents of the middle sub-basin. Several financial and technical assistance programs already exist to accelerate assistance to address issues raised in this assessment. Many of these programs and services are available free of charge through the local Soil and Water Conservation District.

Mining, **Priority 6**, and construction runoff, **Priority 8**, are viewed to hold lower priority regarding activities related to sediment. Total land use associated with these activities in the middle sub-basin is approximately 10%. Mining and construction activities are currently regulated under the CWA. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

Bank erosion, **Priority 7**, is a general problem that can contribute sediment directly from the stream corridor. Extreme bank erosion typically results from large volumes of stormwater runoff and the resultant high flow velocities eroding away the banks along the stream channel. Stream flow, in this case, is the mechanism that brings adjacent soil into the watershed streams. Bank erosion is a natural occurrence that can impact overall stream health when accelerated by man's activities such problems are associated with various hydrologic alterations that result in increased in-stream flow velocities. High runoff velocities (such as rapid stormwater runoff) from hard-packed or impervious surfaces and poor drainage system design can be the underlying cause. Controlling and reducing large volumes and velocities of stormwater runoff can be affected by the use of BMPs associated with the various activities heretofore identified as sources of sediment. The committee acknowledges that bank erosion can be addressed through the priorities previously discussed.

## **MIDDLE BASIN**

### **Nutrients**

The general priority ranking for the middle sub-basin list miscellaneous non-point sources as the **Priority 1** activity associated with nutrient concentrations. Further definition of the miscellaneous non-point sources can be derived from land use information supplied by the Natural Resources/Conservation Subcommittee. Forestry (70%) and Agriculture (17%) make up the majority of the land use within the middle sub-basin. Urban areas make up 8% of the middle sub-basin's land use. Therefore, the greatest potential for contributions from miscellaneous non-point sources via stormwater runoff would be from forested areas, followed by agricultural lands, and then urban areas. It should be noted that any non-point source may be of local concern and associated impacts greater in site-specific situations. In the case of forestry and agriculture runoff, the committee recommends public education information regarding water quality improvement BMPs (e.g., stream corridor buffers) be distributed by Soil and Water Conservation Districts to those involved in forestry and agriculture practices in the middle basin. Urban runoff is scheduled to be regulated under the CWA in accordance with the Stormwater Phase II program. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA.

Failed septic tanks were listed as **Priority 2** for nutrient contributions. Septic tank systems are the predominate wastewater treatment method in the middle sub-basin. Proper functioning of septic tanks typically has oversight by the state and/or county health department. The committee takes note of the existing regulatory structure and will facilitate efforts for more effective operation and maintenance of septic tanks through county health departments. The committee recommends developing public education information about septic tank installation and maintenance for distribution in areas utilizing septic tanks. A program has been proposed to assist areas significantly impacted from failed septic systems. Local Soil and Water Conservation Districts, health officers, and professional engineers are expected to assist in this effort.

**Priority 3** regarding nutrient loadings in the middle sub-basin is wastewater treatment plant discharges. WWTPs can discharge nutrients, particularly in the form of nitrates and phosphates. The Clean Water Act (CWA) contains provisions regulating discharges from WWTPs. In addition, WWTPs are subject to TMDLs in accordance with the CWA. ADEM is currently developing nutrient TMDLs where appropriate in the watershed. The Committee takes note of the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance. (It is the primary responsibility of the regulated entity to ensure compliance.)

**Priority 4** concerning nutrient additions to the middle sub-basin is livestock/crop practices. Livestock/crop practices are a part of the agricultural land use, covering approximately 17% of the middle sub-basin. The nutrient source typically associated with agriculture is the application of fertilizers and management of animal waste. The committee recommends public education information be distributed through Soil and Water Conservation Districts to the agriculture constituents of the middle sub-basin districts. Education materials should contain information regarding soil testing and the proper rates of application for fertilizers, as well as information pertaining to impacts from nuisance levels of nutrients in watershed streams.

The **Priority 5** activity for nutrient contributions to the middle basin is listed as turf management practices. Fertilizer applications on various commercial and residential turf grasses can be a source of nutrients to the watershed. Based on land use information, turf management land use is likely a small percentage of the total land use of the middle sub-basin. The committee recommends public education information be distributed to

communities and commercial property owners regarding soil testing and the proper rates of application of fertilizers, as well as information pertaining to impacts from nuisance levels of nutrients in watershed streams.

**Priority 6** for nutrient contributions to the middle basin is Sanitary Sewer Overflows (SSOs). SSOs occur when wastewater flows out of a sewer line before it reaches the WWTP. SSOs are products of wastewater treatment/collection systems and, therefore, regulated under the Clean Water Act. WWTP owner-operators are required to develop operation and maintenance plans for sewer lines as part of the WWTP permit. The Committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

**Priority 7** addresses nutrients in the watershed as a result of biological wastes from wildlife sources. Wildlife sources were given the lowest priority because these sources would be difficult if not impossible to control. In light of the fact that forested areas are the dominant land cover in the middle basin, the listing is given to create awareness that nutrients are added to the watershed from wildlife.

## **MIDDLE BASIN**

### **Toxic Substances/Pathogens**

Toxic substances and pathogens comprise the third general category of stressors affecting the middle sub-basin. Toxic substances and pathogens can directly affect the physical well-being of organisms, including humans. However, their affect differs in the manner upon which they act upon organisms. "Toxic substances" implies a range of effects from a decline in the overall health of the organism or individual to death of the organism or individual. Pathogens may only lead to discomfort and/or sickness. The Committee prioritized activities that can be sources of these stressors separately. The prioritization of activities that have the potential to contribute toxic substances in the middle basin will be presented first, followed by the discussion of pathogen source priorities.

### **Toxic Substances**

**Priority 1** for toxic substances is listed as industrial sources, especially wood preservation treatment facilities. Several wood preservation treatment facilities are located in the middle basin. Although these facilities do not account for a large volume of water, episodic discharges of toxic chemicals have been known to occur in the past. Without proper containment and treatment (BMPs), discharges from these facilities could cause acute localized problems in the middle basin and perhaps downstream into the lower basin. As point source industrial dischargers, these facilities are regulated under the CWA. The committee recognizes the existing regulatory structure and, where appropriate, will facilitate Measures to ensure compliance with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

**Priority 2** status regarding toxic substances is given to urban runoff. Urban runoff in the middle basin is scheduled to be regulated under the CWA in accordance with the Stormwater Phase II program. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA.

**Priority 3** for toxic substances is identified as agricultural crop management. Conventional agricultural methods incorporate applications of pesticides and herbicides to various crops in order to increase crop yields. Herbicide applications minimize competition from nuisance plant species for nutrient utilization. Pesticide applications aid in controlling insect populations that

can feed on and reduce or destroy crop yield. The committee recognizes the need for chemical applications to crops in order to obtain sufficient yields. Application rates and time of application may be adjusted to ensure adequate nuisance plant and insect control, eliminating applications of chemicals in excess that increase costs to the agriculture producer and increase the potential for the chemicals to enter watershed streams. The committee recommends public education information that outlines efficient management practices for chemical applications be distributed through Soil and Water Conservation Districts to the agricultural constituents of the middle basin. Additionally, standard practices like Conservation Tillage, Minimum Tillage, and No-Till will be promoted as better alternatives to traditional tillage operations that result in off-site deposition of sediments.

Mineral development is ranked as **Priority 4** in the context of toxic substances. Mineral development can contribute toxic substances to the watershed through materials utilized in the mineral development process (such as fuel, oils, etc) and also from the leaching of naturally occurring elements from geologic formations (arsenic, salts, and sulfur and iron compounds) as a by-product of the mineral development process. Mineral development activity is currently regulated under the CWA. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices with the CWA.

**Priority 5** is identified as turf management practices concerning toxic substances. Land use data indicates that turf management practices occur on less than 8% of the land area in the middle basin. However, the committee recognizes that localized impacts can occur from these practices if herbicides and pesticides are not properly applied. The committee recommends that public education information outlining proper chemical application rates, schedules, etc., be distributed to property owners and commercial enterprises that implement turf management practices.

**Priorities 6 and 7** are listed as WWTPs and landfills, respectively, where toxic substances are of concern. Certain activities associated with these facilities may have the potential to contribute toxic substances. There are a small number of these facilities in the middle basin, hence the low priority designation. In the case of WWTPs, it would be rare for acutely toxic substances to move through a treatment facility, as domestic WWTPS typically utilize biological treatment. Further, most domestic WWTPs adhere to a regulated schedule for whole effluent toxicity (WET) testing. Generally toxic substances associated with landfills are generated through leachate from the landfills. Landfills that have leachate discharges are regulated under the CWA. Since these facilities are currently regulated under the CWA, the committee recognizes the existing regulatory structure and, where appropriate, will facilitate practices to ensure compliance with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

## **MIDDLE BASIN**

### **Pathogens**

The committee addressed pathogen sources as a separate category. Pathogens are of concern generally in the context of human health. In the middle sub-basin, four prioritized sources of pathogens were identified: (1) septic tanks, (2) grazing, (3) SSOs, and (4) wildlife. Stormwater runoff or discharges from each of these sources can contain opportunistic bacteria that could become pathogenic under certain conditions. The following provides a discussion of the prioritized sources or activities associated with pathogens.

Septic tanks were designated as the **Priority 1** source. As discussed earlier in the nutrient section, septic tank systems are the predominate method of wastewater treatment in the middle sub-basin. Proper functioning of septic tanks typically has oversight by the state and/or county health department. The committee takes note of the existing regulatory structure and

will facilitate efforts for more effective operation and maintenance of septic tanks through county health departments. The committee recommends developing public education information about septic tank installation and maintenance for distribution to those in the basin who use septic tanks for wastewater treatment.

Agricultural grazing was identified as the **Priority 2** pathogen source. Land cover in the middle sub-basin is approximately 15% pasture (Natural Resources Conservation subcommittee report). Stormwater runoff from pastureland has the potential to increase levels of bacteria in watershed streams. The committee recommends that public education information that outlines practices that minimize bacterial runoff from pastures be distributed through Soil and Water Conservation Districts to the agriculture constituents of the middle sub-basin.

**Priority 3** regarding pathogen sources is Sanitary Sewer Overflows (SSOs). SSOs occur when wastewater flows out of a sewer line before it reaches the WWTP. SSOs are products of wastewater treatment systems and therefore regulated under the Clean Water Act. WWTP owner-operators are required to develop operation and maintenance plans for sewer lines as part of the WWTP permit. The Committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

Wildlife is viewed as the **Priority 4** source for pathogens. Wildlife sources were given the lowest priority because these sources would be difficult if not impossible to control. In light of the fact that forested areas are the dominant land covers in the middle basin, the listing is given to create awareness that pathogens are added to the watershed from wildlife.

#### **LOWER BASIN: HUC Codes 140 - 170** **Sediment**

The lower sub-basin general priority ranking lists unpaved roads as the **Priority 1** contributor of sediment. However, little information has been found to date that quantifies the miles or surface area of unpaved roads in the lower sub-basin. The committee recommends gathering additional information regarding unpaved roads, including the miles of unpaved road construction by public vs. private entities. Public education information regarding unpaved road construction and maintenance methods that minimize sediment runoff should be distributed to entities engaged in or proposing construction, forestry, or agriculture activities requiring unpaved roads.

(Address later in this discussion)

Runoff from agricultural crops is the **Priority 3** source for sediment in the lower basin. Cropland comprises 5% of the land cover in the lower basin (Natural Resources Conservation subcommittee report). Some crop acreage could be of local concern if adequate BMPs (e.g., grassy swales, terraces, streamside buffers, etc.) are not in place. Given the 5% land cover in the lower basin for crops, impacts may be largely site-specific and, therefore, be localized. The committee recommends public education information that describes installation and maintenance of sediment control BMPs be distributed through Soil and Water Conservation Districts to the agriculture constituents of the lower sub-basin. In addition, several financial and technical assistance programs exist to accelerate assistance to address issues raised in this assessment. Many of these programs and services are available free of charge through the local Soil and Water Conservation District.

Stream bank modifications are viewed as **Priority 2** regarding significant contributions of sediment. Removal of riparian canopy and silviculture activities follow closely as **Priority 4**

and **Priority 5**, respectively, in the prioritization regarding sediment. With the major percentage of land cover being forested, it can be assumed that the most likely activity associated with removal of riparian canopy and stream bank modifications is silviculture or forest harvesting activities. The committee recognizes that silviculture-harvesting practices can be carried out in a manner that minimizes sediment loads to the watershed. BMPs such as utilization of stream corridor buffers and select cutting, among others, can control sediment loads and result in a reduction in sediment to the watershed. The committee recommends distribution of public education information and offering materials, workshops, etc., to those involved with the forestry industry.

Bank erosion, **Priority 6**, is a general problem that can contribute sediment directly from the stream corridor. Extreme bank erosion typically results from large volumes of stormwater runoff and the resultant high flow velocities eroding away the banks along the stream channel. Stream flow is the mechanism that brings adjacent soil into the watershed streams. However, high runoff velocities (such as rapid stormwater runoff) from hard-packed or impervious surfaces and poor drainage system design can be the underlying cause. Controlling and reducing large volumes and velocities of stormwater runoff can be affected by the use of BMPs associated with the various activities heretofore identified as sources of sediment. The committee acknowledges that bank erosion can be addressed through the priorities previously discussed.

Construction runoff, **Priority 7**, is viewed to hold lower priority regarding activities related to sediment. Total urban land use associated with this activity in the lower sub-basin is approximately 1%. Construction activities are currently regulated under the CWA. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.) The committee also recommends continued support of training and certification programs for the construction industry, along with the distribution of public education materials regarding water quality problems associated with sediment.

Residential runoff is listed as **Priority 8** for sediment in the lower basin. Residential runoff would most likely contain sediment during the residential construction process. Therefore, the committee suggests that this source will be addressed in Priority 7, construction runoff.

**Priority 9** regarding sediment in the lower sub-basin is runoff from landfill activity. Discharges from landfills are regulated under the CWA in accordance with industrial stormwater regulations. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

## **LOWER BASIN** **Nutrients**

**Priority 1** concerning nutrient additions to the lower sub-basin is livestock/crop practices. Livestock/crop practices are a part of the agricultural land use, covering approximately 19% of the lower sub-basin. The nutrient source typically associated with agriculture is the application of fertilizers. The committee recommends public education information be distributed through Soil and Water Conservation Districts to the agriculture constituents of the lower sub-basin districts. Education materials should contain information regarding soil testing and the proper rates of application for fertilizers, as well as information pertaining to impacts from nuisance levels of nutrients in watershed streams.

The general priority ranking for the lower sub-basin lists miscellaneous non-point sources as the **Priority 2** activity associated with nutrient concentrations. Further definition of the miscellaneous non-point sources can be derived from land use information supplied by the Natural Resources/Conservation Subcommittee. Forestry (78%) and Agriculture (19%) make up the majority of the land use within the lower sub-basin. Urban areas make up 1% of the lower sub-basin's land use. Therefore, the greatest potential for contributions from miscellaneous non-point sources via stormwater runoff would be from forested areas, followed by agricultural lands, and then urban areas. It should be noted that any non-point source may be of local concern and associated impacts greater in site-specific situations. In the case of forestry and agriculture runoff, the committee recommends public education information regarding water quality improvement BMPs (e.g., stream corridor buffers) be distributed by Soil and Water Conservation Districts to those involved in forestry and agriculture practices in the middle basin. Urban runoff is scheduled to be regulated under the CWA in accordance with the Stormwater Phase II program. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA.

Failed septic tanks were listed as **Priority 3** for nutrient contributions. Septic tank systems are the predominate wastewater treatment method in the lower sub-basin. Proper functioning of septic tanks typically has oversight by the state and/or county health department. The committee takes note of the existing regulatory structure and will facilitate efforts for more effective operation and maintenance of septic tanks through county health departments. The committee recommends developing public education information about septic tank installation and maintenance for distribution to those areas utilizing septic tanks. A program has been proposed for the areas with significant impacts from failed septic systems. Local Soil and Water Conservation Districts, health officers, and professional engineers are expected to assist in this effort.

The **Priority 4** activity for nutrient contributions is listed as turf management practices. Fertilizer applications on various commercial and residential turf grasses can be a source of nutrients to the watershed. Based on land use information, turf management land use is likely a small percentage of the total land use of the lower sub-basin. The committee recommends public education information be distributed to communities and commercial property owners regarding soil testing and the proper rates of application of fertilizers, as well as information pertaining to impacts from nuisance levels of nutrients in watershed streams.

**Priority 5** regarding nutrient loadings in the lower sub-basin is wastewater treatment plant discharges. WWTPs can discharge nutrients, particularly in the form of nitrates and phosphates. The Clean Water Act (CWA) contains provisions regulating discharges from WWTPs. In addition, WWTPs are subject to TMDLs in accordance with the CWA. ADEM is currently developing nutrient TMDLs where appropriate in the watershed. The Committee takes note of the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance. (It is the primary responsibility of the regulated entity to ensure compliance.)

**Priority 6** addresses nutrients in the watershed as a result of biological wastes from wildlife sources. Wildlife sources were given the lowest priority because these sources would be difficult if not impossible to control. In light of the fact that forested areas are the dominant land cover in the lower basin, the listing is given to create awareness that nutrients are added to the watershed from wildlife.

**Priority 7** for nutrient contributions is Sanitary Sewer Overflows (SSOs). SSOs occur when wastewater flows out of a sewer line before it reaches the WWTP. SSOs are products of wastewater treatment/collection systems and, therefore, regulated under the Clean Water Act.



WWTP owner-operators are required to develop operation and maintenance plans for sewer lines as part of the WWTP permit. The Committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

## **LOWER BASIN**

### **Toxic Substances/Pathogens**

Toxic substances and pathogens comprise the third general category of stressors affecting the lower sub-basin. Toxic substances and pathogens can directly affect the physical well-being of organisms, including humans. However, their affect differs in the manner upon which they act upon organisms. "Toxic substances" implies a range of effects from a decline in overall health of the organism or individual to causation of mortality or death of the organism or individual. Pathogens may only lead to discomfort and/or sickness. The Committee prioritized activities that can be sources of these stressors separately. The prioritization of activities that have the potential to contribute toxic substances in the lower basin will be presented first, followed by the discussion of pathogen source priorities.

### **Toxic Substances**

**Priority 1** for toxic substances is identified as agricultural crop management practices. Cropland comprises approximately 5% of the land use in the lower basin. Conventional agricultural methods incorporate applications of pesticides and herbicides to various crops to increase crop yields. Herbicide applications minimize competition from nuisance plant species for nutrient utilization. Pesticide applications aid in controlling primarily insect populations that can feed on and reduce or destroy crop yield. The committee realizes the need for chemical applications to crops in order to obtain sufficient yields. Application rates and time of application may be adjusted to ensure adequate nuisance plant and insect control, eliminating applications of chemicals in excess that increase costs to the agriculture producer and increase the potential for the chemicals to enter watershed streams. The committee recommends public education information be distributed through soil and water conservation districts to the agricultural constituents of the lower basin. , Additionally, standard practices such as Conservation Tillage, Minimum Tillage, and No-Till will be promoted as better alternatives to traditional tillage operations that result in off-site deposition of sediments.

**Priorities 2 through 6** are activities identified from sources that make up less than 3% of the land use in the lower basin. The committee recognizes that localized impacts can occur from these sources if adequate controls are not in use. Priorities 2 through 6 are addressed in the following discussion.

**Priority 2**, urban runoff, is scheduled to be regulated under the CWA in accordance with the Stormwater Phase II program. The committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA.

**Priority 3** is identified as turf management practices concerning toxic substances. Land use data indicates that turf management practices occur on less than 3% of the land area in the lower basin. However, the committee recognizes that localized impacts can occur from these practices if herbicides and pesticides are not properly applied. The committee recommends that public education information outlining proper chemical application rates, schedules, etc., be distributed to property owners and commercial enterprises that implement turf management practices.

**Priorities 4 through 6**, landfills, WWTPs and industrial sources respectively, are regulated as point source discharges. The committee takes note of the existing regulatory structure and will facilitate practices, when appropriate, to ensure compliance. (It is the primary responsibility of the regulated entity to ensure compliance.)

## Pathogens

The committee addressed pathogen sources as a separate category. Pathogens are of concern generally in the context of human health. In the lower sub-basin, five prioritized sources were identified: (1) grazing, (2) septic tanks, (3) CAFOs, (4) SSOs, and (5) wildlife. Stormwater runoff or discharges from each of these sources can contain bacteria that can contain opportunistic bacteria that could become pathogenic under certain conditions. The following provides a discussion of the prioritized sources or activities associated with pathogens.

Agricultural grazing was identified as the **Priority 1** pathogen source. Land cover in the lower sub-basin is approximately 15% pasture (NRC subcommittee). Stormwater runoff from pastureland has the potential to increase levels of bacteria in watershed streams. The committee recommends that public education information that outlines practices that minimize bacterial runoff from pastures be distributed through Soil and Water Conservation Districts to the agriculture constituents of the lower sub-basin.

Septic tanks were designated as the **Priority 2** source. As discussed earlier, septic tank systems are the predominate wastewater treatment method in the lower sub-basin. Proper functioning of septic tanks typically has oversight by the state and/or county health department. The committee takes note of the existing regulatory structure and will facilitate efforts for more effective operation and maintenance of septic tanks through county health departments. The committee recommends developing public education information about septic tank installation and maintenance for distribution to those in the basin who use septic tanks for wastewater treatment.

Concentrated animal feeding operations (CAFOs) are agriculture facilities, such as feedlots and poultry houses, where large numbers of animals are concentrated in an area and fed to marketable size.

**Priority 4** regarding pathogen sources is Sanitary Sewer Overflows (SSOs). SSOs occur when wastewater flows out of a sewer line before it reaches the WWTP. SSOs are products of wastewater treatment systems and therefore regulated under the Clean Water Act. WWTP owner-operators are required to develop operation and maintenance plans for sewer lines as part of the WWTP permit. The Committee recognizes the existing regulatory structure and, when appropriate, will facilitate measures to ensure compliance practices consistent with the CWA. (It is the primary responsibility of the regulated entity to ensure compliance.)

Wildlife is viewed as the **Priority 5** source for pathogens. Wildlife sources were given the lowest priority because these sources would be difficult if not impossible to control. In light of the fact that forested areas are the dominant land cover in the lower basin, the listing is given to create awareness that pathogens are added to the watershed from wildlife.

## IV. EXISTING PROGRAMS AND MECHANISMS

The methods currently in use or available for use in the Cahaba River Basin include both regulatory and non-regulatory approaches. Regulatory methods utilize legal means and administrative rules established by Federal, State and local laws and codes. For certain activities or development in the watershed, permits issued by the appropriate regulatory agency including local, state, and federal agencies are required for initiation and completion of the projects.

The non-regulatory methods involve public and private management tactics such as incentive programs, private stewardship, and citizen involvement. Incentive programs offered by government agencies provide money on a grant or cost-share basis to assist management programs. Tax incentives are also available that reduce the tax burden on property within the watershed that is managed in an environmentally sound manner. Significant regulatory and non-regulatory programs are described below.

### A. Regulatory

#### 1. Clean Water Act (CWA) and Implementing Regulations

##### a. National Pollutant Discharge Elimination System (NPDES) Permits

The NPDES requirements were established by the Federal Water Pollution Control Act (1972) to control point source discharges to streams. The Alabama Department of Environmental Management (ADEM) administers the NPDES program in Alabama. ADEM's Municipal Branch regulates the storm water permits for municipalities and the industrial wastewater discharge falls under the authority of ADEM's Industrial Branch.

The NPDES permitting system sets effluent limitations for discharges of treated municipal, industrial, and mining wastes. Construction sites over five acres in size are also included under the mining provisions of this program. The NPDES program also requires that permitted facilities submit discharge-monitoring reports (DMR) to ADEM. The DMR contains data for all parameters and monitoring frequency specified by the NPDES permit.

##### b. Nonpoint Source Discharge Regulations

The U.S. Congress enacted Section 319 of the Clean Water Act in 1987 to provide for the assessment of water quality impacts due to nonpoint source (NPS) water pollution. Section 319 also provides for the implementation of programs to address NPS water pollution.

ADEM is responsible for the administration of Section 319 in Alabama. This responsibility involves the use of funds for NPS pollution education and demonstration projects. There are no present limitations for NPS pollution discharges. The responsibility of NPS pollution education and control lies within the agencies that oversee the activities of each NPS category.

There are no effluent limitations for NPS discharges and Best Management Practice (BMP) implementation is voluntary. However, ADEM may take enforcement action on any site or activity where discharges result in a water quality violation in waters of the State.

## 2. Army Corps of Engineers Regulatory Programs

Wetlands are considered one type of “waters of the United States” that are protected from unauthorized discharges of dredged or fill material under Section 404 of the Clean Water Act. The purpose of Section 404 is to protect and enhance water quality by regulating the discharge of dredged or fill material into wetlands. The U.S. Environmental Protection Agency (EPA) and the Army Corps of Engineers (COE) jointly define wetlands as:

“..those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”  
(EPA 40 Code of Federal Regulations (C.F.R.) 5 230.3 and COE 33 C.F.R. 5 328.3)

The Section 404 regulatory program authorizes the COE to issue permits, after public notice and opportunity for public comment, and take enforcement action for unauthorized activities in wetlands and other U.S. waters.

The Rivers and Harbors Act (1899) was originally enacted primarily to protect and promote water navigation for commerce. Jurisdiction under the Rivers and Harbors Act is based on the “navigability” of a water body. The jurisdiction extends laterally over the surface of ordinary high-water mark for non-tidal areas and the mean high water mark for tidal areas. The regulatory definition of navigable waters of the United States is:

“Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use, to transport interstate or foreign commerce.” (33 C.F.R. 5 329.4)

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any “navigable water of the United States” except by permit from the COE. Regulated activities include dredging, placement of dredged or fill material, and construction in or over navigable waters.

## 3. Health Department Septic Tank Permits

Most sewer systems are maintained and regulated by local municipalities, counties, boards, or private entities. However, some rural landowners use a septic tank as an onsite sewage disposal system. Septic tanks must conform to the regulations of the State Board of Health and/or county boards of health.

Generally, the permitting process begins with soil investigations that are conducted by a local engineer, land surveyor, or soil scientist. An application is then submitted to the municipal governing body such as the county board of health. Ultimately, the municipal governing body issues a permit to construct the onsite sewage disposal system.

Environmental health officials are responsible for overseeing the installation and repair of septic tanks, as well as the regulation of the contractors who do the work. An environmental health specialist often evaluates the data submitted and performs a site

evaluation and soils examination prior to determining the feasibility of constructing an onsite sewage disposal system.

#### **4. Sanitary Sewer Systems**

Sanitary sewer systems may be designed on the basis of judicial districts, topography, number of households or other site characteristics and are intended to provide proper sewage disposal in areas susceptible to onsite septic system failures or malfunctions. Sanitary sewer systems typically use a variety of funding tools such as local taxation, special assessments, grants and loans to implement septic system maintenance, inspection, and educational programs.

#### **5. Total Maximum Daily Load (TMDL)**

The TMDL is becoming a prominent and far reaching water quality policy tool that exists for watersheds. The EPA developed the TMDL process to identify the impaired water bodies and develop plans to mitigate the impairments. The EPA defines a TMDL as the “sum of the individual waste load allocations for point sources, load allocations for nonpoint sources and natural background pollutants, and an appropriate margin of safety (EPA C.F.R. 130.2).”

As a process, the TMDL Program serves to list the source(s) of impairment for the water body and implement mitigation measures to reduce those sources.

#### **6. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**

Congress enacted CERCLA, commonly known as Superfund, in 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

CERCLA:

- Established prohibitions and requirements concerning closed and abandoned hazardous waste sites;
- Provided for liability of persons responsible for releases of hazardous waste at these sites; and
- Established a trust fund to provide for cleanup when no responsible party could be identified.

The law authorizes two kinds of response actions:

- Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response.
- Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on EPA's National Priorities List (NPL).

CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened

releases of hazardous substances, pollutants, or contaminants. The Cahaba River Basin has the possibility of releases that would be subject to the CERCLA requirements.

**7. Resource Conservation and Recovery Act (RCRA)**

The primary goals of RCRA are to protect human health and the environment from the potential hazards of solid and hazardous wastes. RCRA helps to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. RCRA regulations include requirements for hazardous waste tracking, labeling, treatment, storage, and disposal.

Past and present activities at RCRA facilities have sometimes resulted in releases of hazardous waste and hazardous constituents into soil, ground water, surface water, and air. Under the RCRA Corrective Action program, EPA and authorized states require owners and operators of RCRA facilities to conduct investigation and cleanup of these hazardous releases. The Cahaba River Basin has several facilities that are subject to the RCRA regulations including landfills.

**8. Safe Drinking Water Act (SDWA)**

The Safe Drinking Water Act (SDWA) was developed in 1974. The purpose of the law is to assure that the nation's water supply systems serving the public meet minimum national standards for the protection of public health. Under the SDWA, the EPA has the authority to set national health-based standards for drinking water to protect against contaminants that may be present in drinking water.

The 1996 amendments to the SDWA contained extensive provisions for consumer involvement, right-to-know, and source water protection. The Consumer Confidence Reports are the centerpiece of public right-to-know in SDWA.

The 1996 amendments also require that states develop source water assessments for all public water supply sources. The Cahaba River and Lake Purdy provide a significant amount of water supply to the Birmingham metropolitan area. A portion of the Cahaba River above the Highway 280 dam must comply with the SDWA requirements.

**9. Alabama Department of Economic and Community Affairs - Office of Water Resources (ADECA-OWR) Programs**

**a. Certificate of Use Program**

The Alabama Water Resources Act mandates that the Alabama Water Resources Commission adopt rules and regulations governing the use of water in the State. The Act also makes water use reporting a condition of maintaining a Certificate of Use. The Certificate of Use contains the following information:

- Water source;
- Primary uses of water;
- Estimated or actual amount, in gallons, of waters of the state that is used on an average daily basis;

- Estimated maximum capacity, in gallons, of waters of the state that could potentially be withdrawn or diverted within any single day;
- Duration of the Certificate of Use; and
- Frequency of water use reporting.

**b. Alabama Water Resources Act**

The Office of Water Resources (OWR) in coordination with other agencies will conduct critical use studies to determine if certain areas should be designated as capacity stress areas. Each critical use study includes an analysis of alternatives to address quantitative water resources problems identified during the critical use study.

At a minimum the critical use study includes an assessment of a no-action alternative, a conservation alternative, a water resources development alternative, and a restrictive use alternative. Within each area of the state for which a critical use study is proposed the OWR shall consult with all persons holding a certificate of use within such area as well as all appropriate federal, state, or local government agencies within such area prior to the completion of the critical use study.

Upon the completion of a critical use study the OWR submits a final report of the critical use study to the commission to protect the quantitative water resources of such area. The commission shall review the critical use study submitted by the OWR and determine if the implementation of water use restrictions in such area is needed (ADECA-OWR, Chapters 305-7-7 and 305-7-11).

**10. Animal Feeding Operation/Concentrated Animal Feeding Operation (AFO/CAFO) Program**

The ADEM AFO/CAFO Program sets requirements on the construction, operation, and closure of AFO/CAFOs. The program was adopted in 1999 and strictly prohibits the discharge of animal waste to surface or ground waters. The rules were originally developed over a three-year period with input from the agricultural community, interested state and federal resource agencies, EPA Region 4 and environmental groups.

The program imposes buffer requirements as well as other management provisions to protect water quality. All animal-feeding operations must fully implement and maintain comprehensive waste management system practices that meet or exceed the guidelines of the U.S. Department of Agriculture – Natural Resource Conservation Service (USDA-NRCS). The Cahaba River Basin has AFOs that are subject to the requirements of the AFO/CAFO Program.

**B. Non-Regulatory**

**1. Incentive Programs**

**a. Conservation Reserve Program (CRP)**

The CRP program, administered by NRCS, was established as a conservation provision of the Farm Bill to encourage and assist farm producers willing to set aside highly erodible, riparian, and other environmentally sensitive lands from crop production for a 10 or 15-year period. Producers may enroll in the CRP program according to U.S. Department of Agriculture (USDA) program rules. If a landowner's

CRP bid is accepted, a Conservation Plan of Operation is developed. In addition to an annual CRP payment, USDA will provide a 50% cost-share to establish the selected conservation practice. Landowners may receive a maximum of \$50,000 annually in CRP payments.

**b. Wetlands Reserve Program (WRP)**

This voluntary USDA program for restoring wetlands is administered by NRCS with technical assistance from the FWS. Participating landowners can establish conservation easements of either permanent or 30-year duration, or can enter into restoration cost-share agreements where no easement is involved. NRCS and FWS assist private landowners with site selection and development of restoration plans for the site. Up to 100% of the cost of restoring the wetland is provided by the USDA.

**c. Environmental Quality Incentives Program (EQIP)**

This USDA program is administered by NRCS. EQIP works primarily in locally identified conservation priority areas where there are significant problems with natural resources. High priority is given to areas where State or local governments offer financial, technical, or educational assistance, and to areas where agricultural improvements will help meet water quality objectives. Landowners can apply to the program for assistance in solving problems related to animal waste management, erosion, and other environmental problems. EQIP will provide up to 60% cost-share for restoration. A landowner may receive up to \$50,000 annually in EQIP payments.

**d. Emergency Watershed Protection (EWP)**

The EWP program helps protect lives and property threatened by natural disasters such as floods, hurricanes, tornadoes, and wildfires. The program is administered by the USDA-NRCS, which provides technical and financial assistance to preserve life and property threatened by excessive erosion and flooding.

EWP provides funding to project sponsors for such work as clearing debris from clogged waterways, restoring vegetation, and stabilizing river banks. The measures that are taken must be environmentally and economically sound and generally benefit more than one property owner.

NRCS provides up to 75 percent of the funds needed to restore the natural function of a watershed. The community or local sponsor of the work pays the remaining 25 percent, which can be provided by cash or in-kind services.

**e. Forestry Incentive Program (FIP)**

FIP is a USDA program administered by the USDA-NRCS and state foresters. The program offers landowners an incentive to plant and maintain forests. FIP supports three principle forest management activities that can be carried out either with a comprehensive Forest Stewardship Plan, or independently, in accord with an agreement reached with the State Forester. These three practices are tree planting, forest stand improvement and site preparation for natural regeneration. In all three instances, the principal goal is to build or restore the productive capacity of non-industrial private forestlands. FIP is designed to benefit the environment while meeting future demands for wood products.



**f. Wildlife Habitat Incentives Program (WHIP)**

WHIP is a voluntary program for landowners who want to develop and improve wildlife habitat on private lands. Participants work with NRCS to prepare a wildlife habitat development plan. USDA provides technical assistance and cost-share payments up to 75 percent of the cost of installing the wildlife habitat practices. USDA and the participant enter into a cost-share agreement that usually lasts a minimum of 10 years.

**g. Farmland Protection Program (FPP)**

The FPP provides funds to help purchase development rights to keep productive farmland in agricultural use. Seventeen states are currently implementing the FPP program. Alabama is not currently implementing this program.

**h. Partners for Fish and Wildlife**

The Partners for Fish and Wildlife program is an incentive program that is administered by the Fish and Wildlife Service (FWS). The goal of the program is to restore, improve, and protect fish and wildlife habitat on privately owned land. Funds received cannot exceed \$10,000 during one fiscal year and projects with private landowners must be secured by a minimum 10-year habitat development agreement; Landowners can receive up to 100% funding for project expenses. The program emphasizes Federal trust resources: e.g. migratory birds, endangered and threatened species, wetlands, flood plains and riparian areas.

**i. Alabama Agricultural Conservation Development Commission Program**

State of Alabama funding available to landowners and operators to make conservation improvements . Generally done as a 60:40 Cost-share for practices and components recommended by the technical service provider. Funding is available through the local Soil & Water Conservation District.

**2. Private Stewardship**

Given the opportunity, landowners will normally incorporate conservation practices into the management of their property. Most landowners are aware of water quality issues but may not have the information needed to minimize nonpoint source pollution. Information and education programs are an important part of any program that relies on private stewardship.

**3. Tax Incentives**

**a. Conservation Easements**

A conservation easement is a legal agreement that property owners may use to place development restrictions on their property. Each easement's restrictions are tailored to the particular property owner's needs and interests and may include limitations on the type or amount of development that may take place. These limitations may be used to protect conservation or historic resources on a parcel of land. If an easement donor wishes to claim tax benefits for the gift, he or she must donate it or sell it for less than fair market value to a public agency or to a conservation or historic preservation organization that qualifies as a public charity under Internal Revenue Code Section 501 (c)(3). An easement may be perpetual or may be a term easement that is written for a

specified period of years. Only gifts of perpetual easements, however, can qualify a donor for income and estate tax benefits.

In order to qualify for Internal Revenue Service (IRS) tax-deductibility, an easement must be given exclusively for conservation purposes. The IRS developed several resource categories for tax purposes. These include: Public Recreation and/or Recreation, Significant Natural Habitat, Open Space for Scenic Enjoyment, Open Space Pursuant to Government Policy, and Historic Preservation.

**b. Gift of Remainder Interest**

A gift of remainder interest is a charitable contribution of property to a public agency or a conservation or historic preservation organization that allows the owner the right to live on the property until death. Unlike a conservation easement, where the development rights to a property are donated, a donation of remainder interests will donate all or portions of the property itself to the charitable organization upon death of the owner.

**c. Gift by Will (Testamentary Gift)**

A charitable contribution of a conservation easement or an outright gift of property can be made by will. The full value of the gift is deductible from estate taxes.

**4. Citizen Involvement**

There are currently a number of programs in place for citizens to take an active role in protecting the Cahaba River Basin. Watershed education initiatives play a role in energizing and organizing citizen activities. Information and education programs to encourage watershed protection are directed at a diverse group of stakeholders including agricultural producers, builders and contractors, school teachers, students, homeowners, business and community leaders as well as elected officials.

In 1996, ADEM created the Office of Education & Outreach and combined a number of non-regulatory functions. Through the Office of Education & Outreach, ADEM provides speakers for civic clubs, professional groups or other organizations and educational materials for the general public, businesses, teachers and students.

ADEM's Pollution Prevention Unit provides assistance on recycling and pollution prevention and facilitates the Waste Reduction & Technology Transfer program. The Nonpoint Source Unit provides assistance on controlling nonpoint source pollution to the agricultural, sivicultural, construction, mining and urban communities through education and funding for demonstration projects.

## V. Strategy for Protection

The mission of the Cahaba River Basin Clean Water Partnership is to identify issues, explore solutions, and make recommendations for the management and stewardship of the Cahaba River basin while maintaining the balance between protecting the environment and promoting the economy.

Given the importance of the Cahaba River as a multifaceted resource serving significant portions of eight counties, strategies for protection of the river have been developed consistent with this mission statement. These strategies were proposed after assessing the existing status of the river from ecological and economic perspectives, and conceptualizing the watershed of tomorrow as significant in maintaining and enhancing the quality of life for future generations.

Protection was viewed as necessary in order to provide an appropriate environment for socioeconomic growth while maintaining scenic, natural conditions along the river corridor, enabling the river ecosystem to continue to be a haven for diverse aquatic floral and faunal communities.

In accordance with the diverse characteristics of the watershed, the strategies for protection have been apportioned in three distinct areas: (1) the Upper Cahaba Basin from the source of the Cahaba River to Helena; (2) the Middle Cahaba Basin from Helena to Centreville, and (3) the Lower Cahaba Basin from Centreville to Selma.

With the exception of the existing legal and regulatory framework, the strategies for protection are comprised of voluntary measures. The strategies rely heavily on public outreach and education programs to instill a sense of personal and civic responsibility, encouraging local participation in efforts to maintain a thriving watershed community.

The goal of the Cahaba Basin Clean Water Partnership is to improve, protect and maintain the beneficial uses and water quality standards of the Cahaba Watershed through a basin-wide public/private partnership. The strategies for obtaining this goal are based on the following twelve objectives:

1. Reduce nonpoint source pollution from agricultural activities.
2. Reduce nonpoint source pollution from forestry activities.
3. Reduce nonpoint source pollution from construction, road building and maintenance and other land clearing activities.
4. Reduce nonpoint source pollution from residential sources.
5. Reduce pollution from existing and future on-site sewage systems.
6. Reduce runoff from stormwater discharges to the main stem of the Cahaba and its tributaries.
7. Reduce the input of wastes from stormwater flows including sewage, petroleum products, and litter
8. Protect groundwater resources through conservation and pollution prevention.

9. Seek identification and protection of fish and wildlife habitat.
10. Continue to track trends in physical, chemical and biological water quality parameters for surface and groundwater, particularly where BMPs have been applied; and provide transfer of technical and scientific information to aid decision-making activities.
11. Cooperate with Federal, State, and local agencies to assess the effectiveness of the Plan and to make adjustments to achieve the objectives and strategies described herein.
12. Increase citizen concern for watershed protection, and develop long-term support and involvement of citizens for watershed planning and management.

### **Strategies for Protection/Comparative Risk Assessment**

Specific strategies for protection of the watershed are proposed based on consensus of the Partnership Steering Committee regarding issues of concern. The Partnership Steering Committee developed a priority list of issues using Comparative Risk Assessment (see Section III, Priority Determination Using Comparative Risk Assessment).

The priority list identified pollutants (stressors) and activities typically associated with those pollutants (sources of stressors).

The strategies for protection target the sources of pollutants (stressors) with the intent of reducing pollutant loading at or near the source. Strategies for protection are proposed in accordance with the general priority rankings of pollutants/sources agreed upon by the Partnership Steering Committee.

The strategies for protection can be approached through two different mechanisms, (1) policy measures, and (2) physical measures.

#### **i. Policy Measures**

Policy measures include existing and future regulatory programs at the federal, state and local level coupled with future innovative land use scenarios. The regulatory policy measures are mechanisms such as discharge permitting, zoning, and other development requirements that are inherent to existing laws such as the Clean Water Act and local zoning regulations.

A description of regulatory programs in the watershed may be found in Section IV of this report.

It is expected that as the Clean Water Partnership program matures, other state and local government policy programs will emerge that include regulatory as well as voluntary participation incentives, etc.

Policy measures are intended to be comprehensive in addressing all sources of pollutants. Strategies for protection implemented through policy measures are as follows:

*Policy Strategy:* Coordinated, Conservation-Based Land Use Planning

*Policy Strategy:* Community Design Guidelines  
Development Design Guidelines

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- Policy Strategy:* Partnering agreements among policy-makers in the watershed, including the Upper Cahaba Watershed Consortium, Lower Cahaba River Basin Committee and the Cahaba Trace Commission
- Policy Strategy:* Planning initiatives coordinated with development of infrastructure
- Policy Strategy:* Incentives for acquisition of land and interests in land especially sensitive for protection of water quality, conservation easements, transfer of development rights, and other measures to set aside acreage (land parcels)

### ii. Physical Measures

Physical measures are actual activities implemented in the watershed that assess and improve overall watershed conditions. These include in-stream monitoring, innovative demonstration projects, and long-term water quality improvement projects and education/outreach activities with stakeholders. The majority of these activities are voluntary, culminating from partnering and consensus building through the Clean Water Partnership.

Some volunteer initiatives, such as in-stream monitoring, overlap and support regulatory policy measures. Several locally led efforts provide water quality monitoring within the watershed. These efforts are specifically identified in the detailed strategies of the physical measures.

### iii. Education and Outreach Measures

Education and Outreach is integral to each of the activities listed in this Protection Plan. In addition this component will include levels of education and outreach oriented to a variety of audiences. General education items will be addressed here with specific items listed in their respective strategy.

Education and Outreach will be anchored by stakeholder meetings and a public education marketing plan. Programs about the river, its tributaries, and its protection will be presented for:

- Elected officials (NEMO)
- Heavy equipment operators, contractors, and developers
- Public Health and Wastewater Managers
- School groups
- Advocacy's groups

All media formats will be used to distribute educational materials to the target audiences. Print, broadcast, and cyber sources will all be used. The education and outreach will also include presenting factual information to the public and the Cahaba River Clean Water Partnership. The ultimate goal is to not be the final source of information related to the use and protection of the river while preserving its value, but to serve as a first point of contact related to this topic. The education and outreach efforts will also link partners from all sources to better coordinate water quality and quantity initiatives. A concerted effort will attempt to forge communication and coordination links between these disparate efforts. This is also expected to provide significant savings that can then be reapplied to the betterment of the basin. In addition to the above, an aggressive program of demonstrations will be used to showcase the techniques, technologies, and concepts presented in the strategies.

**1. Reduce nonpoint source pollution from agricultural activities.**

**Strategy:**

- a. *Identify and prioritize sub watersheds that are most impacted by agricultural nonpoint source pollution.*

Discussion: Sub watersheds with 303(d) listed waters will be ranked highest on the priority list. Other rankings should be based largely on the Watershed Assessment Inventory collected every five years by the SWCDs and NRCS. This assessment uses aerial photography, farm plans and other resources to identify types of agricultural activities, animal numbers, proximity to streams, etc. to evaluate potential effects on streams.

Responsible Parties: NRCS, ACES, Project Coordinator

Cooperators: Watershed Project SBAC'S

Potential Funding: No additional funds necessary

Schedule: First quarter, 2003
- b. *Work with landowners to identify and install agricultural BMPs outlined in the CWA Work plan.*

Discussion: Implementing agricultural BMPs within the Watershed will significantly reduce soil erosion, and sediment and nutrient loading to the Cahaba and its tributaries. The work plan outlines a five-year implementation schedule for installing agricultural BMPs in the Watershed portion of Bibb , Perry, and Dallas counties. As other counties, or sub-watersheds, apply for 319 money to implement agricultural BMPs, appropriate work plans will be developed.

Responsible Parties: Project Technician, NRCS

Cooperators: Landowners

Potential Funding: 319 Project funds

Schedule: Ongoing, beginning First quarter, 2003.
- c. *Involve the agricultural community in watershed planning activities and encourage the establishment of voluntary goals for BMPs within the Watershed.*

Discussion: Attend meetings of local farm groups such as the Farmers' Federation, Poultry Associations, Cattleman's Association, etc. to discuss water quality and the importance of BMPs. This direct contact with a large diverse group of farmers will be much more effective than attempting to get them all to attend a watershed stakeholder meeting.

Responsible Parties: NRCS, ACES, Project Coordinator

Cooperators: Watershed Project SBAC'S

Potential Funding: No additional funds necessary

Schedule: Ongoing, beginning First quarter, 2003
- d. *Coordinate BMP demonstration projects on local farms within the Watershed.*

Discussion: BMP demonstration projects will promote the understanding and adoption of BMPs by farmers within the Watershed. The projects will demonstrate the effectiveness of BMPs on local farms, and will showcase progress of the practices throughout the growing season.

Responsible Parties: Project Coordinator, Project Technician

Cooperators: Landowners, SWCDs, NRCS, ACES

Potential Funding: 319 Project funds

Schedule: Ongoing, begun 2002

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- e. *Initiate educational outreach activities with youth involved in agriculture.*  
Discussion: Educational programs for youth involved in agriculture are imperative for agriculture and a healthy watershed. It is much easier to influence the young and expose them to conservation ideas and practices than to wait until they enter the business. The outreach program will consist of both presentations and projects to get youth involved in actual applications of BMPs.  
Responsible Parties: Project Coordinator, Project Technician, ACES, NRCS  
Cooperators: FFA, Landowners, 4H Club, school officials  
Potential Funding: Legacy, SWCDs, local businesses  
Schedule: Ongoing, beginning First quarter, 2003
- f. *Recognize agricultural participants who are implementing effective BMPs on their land.*  
Discussion: Recognizing farmers for effective BMP practices not only rewards the farmer, but also serves as an educational tool and incentive for others to do the same. The signs will feature the project logo and state what the farmer is being recognized for.  
Responsible Parties: Project Coordinator, Project Technician, SWCDs, SBAC  
Cooperators: NRCS, ACES  
Potential Funding: 319 funds, industries/businesses  
Schedule: Ongoing, beginning First quarter, 2004
- g. *Coordinate an Agricultural Amnesty Day for farmers within the Cahaba Watershed boundaries.*  
Discussion: Work with responsible agencies to establish an annual Amnesty Day event. Although initial costs may be high due to citizens bringing chemical products stored over several years, costs should decrease in subsequent years with fewer pollutants to be collected.  
Responsible Parties: Alabama Department of Agriculture & Industries, County Solid Waste Management Departments, County EMA's  
Cooperators: Project Coordinator, ACES  
Potential Funding: ADAI, county funds, EPA, foundations/private organizations  
Schedule: As scheduled by ADAI

## 2. Reduce nonpoint source pollution from forestry activities.

### **Strategy:**

- a. *Educate forest landowners concerning the importance of BMPs in reducing nonpoint source pollution associated with timber management.*  
Discussion: Work with the forest industry to conduct BMP implementation workshops and seminars for loggers and public and private landowners. Distribute BMP educational material to private landowners through large mail outs. Attend meetings pertinent to forestry activities. Encourage landowners to participate in annual Forestry Field Days and Urban Forestry Fairs.  
Responsible Parties: Alabama Forestry Commission  
Cooperators: Project Coordinator, Auburn University School of Forestry, the Alabama Loggers Council, the Alabama Forestry Association, consulting foresters  
Potential Funding: AFC, timber companies, grants  
Schedule: Ongoing, beginning First quarter, 2003

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*b. Initiate education and outreach programs with students involved in forestry activities.*

Discussion: Present programs to school FFA clubs or other related youth organizations. Attend Forest Field Days sponsored by FFA in local schools. Distribute forestry educational material to local teachers in grades K-12. Coordinate these activities around National Arbor Day or other designated forestry awareness days.

Responsible Parties: Project Coordinator, AFC, ACES, and NRCS

Cooperators: FFA, landowners, 4H Club, local school districts

Potential Funding: Legacy, AFC, USDA Forest Service, and State & Private Forestry

Schedule: Ongoing, beginning First quarter, 2003

*c. Utilize the Alabama Forestry Commission's TREASURE Forest program to recognize forest landowners with a proven record of Best Management Practices.*

Discussion: Use this BMP recognition program to provide signs and other forms of recognition to landowners. Encourage TREASURE candidates to participate in the Alabama TREASURE Forest Association (AFTA) chapter within their county. Explore new ways of increasing participation from landowners. Educate the general public about the importance of sound forestry practices, so that land stewardship is appreciated and encouraged.

Responsible Parties: AFC

Cooperators: Project Coordinator, Project SBAC'S, landowners

Potential Funding: AFC, Legacy, grants

Schedule: Ongoing, beginning third quarter, 2003

### **3. Reduce nonpoint source pollution from construction, road building and maintenance, and other land clearing activities.**

#### **Strategy:**

*a. Implement urban BMPs as outlined in the FY 2000 Clean Water Action Plan Work plan.*

Discussion: Implementing urban BMPs will significantly reduce soil erosion, nutrient loading and other urban runoff contaminants entering the Cahaba River and its tributaries. As other counties or sub-watersheds apply for 319 money to implement urban BMPs, appropriate work plans will be developed.

Responsible Parties: Project Technician, Water Works and Sewer Boards, Stormwater Management Authority

Cooperators: NRCS, Engineering Companies, Watershed Project Coordinator, Local governments/municipalities

Potential Funding: 319 funding, local municipalities

Schedule: Ongoing, beginning with First quarter 2003.

*b. Coordinate local Urban BMP demonstration projects.*

Discussion: BMP demonstration projects will promote the understanding and adoption of BMPs by those involved in urban construction and land clearing activities. The projects will demonstrate the effectiveness of properly installed BMPs on selected construction sites.

Responsible Parties: Project Coordinator, Project Technician

Cooperators: Upper Cahaba Consortium, Landowners, SWCDs, NRCS, Local Homebuilders Associations, city governments



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Potential Funding: 319 Project funds, Local governments, Local Homebuilders Associations

Schedule: Ongoing, beginning Second quarter, 2004

- c. *Conduct nonpoint source pollution and BMP workshops and educational programs for the construction industry.*

Discussion: Encourage implementation of NPS pollution control measures during construction through promoting the Homebuilders Association of Alabama's Construction Stormwater Management Course, and presenting educational and outreach programs to local governments and builder/contractor groups. Provide mini-workshops on erosion and sediment control in evening or weekend formats utilizing the publication *Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas* developed by the Alabama Soil and Water Conservation Committee. Participate in SWMA certification and recertification training for contractors. Utilize *Business Partners for Clean Water* and other educational material as offered by the Clean Water Partnership. Research and distribute other handbooks or manuals as appropriate. Encourage attendance to the Nonpoint Source Education for Municipal Officials (NEMO) workshops to educate and train local, city and county officials about NPS pollution and stormwater pollution prevention and treatment.

Responsible Parties: Local Homebuilders Associations, ADEM, Watershed Project Coordinator

Cooperators: County Planning Departments, HBAA, Soil & Water Conservation Society, SWMA

Potential Funding: EPA, County Commissions, City governments, HBAA

Schedule: Ongoing, beginning First quarter, 2003

- d. *Develop pro forma NPS guidelines for erosion control, concentrating on the NRCS Watershed Assessment Priority areas.*

Discussion: The Cahaba CWP will encourage coordination among county and municipal governments and ADEM to develop an awareness of the need for increased erosion control and, as possible to assist in the development of uniform erosion control program ordinances that can be adopted by local authorities.

Responsible Parties: Local planning departments, county and city governments, Watershed Project Coordinator, Stormwater Management Authority

Cooperators: Upper Cahaba Consortium, Regional Planning Commission of Greater Birmingham, ADEM, Watershed Project SBAC's

Potential Funding: ARC, local governments

Schedule: Ongoing, beginning Second quarter, 2003

- e. *Identify and rank dirt roads in the Cahaba Watershed that contribute most to stream sediment loads.*

Discussion: Utilize the NRCS Watershed Assessment to identify sub-watersheds most impacted by dirt road sediment runoff. Prioritize roads for improvement projects. Work with county commissions and county engineers to develop ranking systems based on standard criteria that include environmental effects. Dirt roads located near 303(d) listed streams will be given highest priority.

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Responsible Parties: Watershed Project Coordinator, Watershed Project SBAC'S, County Commissions

Cooperators: NRCS, SWCDs, county engineers

Potential Funding: No additional funding needed

Schedule: Fourth quarter 2003

- f. *Provide training on sediment and erosion control for public works employees and others involved in building and maintaining roads.*

Discussion: Hold public workshops as well as private training seminars to target groups. Encourage public works departments and developers to hire trained contractors. Utilize the publication *Recommended Practices Manual—A Guideline for Maintenance and Service of Unpaved Roads* developed by the Choctawhatchee, Pea and Yellow Rivers Watershed Management Authority (Alabama). Enlist ADEM to present their Erosion Control PowerPoint presentation or have a “training of the trainers” session to equip others to do presentations.

Responsible Parties: Project Coordinator, ADEM, County and municipal public works departments

Cooperators: County and city governments, ACES, ADEM, SWCD Society

Potential Funding: 319 funding, county commissions

Schedule: Ongoing, beginning Second quarter 2003

- g. *Recognize developers and contractors who are participating in the Clean Water Partnership and have implemented effective BMPs on their sites.*

Discussion: This BMP recognition program provides signs and other forms of recognition to developers and contractors. Participants must be in compliance with all applicable environmental regulations and will be monitored periodically to ensure maintenance of BMPs. New ways for increasing recognition and participation of developers and contractors will be explored.

Responsible Parties: Project Coordinator, Project Technician, SWCDs, SBAC'S

Cooperators: NRCS, Area Homebuilders Assoc., Area Board of Realtors

Potential Funding: 319 funding

Schedule: Ongoing, beginning First quarter, 2004

#### **4. Reduce nonpoint source pollution from residential sources.**

**Strategy:**

- a. *Develop and distribute a homeowners' informational packet regarding prevention of residential nonpoint source pollution.*

Discussion: Each household produces an assortment of nonpoint source pollution from a variety of sources. A homeowners' packet addressing the causes and prevention of NPS pollution will be an efficient and effective way to educate people on responsible homeownership. The packets will include information on maintaining septic systems, proper disposal of household wastes, water conservation, groundwater protection, gardening and native plant tips, and a publication of relevant agencies and phone numbers. These packets will be distributed through local utility companies, realtors associations, extension offices and public health departments (see 8b).

Responsible Parties: Project Coordinator, ACES, County Health Departments

Cooperators: ADEM, Watershed SBAC'S, Area Realtors Association, local utility Companies, Master Gardeners, Homebuilders Association

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Potential Funding: 319 funding, Homebuilders Association, lending institutions, grants

Schedule: Ongoing, beginning Third quarter, 2003

b. *Coordinate local Urban BMP demonstration projects.*

Discussion: BMP demonstration projects will promote the understanding and adoption of BMPs by those involved in urban construction and land clearing activities. The projects will demonstrate the effectiveness of properly installed BMPs on selected construction sites.

Responsible Parties: Project Coordinator, Project Technician, Stormwater Management Authority

Cooperators: Landowners, SWCDs, NRCS, Local Homebuilders Associations, city governments

Potential Funding: 319 Project funds, Local governments, Local Homebuilders Associations

Schedule: Ongoing, beginning Second quarter 2004

c. *Educate commercial landscapers about ways to prevent nonpoint source pollution.*

Discussion: Businesses and riverfront property owners commonly employ commercial landscapers. Since fertilizer and pesticide runoff are major contributors to the NPS pollution load within the Watershed, educating commercial landscapers about ways to reduce this type of pollution is important. Workshops will be held addressing these issues. The possibility of requiring continuous education for business license renewal will be explored. Informational brochures will also be distributed.

Responsible Parties: Project coordinator, ACES

Cooperators: ADEM, Turf Management contractors, Master Gardeners

Potential Funding: 319 funding

Schedule: First quarter 2004

d. *Conduct shoreline management presentations to local Lake Protection Associations.*

Discussion: Utilize realty and neighborhood associations to access large numbers of homeowners for promotion of the Watershed Project. Provide information on the causes and prevention of NPS pollution on and around river banks. Recruit volunteers for the Alabama Water Watch citizens' monitoring program.

Responsible Parties: Project coordinator, ACES

Cooperators: Greater Birmingham Realtor's Association, utility inserts, ADEM, Alabama Water Watch

Potential Funding: 319 funding

Schedule: Fourth quarter 2004

e. *Coordinate a Watershed-wide Amnesty Day event for residential hazardous waste disposal.*

Discussion: Work with responsible agencies to establish an annual Amnesty Day event for residential hazardous waste disposal. Although initial costs may be high due to citizens bringing products stored over several years, costs should decrease in subsequent years with fewer pollutants to be collected. This event may be combined with the Agricultural Amnesty Day to maximize efficiency in coordinating the event.

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Responsible Parties: Alabama Department of Agriculture & Industries, County Solid Waste Management Departments, County EMA's

Cooperators: Project Coordinator, ACES

Potential Funding: ADAI, county funds, EPA, foundations/private organizations

Schedule: As scheduled by ADAI

**5. Reduce pollution from existing and future on-site sewage systems.**

**Strategy:**

- a. Identify areas with significant impacts from onsite sewage disposal systems (OSDS) (failures, overflows, pollution) and public-owned treatment works (POTWs) (failures, overflows, pollution); encourage solutions through education and incentives.

Discussion: Use water quality monitoring data to identify areas impacted by sewage problems; indicate if sewage pollution may be caused by septic tank systems, POTWs, or both. Conduct education and outreach to inform residents. Promote use of alternative onsite sewage treatment systems. Promote proper operation and maintenance by owners of all OSDS through education and incentives. Seek support from local pumpers to provide discounted pump-outs to homeowners and free inspections to identify septic tank system failures. Work with engineers, county health departments, and the State Health Department to speed up approval process for alternative systems. Seek funding assistance for low-income areas to provide or repair septic tank systems. Encourage pumpers to become certified maintainers of OSDS. Produce and maintain list of certified pumpers and installers.

Responsible Parties: County Commissions, County Health Departments, POTWs, Project Coordinator, local water authorities

Cooperators: ACES, Alabama Dept. of Health, Alabama Onsite Wastewater Association, SWCDs, County Health Departments

Potential Funding: 319 funding, EPA Rural Hardship Assistance Program, County commissions

Schedule: Ongoing, beginning with Second quarter, 2003

- b. *Educate homeowners and businesses on proper septic tank siting, installation, operation, and maintenance; and advantages of alternative onsite sewage treatment technologies.*

Discussion: Develop suitable presentations for use in workshops, public service announcements and other media. Conduct onsite sewage education workshops in the Watershed for the public, local officials, developers, realtors, lenders and school children.

Responsible Parties: Project Coordinator, Alabama Department of Public Health, County Health Departments

Cooperators: ACES, ADEM, Alabama Septic Tank Association, County Commissions, Alabama Onsite Wastewater Committee

Potential Funding: 319 funding, Legacy

Schedule: Ongoing, beginning Second Quarter, 2003

- c. *Promote county/local resolutions regarding onsite sewage disposal containing more stringent requirements for approving OSDSs, for homeowner maintenance and repair, and for effluent quality before infiltration to soil. Encourage communities to consider alternatives such as, small decentralized onsite sewage treatment and disposal systems with adequate operation and maintenance by certified operators.*

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Discussion: Stronger local ordinances are needed to curb the amount of fecal coliform bacteria entering ground or surface waters from septic tank systems and POTWs. Requirements and incentives for inspections, certifications, and necessary upgrades of OSDs before the sale or transfer of property should be considered. Larger minimum lot sizes could be established with respect to soil type and suitability for sewage treatment. Effluent quality criteria and annual monitoring of systems could be required.

Responsible Parties: County Commissions, County Planning Departments

Cooperators: Project Coordinator, Watershed SBAC'S, SWCDs, Alabama Department of Public Health, County Health Departments, ADEM, Alabama Septic Tank Association, Engineers, Cawaco RC&D

Potential Funding: County funds, SWCDs, pumper/installer license fees, Onsite Sewage Disposal System application fees, renewable permit fees, other

Schedule: First quarter, 2003

d. *Implement alternative onsite sewage treatment system demonstration projects.*

Discussion: In many areas of the watershed, soils are not suitable for conventional septic tank systems. In these cases, alternative onsite sewage treatment systems are an ideal option in treating wastewater. Demonstration projects will promote the understanding and acceptance of alternative systems to public health officials, engineers, homebuilders, homeowners, etc.

Responsible Parties: Project Coordinator, County Health Departments, County Engineers

Cooperators: Property owners, Alabama Department of Public Health, Homebuilders Association, Gadsden State Community College, Alabama Onsite Wastewater Training Center

Potential Funding: County funds, SWCDs, 319 funding

Schedule: Second quarter 2003

**6. Reduce runoff from stormwater discharges to the Cahaba River and its tributaries. (Strategies a, b, and c in this section are adapted from the Great Swamp Watershed Management Plan, F.X. Browne, Inc.)**

**Strategy:**

a. *Identify potential sites for regional stormwater management facilities such as wet ponds and constructed wetlands.*

Discussion: An evaluation should be done to identify potential sites for regional stormwater facilities such as constructed wetlands. The economic, environmental and social aspects of developing regional facilities should be considered. Most municipalities have existing detention basins to hold stormwater runoff before it enters the nearest water body. Typical stormwater basins are designed to control the peak rate of stormwater runoff, not the volume or quality. These basins can be retrofitted into stormwater wetlands, conventional wet ponds or a combined wetlands-pond system. A modified stormwater control facility has longer storage time, long flow paths and biological treatment, therefore providing a pollutant treatment aspect to the basin.

Responsible Parties: County and City Governments, Stormwater Management Authority

Cooperators: County Engineers, County Planning Departments, Watershed SBAC's

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Potential Funding: County and City Governments, 319 funding, grants

Schedule: Ongoing, beginning First quarter, 2003

- b. *Encourage municipalities to develop and implement stormwater management policies to control both the quantity and quality of stormwater runoff.*

Discussion: Stormwater management policies should be updated to include provisions to reduce site runoff, maximize the use of natural drainage systems, and provide treatment to runoff before it enters water bodies. Municipalities should refer to the "How To" publication *Considerations for Stormwater and Urban Watershed Management: Developing a Program for Complying with Stormwater Phase II MS4 Permit Requirements and Beyond* developed by the Center for Environmental Research and Service, Troy State University. Public officials should be encouraged to attend the Nonpoint Source Education for Municipal and Elected Officials (NEMO) program to provide them the tools to develop effective stormwater policies or management plans.

Responsible Parties: County and City governments

Cooperators: Project Coordinator, ADEM, Municipal Planners, Watershed Project SBAC'S, County and City engineers, Municipal Water Boards

Potential Funding: No additional funding needed

Schedule: Ongoing, beginning in first quarter, 2003

- c. *Evaluate current and future impervious cover limits and encourage developments with a minimal amount of impervious land cover.*

Discussion: Studies have shown that the pollutant loadings in a watershed are directly related to the amount of impervious area in a watershed. Therefore, the best method of reducing runoff is to minimize the amount of impervious area on a site. Implementing practices such as smaller parking lots, narrower residential road widths, shorter driveways, cul-de-sac with islands and open-space planning can minimize the amount of impervious area. Creation of open space increases infiltration of stormwater into the ground resulting in decreased stormwater runoff. Open space also provides wildlife habitat and recreational space, thus increasing economic value. The amounts and locations of future impervious cover within the Watershed will be evaluated. Future growth should be encouraged in sub-watersheds that appear most capable of absorbing growth in impervious cover. For new subdivisions, municipalities should identify potential conservation or open space lands, both primary (un-buildable) and secondary (prime agricultural, streams, wetlands, historic/cultural areas, sensitive areas, etc.) and then locate house or development sites accordingly. Reduction in impervious areas should be balanced with the social and economic needs of residents and users.

Responsible Parties: Upper Cahaba Consortium, Project Coordinator, City and County Governments, Regional Councils of Government

Cooperators: Watershed Project SBAC's, Municipal Planners, Ducks Unlimited, Alabama Natural Heritage, Historical Societies, NRCS

Potential Funding: No additional funding needed

Schedule: First quarter, 2003

- d. *Encourage the adoption of a wetlands protection ordinance to ensure that new developments, construction, or earth moving activities do not destroy wetlands.*

Discussion: A countywide wetland protection program is needed to assure compliance with the Section 404 Nationwide Permit program. Valuable wetlands should be identified and then provided permanent protection status through countywide subdivision or floodplain regulations. A local wetland program will improve permit compliance and enforcement through increased

site inspections by county staff. In addition, this program could develop mitigation performance standards and require accountability for mitigated wetlands that are not functioning properly.

Responsible Parties: County Commissions, US FWS, County Planning Departments

Cooperators: COE, ADEM, ADECA, Watershed Project SBAC'S

Potential Funding: County funds

Schedule: Second quarter, 2003

- e. *Promote the use of stormwater drain stencils in residential and urban areas of the watershed.*

Discussion: Storm drain stencils are Mylar, plastic or other durable cut outs of phrases such as "DUMP NO WASTE: DRAINS TO STREAMS." These phrases are spray painted on the concrete storm drains found in many residential and commercial areas. Stenciling may also be used on bridges in rural areas. Storm drain stenciling is a great project for young children. Teachers, Scout leaders, and other civic and environmental organizations will be informed of the availability of stencils. The use of stencils can also be promoted through newspaper articles and other forms of recognition.

Responsible Parties: Project Coordinator, City and County Government, Stormwater Management Authority

Cooperators: Girl Scouts, Boy Scouts, Educators, Environmental Clubs

Potential Funding: Local Governments, SWCDs

Schedule: Third quarter, 2003

**7. Reduce the input of wastes generated by water-related recreational activities, including sewage, petroleum products and litter.**

**Strategy:**

- a. *Develop and distribute educational materials for boaters outlining environmental issues and responsible recreation activities.*

Discussion: An educational brochure will be developed to address ways in which boaters can minimize harmful effects on the environment. The brochure will include information regarding human waste disposal, litter issues, sensitive habitat information and other ways to apply safe and environmentally sound boating practices. These brochures will be disbursed in a variety of places including boat marinas, the courthouse (where the boaters' licenses are obtained), boat shows and tournaments, etc.

Responsible Parties: Project Coordinator, Watershed Project SBAC'S

Cooperators: Alabama Department of Conservation, Alabama Power Squadrons, PALS, Keep Alabama Beautiful, Local Marinas, Outdoor Outfitters, Outdoor Equipment retailers

Potential Funding: 319 funding, grants

Schedule: First quarter, 2004

**8. Protect groundwater resources through conservation and pollution prevention.**

**Strategy:**

- a. *Encourage communities using groundwater as the major water supply to become Ground Water Guardians.*

Discussion: Work with Alabama Water Watch and Ground Water Guardians program to implement correct protocol for groundwater testing.

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Responsible Parties: Project Coordinator, AWW

Cooperators: Geological Survey of Alabama, Ground Water Guardians, ADEM, ADAI, Legacy, USGS, Water Works and Sewer Boards

Potential Funding: ADEM, EPA

Schedule: Second quarter, 2004

*b. Educate citizens on water conservation and ways to prevent ground water pollution.*

Discussion: Include a section on water conservation and groundwater pollution prevention within a homeowner's educational brochure (see 4a, above).

Continue to coordinate established Groundwater Festivals and assist with the expansion to other Cahaba Basin counties that are not yet participating. Work with teachers to incorporate a groundwater component into other watershed educational activities.

Responsible Parties: Project Coordinator, ACES, Watershed Project SBAC'S

Cooperators: Local school districts, City and County Government, Local Water Boards, SWCDs, Water Works and Sewer Boards, ADEM

Potential Funding: City and County Government, Local Water Boards, Private Donations, 319 funding

Schedule: Third quarter, 2003

*c. Encourage counties to adopt a countywide mandatory garbage collection ordinance to deter illegal dumping in rural areas.*

Discussion: In many rural areas, isolated dirt roads and sinkholes become illegal dumps for garbage and other waste materials. These places are eyesores and pose a threat to ground and surface water quality. Illegal dumps can also harbor insect and rodent populations that can transmit disease. Hazardous materials, dead animals, and other types of garbage placed in areas characterized by limestone aquifers and sinkholes, are particularly susceptible to contamination.

Responsible Parties: County health departments Project Coordinator, Watershed Project SBAC'S, Solid Waste Management Authorities

Cooperators: County Government, Local Water Boards, SWCDs,

Potential Funding: No funding necessary

Schedule: Ongoing, beginning First quarter, 2003

**9. Seek identification and protection of fish and wildlife habitat through education and incentive programs.**

***Strategy:***

*a. Identify and map sensitive habitats, and develop a ranking system for prioritization.*

Discussion: Alabama Natural Heritage will use the Nature Conservancy's Biological and Conservation Database (BCD) program as a primary information-managing tool to identify degradation of various threatened and endangered (T&E) flora and fauna in the Watershed. A map or GIS data layer of sensitive lands and other significant biological features in the Cahaba will be produced. Utilize the FWS's *Recovery Plan for Mobile River Basin Aquatic Ecosystem* to ensure conservation efforts are in accord.

Responsible Parties: Alabama Natural Heritage, FWS, ADCNR

Cooperators: Project Coordinator, Watershed Project SBAC'S,

Potential Funding: 319 funding

Schedule: Fourth quarter, 2003



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- b. *Identify sub-watersheds with significant habitat restoration needs and rank valuable parcels for acquisition or other forms of protection.*  
Discussion: Develop ecological indicators that can be used to identify valuable habitats in the Watershed. Examine aerial photographs to identify sub-watersheds with significant habitat loss. Identify possible areas for restoration based on their potential benefit for fish and wildlife and/or to mitigate water quality effects from adjacent land use activities. Prioritize areas for habitat restoration and important parcels for protection. Develop report and map to justify ranking and distribute to land protection organizations (see 9d).  
Responsible Parties: Alabama Natural Heritage, Project Coordinator  
Cooperators: Watershed Project SBAC's, TNC, FWS, ADCNR  
Potential Funding: 319 funding  
Schedule: Fourth quarter, 2003
- c. *Utilize existing programs to provide cost-share to landowners for habitat restoration and protection activities such as Environmental Quality Incentives Program (EQUIP) Wetlands Reserve Program (WRP), Conservation Reserve Program (WHIP) and Partners for Wildlife (FWS). Pursue funding to establish new grant or cost-share opportunities for habitat protection activities.*  
Discussion: Assist NRCS and FWS in informing landowners of the availability of Federal cost-share assistance for habitat protection. Many programs are available to assist landowners in habitat restoration and protection activities; however, many landowners are not aware that programs are available or do not rank habitat protection as a management priority. Develop educational programs that include literature, workshops and press releases on conservation options. Write grants to fund additional programs that will provide cost-share at a higher rate, increasing the incentive for landowners.  
Responsible Parties: Project Coordinator, Watershed Project SBAC'S,  
Cooperators: SWCDs, NRCS, FWS, Local media  
Potential Funding: SWCDs, NRCS, FWS, additional grants  
Schedule: First quarter, 2003
- d. *Provide information to the general public on tax incentives and other benefits that can be achieved through the use of conservation easements and other land protection programs.*  
Discussion: Seek to acquire sensitive areas through existing organizations such as Ducks Unlimited, The Nature Conservancy, USDA-NRCS's Farmland Protection Program, various Land Trusts, etc. Hold workshops for the general public on conservation easements and other land protection strategies.  
Responsible Parties: Project Coordinator, Watershed Project SBAC's, Black Warrior - Cahaba Rivers Land Trust  
Cooperators: FWS, Legacy, Ducks Unlimited, Nature Conservancy, Trust for Public Land, Land Trust Alliance, Forever Wild, SWCDs, Alabama Forest Resources Center, Alabama Land Trust  
Potential Funding: Land Trust Alliance, Alabama Forest Resources Center, additional grants  
Schedule: Third quarter, 2004
- e. *Review COE permit applications for wetland filling & dredging permits in the watershed.*  
Discussion: Review COE permit applications (the Mobile District) for activities within the Watershed. Provide written comment during public comment period on all permits where activities may cause unnecessary environmental impacts.

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Responsible Parties: Watershed Project SBAC's, NRCS, Project Coordinator

Potential Funding: No additional funding needed

Schedule: Ongoing, beginning First quarter, 2003

**10. Continue to inventory and monitor physical, chemical and biological water quality parameters for surface and groundwater, particularly where BMPs have been applied; and provide database information.**

**Strategy:**

- a. *Continue to support and expand Alabama Water Watch citizens' monitoring program, concentrating on 303(d) listed streams and other water bodies where BMPs have been installed as a part of this plan.*

Discussion: Maintain current monitoring activity with monthly monitoring of active sites in the Watershed. Hold basic and bacteriological certification workshops at least twice per year. Water Watch data will be compared to data obtained following installation of BMPs and other strategies to assess impact of measures on water quality. Hold at least one annual Advanced Workshop for biological (bacteria and macro invertebrate) monitoring. Encourage school groups at all levels (middle school, high school and college) to get involved.

Responsible Parties: AWW, Water Works and Sewer Boards

Cooperators: Project Coordinator, Local teachers/schools, SWCD's

Potential Funding: SWCDs, Water Works and Sewer Boards

Schedule: Ongoing, beginning First quarter 2003

- b. *Continue to cooperate with Birmingham Water Works, Jeff. County Environmental Services, GSA, and USGS monitoring the Cahaba River and its tributaries.*

Discussion: These entities began sampling the Cahaba River. This baseline data will be used to compare water quality before and after BMP projects are implemented within the Watershed. Other water authorities will be encouraged to implement similar water monitoring efforts within their sub-watersheds.

Responsible Parties: BWW&SB, Project Coordinator, Local Water Utilities

Cooperators: SBAC'S, City and County Governments

Potential Funding: B'Ham Water Works, City and County Governments, Local Water Boards, Grants

Schedule: Ongoing

- c. *Partner with Universities within the state to collect and analyze water quality data.*

Discussion: Promote the Cahaba River Watershed Project to colleges and universities. Seek and encourage research projects that include data collection. Utilize their water quality labs, personnel, and expertise to analyze data. Encourage instructors to incorporate the Cahaba River Watershed Project into their labs and coursework.

Responsible Parties: Project Coordinator

Cooperator: UAB, AU, UA, JSCC, GSCC, other colleges and universities, instructors, students, science clubs

Potential Funding: UAB, UA, Legacy, other grants

Schedule: Ongoing, beginning with First quarter 2003

- d. *Participate in the State's effort to establish a water quality database and collection of all watershed research and reports.*

Discussion: The Alabama Clean Water Partnership is currently compiling all available water quality data and organizing it by basin. The information will be available through the statewide Clean Water Partnership website at

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([www.cleanwaterpartnership.org](http://www.cleanwaterpartnership.org)). The Cahaba River CWP will maintain a library of all Cahaba data, including water quality and research reports. This archive will be used to analyze data pertaining to 303(d) listed waters—determine when data was collected, frequency of data collection, improvement in water quality and possible de-listing of water bodies.

Responsible Parties: Cahaba Basin Clean Water Partnership, Project Coordinator, Watershed Project Technical Committee

Cooperators: Alabama Clean Water Partnership, ADEM

Potential Funding: ADEM

Schedule: Ongoing, beginning First quarter 2003

**11. Cooperate with Federal, State and local agencies to assess the effectiveness of the Plan and to make adjustments to achieve the objectives and strategies described herein.**

**Strategy:**

- a. *Identify and prioritize additional information needs to improve Plan effectiveness.*

Discussion: The Coordinator and the Project SBAC'S will identify information needs and develop a proposed research plan for the watershed. Potential research projects should provide information useful in implementing the strategies established in this Management Plan. The research plan will be distributed to research institutions around the State. Possible funding for these projects, via private grants and fellowships, will also be explored and identified.

Responsible Parties: Project Coordinator, Watershed Project SBAC'S

Cooperators: Cahaba Basin Partnership, Universities, Industries, Municipalities, Water Resources Research Institute

Potential Funding: No additional funding needed

Schedule: Fourth quarter, 2003

- b. *Review Watershed Management Plan annually and update plan as necessary.*

Discussion: Utilize stream, lake and groundwater monitoring results (see 10a-e) to evaluate effectiveness of agricultural and urban BMPs. Monitor citizen concerns, revised EPA/ADEM regulations, new 303(d) listings, etc. to achieve maximum improvement in water quality and removal of streams from the 303(d) List.

Responsible Parties: SBAC'S, Project Coordinator, NRCS, ADEM, Water Works and Sewer Boards

Cooperators: SWCDs

Potential Funding: No additional funding needed

Schedule: Ongoing, with initial assessment Fourth quarter, 2003

- c. *Encourage all sub-watersheds within the Cahaba to apply for grant money to carry out the objectives and strategies within the Management Plan.*

Discussion: Currently, only the three southernmost counties have applied for and received 319 grant money to implement project components. The Project Coordinator, along with the Project SBAC's, will work to promote the project and obtain funds to implement water quality strategies in other counties in the Cahaba Basin.

Responsible Parties: Project Coordinator, Watershed Project SBAC's, Cahaba Basin CWP

Cooperators: ADEM, NRCS, SWCDs

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Potential Funding: No additional funding needed.

Schedule: Ongoing, beginning with First quarter, 2003

- d. *Work with ADEM through the TMDL process to ensure effective and efficient TMDL implementation within the Cahaba River Basin CWP.*

Discussion: Total Maximum Daily Loads (TMDLs) will be established for stream segments within the Cahaba Basin by November 2003. TMDLs will mandate a daily limit on specific pollutants coming from all point and nonpoint sources going into a particular waterbody. The Watershed Project Coordinator will work with ADEM to provide data or other information that will be beneficial in the development of the Cahaba TMDLs. Public participation throughout the process will be encouraged, as well as written comment during the public comment period. As noted earlier, the strategies presented in this Cahaba River Basin CWP Management Plan already addresses the key pollutants to be regulated by the TMDLs. This should expedite achievement of TMDL goals in the Cahaba. When the TMDL data is available, the Plan's BMPs will be adjusted as necessary to give highest priority to TMDL requirements in 303(d) listed streams.

Responsible Parties: Project Coordinator, Project SBAC'S

Potential Funding: No additional funding needed

Schedule: First quarter, 2003-Fourth quarter, 2003

**12. Increase citizen concern for watershed protection and develop long-term support of citizens for watershed planning and management.**

***Strategy:***

- a. *Advocate the adoption of the Management Plan by the Alabama Clean Water Partnership and the general public.*

Discussion: It is very important to have buy-in from local key stakeholders such as landowners, municipal and county government, health departments, planners and city and county engineers. Personal dialog between the Project Coordinator and these parties is essential to the plan implementation success. Solicit comment on the Draft Plan and future Plan revisions. Seek to have an official "Adoption" of the Plan by public officials, by having a public signing ceremony at a water-related event such as the *Renew the Cahaba* river clean up.

Responsible Parties: Project Coordinator

Cooperators: Public officials, Local media

Potential Funding: No additional funding needed

Schedule: First quarter 2003

- b. *Actively solicit input in all components of the Management Plan.*

Discussion: Continue to hold public forums in Watershed communities and neighborhoods. Circulate draft Watershed Management Plan and final Plan to interested citizens. Provide ample comment period and public hearings to solicit input. Provide annual review of progress on Plan implementation and update the Plan as needed.

Responsible Parties: Project Coordinator, Watershed Project SBAC'S

Potential Funding: No additional funding needed

Schedule: Ongoing, beginning First quarter 2003

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- c. *Expand annual clean-up events to all segments of the Cahaba Basin.*  
Discussion: Currently there are a few annual river clean-ups along the Cahaba River. These events are organized independently by volunteers. It is the goal of the Cahaba CWP to have routine coordinated clean-up efforts within the entire Cahaba River Basin.  
Responsible Parties: KAB, PALS  
Cooperators: Project Coordinator, Project SBAC'S, Alabama Power, SWCD's, Cahaba River Society  
Potential Funding: KAB, PALS, ADECA, Alabama Power, and 319 funding, local municipalities  
Schedule: Ongoing, beginning Second quarter 2003
- d. *Utilize existing programs to expand environmental awareness among K-12 grade students.*  
Discussion: There is a vast amount of environmental education material and programs available for schools, educators and others involved in environmental education. The Project Coordinator will research, acquire and make available such resources to teachers and students. The Project Coordinator will do presentations, and recruit volunteers to do presentations, for local classes and youth groups. Use existing Outdoor Learning Programs as models for creating additional outdoor environmental classrooms throughout the watershed.  
Responsible Parties: Project Coordinator  
Cooperators: SWCDs, NRCS, Legacy, FWS, ADEM, Local school districts  
Potential Funding: SWCDs, NRCS, Legacy, grants  
Schedule: Ongoing, beginning with First quarter, 2003
- e. *Utilize the news media to increase public awareness about the watershed project.*  
Discussion: Publish articles in local newspapers and newsletters periodically to update citizens on activities within the Cahaba Basin. Use local radio stations to do public service announcements (PSAs). Promote the Alabama Clean Water Partnership PSAs through local television stations.  
Responsible Parties: Project Coordinator, Project SBAC'S  
Cooperators: Local newspapers, television stations, and radio stations, AL Clean Water Partnership  
Potential Funding: No additional funding needed  
Schedule: Ongoing, beginning First quarter, 2003
- f. *Maintain a Website for the project.*  
Discussion: A Website helps publicize the Cahaba Basin CWP Watershed Project and provides information on watersheds in general. The site also links with the statewide Clean Water Partnership Website.  
Responsible Parties: Watershed SBAC'S, Project Coordinator  
Potential Funding: SWCDs, in-kind donations, grants, (Malcom Pirnie, Inc. currently hosts the website as part of its generous support of the CWP)  
Schedule: Ongoing
- g. *Design and print brochures describing the goals and objectives of the Cahaba River Basin CWP.*  
Discussion: Decide on appropriate logo to be used on all printed material. Include map of the Cahaba and other colorful graphics in the brochure.  
Responsible Parties: Project Coordinator, Project SBAC'S  
Cooperators: Local publisher  
Potential Funding: 319 funding  
Schedule: First quarter, 2003

- h. *Place “Watershed Boundary” signs on major roads entering and leaving the watershed.*

Discussion: Install signs along major roads to identify watershed boundaries. Signage will promote awareness of the Cahaba Watershed, as well as a sense of ownership for area residents.

Responsible Parties: Project Coordinator

Cooperators: Watershed SBAC’S, SWCDs, Water Works and Sewer Boards

Potential Funding: 319 funding, In-kind donations, and grants

Schedule: Third quarter, 2003

- i. *Develop PowerPoint presentations to present to educators, civic organizations, businesses, homebuilders associations, county and city personnel, etc., to promote the project.*

Discussion: PowerPoint is a simple and effective tool for delivering presentations, especially those of a technical nature. The Project Coordinator will utilize the NEMO toolbox to develop appropriate presentations catered to particular groups for use throughout the project. Seek to acquire a laptop and projector solely for the Cahaba Basin CWP.

Responsible Parties: Project Coordinator

Cooperators: ADEM, Legacy, SWCDs, Project SBAC’S

Potential Funding: Legacy, other grants, SWCDs

Schedule: First quarter, 2003

## Appendix A

### Land Use (1/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	County-Sub-Acres	Cropland - Acres	Cropland %	Pastureland - Acres	Pastureland %	Forestland - Acres	Forestland %	Urbanland - Acres	Urbanland %	Ponds & Lakes - Acres	Ponds & Lakes %	Mined Lands - Acres	Mined Lands - %	Other Land - Acres	Other Land - %
Cahaba River	Bibb	3150202070	Cahaba	Warrior-Cahaba	59514	0	0	2976	5	44636	75	2976	5	0	0	8927	15	0	0
Haysop Creek	Bibb	3150202120	Cahaba	Warrior-Cahaba	92977	3719	4	13947	15	69733	75	4649	5	930	1	0	0	0	0
Little Shultz Creek	Bibb	3150202100	Cahaba	Warrior-Cahaba	5089	0	0	509	10	4580	90	0	0	0	0	0	0	0	0
Oakmulgee Creek	Bibb	3150202160	Cahaba	Warrior-Cahaba	26635	0	0	3995	15	22640	85	0	0	0	0	0	0	0	0
Rocky Branch	Bibb	3150202130	Cahaba	Warrior-Cahaba	52870	0	0	6873	13	42296	80	2644	5	529	1	0	0	529	1
Shades Creek	Bibb	3150202060	Cahaba	Warrior-Cahaba	6943	0	0	139	2	6318	91	0	0	139	2	347	5	0	0
Shoal Creek	Bibb	3150202080	Cahaba	Warrior-Cahaba	8118	0	0	406	5	7550	93	162	2	0	0	0	0	0	0
Shultz Creek	Bibb	3150202110	Cahaba	Warrior-Cahaba	39860	399	1	3986	10	31888	80	1993	5	797	2	399	1	399	1
Sixmile Creek	Bibb	3150202090	Cahaba	Warrior-Cahaba	66540	1996	3	16635	25	46578	70	0	0	1331	2	0	0	0	0
Oakmulgee Creek	Chilton	3150202160	Cahaba	Warrior-Cahaba	26555	500	2	500	2	24893	94	0	0	15	0	0	0	647	2
Shoal Creek	Chilton	3150202080	Cahaba	Warrior-Cahaba	34121	675	2	5250	15	27391	80	15	0	190	1	0	0	600	2
Sixmile Creek	Chilton	3150202090	Cahaba	Warrior-Cahaba	9386	225	2	1750	19	7049	77	5	0	60	0	113	0	184	2

Cahaba River Basin Management Plan

**Land Use (2/3)**

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	County-Sub-Acres	Cropland - Acres	Cropland %	Pastureland - Acres	Pastureland %	Forestland - Acres	Forestland %	Urbanland - Acres	Urbanland %	Ponds & Lakes - Acres	Ponds & Lakes %	Mined Lands - Acres	Mined Lands - %	Other Land - Acres	Other Land - %
Cahaba River	Dallas	3150202170	Cahaba	Warrior-Cahaba	44280	886	2	11070	25	30553	69	885	2	443	1	0	0	443	1
Oakmulgee Creek	Dallas	3150202160	Cahaba	Warrior-Cahaba	20577	1028	5	2058	10	16667	81	206	1	206	1	0	0	412	2
Big Black Creek	Jefferson	3150202010	Cahaba	Warrior-Cahaba	30058	301	1	2104	7	21942	73	4509	15	300	1	0	0	902	3
Cahaba River	Jefferson	3150202030	Cahaba	Warrior-Cahaba	63367	317	1	3168	5	25664	40	31684	50	315	0	319	1	1901	3
Little Cahaba River	Jefferson	3150202020	Cahaba	Warrior-Cahaba	12399	124	1	3720	30	4340	35	3100	25	558	4	186	2	372	3
Shades Creek	Jefferson	3150202060	Cahaba	Warrior-Cahaba	70588	0	0	4588	6	28235	40	35294	50	353	1	0	0	2118	3
Cahaba River	Perry	3150202150	Cahaba	Warrior-Cahaba	78966	7897	10	15793	20	51328	65	3948	5	0	0	0	0	0	0
Cahaba River	Perry	3150202170	Cahaba	Warrior-Cahaba	5528	498	9	3317	60	1658	30	0	0	55	1	0	0	0	0
Cahaba River	Perry	3150202140	Cahaba	Warrior-Cahaba	87778	4389	5	8778	10	73733	84	0	0	878	1	0	0	0	0
Oakmulgee Creek	Perry	3150202160	Cahaba	Warrior-Cahaba	34951	1748	5	3146	9	29708	85	0	0	350	1	0	0	0	0
Rocky Branch	Perry	3150202130	Cahaba	Warrior-Cahaba	5749	288	5	575	10	4886	85	0	0	0	0	0	0	0	0
Cahaba River	Shelby	3150202050	Cahaba	Warrior-Cahaba	51338	300	1	9600	19	27438	53	9800	19	1400	3	1800	4	1000	2



### Land Use<sup>2</sup> (3/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	County-Sub-Acres	Cropland - Acres	Cropland %	Pastureland - Acres	Pastureland %	Forestland - Acres	Forestland %	Urbanland - Acres	Urbanland %	Ponds & Lakes - Acres	Ponds & Lakes %	Mined Lands - Acres	Mined Lands - %	Other Land - Acres	Other Land - %
Cahaba River	Shelby	3150202030	Cahaba	Warrior-Cahaba	14432	0	0	20	0	2512	17	10500	73	400	3	0	0	1000	7
Cahaba Valley Creek	Shelby	3150202040	Cahaba	Warrior-Cahaba	46639	800	2	1650	4	6289	13	30000	64	3000	6	100	0	4800	10
Little Cahaba River	Shelby	3150202020	Cahaba	Warrior-Cahaba	8359	25	0	160	2	1415	17	5059	61	1100	13	0	0	600	7
Shades Creek	Shelby	3150202060	Cahaba	Warrior-Cahaba	3235	25	1	100	3	2920	90	20	1	20	1	100	3	50	2
Shoal Creek	Shelby	3150202080	Cahaba	Warrior-Cahaba	50573	1300	3	9500	19	14623	29	20000	40	1500	3	1200	2	2456	5
Big Black Creek	St. Clair	3150202010	Cahaba	Warrior-Cahaba	29803	0	0	600	2	26609	89	894	3	506	2	300	1	894	3
Little Cahaba River	St. Clair	3150202020	Cahaba	Warrior-Cahaba	6457	0	0	1614	25	3551	55	933	14	100	2	0	0	258	4
Shades Creek	Tuscaloosa	3150202060	Cahaba	Warrior-Cahaba	7975	250	3	2187	27	4168	52	860	11	90	1	110	1	310	4
Shultz Creek	Tuscaloosa	3150202110	Cahaba	Warrior-Cahaba	7680	50	1	2300	30	3785	49	1300	17	35	0	0	0	210	3

<sup>2</sup> <http://www.swcc.state.al.us/watershedresults.asp>

## Appendix B

### Sediment Loads (1/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	Cropland Sediment (Tons)	Sand & Gravel Pits Sediment (Tons)	Mined Land Sediment (Tons)	Developing Urban Land Sediment (Tons)	Gullies Sediment (Tons)	Critical Areas Sediment (Tons)	Streambanks Sediment (Tons)	Dirt roads & Road banks Sediment (Tons)	Woodland Sediment (Tons)
Cahaba River	Bibb	3150202070	Cahaba	Warrior-Cahaba	0	0	1606878	178542	2450	22500	5100	15000	13391
Haysop Creek	Bibb	3150202120	Cahaba	Warrior-Cahaba	8926	0	0	278934	3920	27375	6600	18750	20920
Little Shultz Creek	Bibb	3150202100	Cahaba	Warrior-Cahaba	0	0	0	0	1470	3750	1500	750	1374
Oakmulgee Creek	Bibb	3150202160	Cahaba	Warrior-Cahaba	0	0	0	0	2450	16875	4500	9750	6792
Rocky Branch	Bibb	3150202130	Cahaba	Warrior-Cahaba	0	0	0	158610	3920	22500	3600	12006	12689
Shades Creek	Bibb	3150202060	Cahaba	Warrior-Cahaba	0	0	0	0	2450	3750	3000	3000	1895
Shoal Creek	Bibb	3150202080	Cahaba	Warrior-Cahaba	0	0	0	9744	2450	3750	2400	3750	2265
Shultz Creek	Bibb	3150202110	Cahaba	Warrior-Cahaba	957	0	71748	119580	2450	20625	3000	11250	9566
Sixmile Creek	Bibb	3150202090	Cahaba	Warrior-Cahaba	4790	0	0	0	4900	26250	6000	14250	13973
Oakmulgee Creek	Chilton	3150202160	Cahaba	Warrior-Cahaba	1800	4200	0	0	9800	1500	5000	15000	22500
Shoal Creek	Chilton	3150202080	Cahaba	Warrior-Cahaba	0	0	60660	900	7350	1125	3700	11250	5625
Sixmile Creek	Chilton	3150202090	Cahaba	Warrior-Cahaba	810	8750	20340	300	2450	375	1300	3750	5625

**Sediment Loads (2/3)**

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	Cropland Sediment (Tons)	Sand & Gravel Pits Sediment (Tons)	Mined Land Sediment (Tons)	Developing Urban Land Sediment (Tons)	Gullies Sediment (Tons)	Critical Areas Sediment (Tons)	Streambanks Sediment (Tons)	Dirt roads & Road banks Sediment (Tons)	Woodland Sediment (Tons)
Cahaba River	Dallas	3150202170	Cahaba	Warrior-Cahaba	1329	70000	0	0	61250	18750	1500	8100	9166
Oakmulgee Creek	Dallas	3150202160	Cahaba	Warrior-Cahaba	1542	0	0	6000	24500	0	363	6333	5000
Big Black Creek	Jefferson	3150202010	Cahaba	Warrior-Cahaba	1355	0	0	135300	147490	45075	4500	2700	1470
Cahaba River	Jefferson	3150202030	Cahaba	Warrior-Cahaba	1427	0	28620	950520	310660	95025	9450	5700	600
Little Cahaba River	Jefferson	3150202020	Cahaba	Warrior-Cahaba	558	0	16740	93000	60760	18600	1950	1140	630
Shades Creek	Jefferson	3150202060	Cahaba	Warrior-Cahaba	0	0	0	1058820	345940	105900	10650	6360	1500
Cahaba River	Perry	3150202150	Cahaba	Warrior-Cahaba	22505	0	0	1600	4200	22500	6000	6750	15398
Cahaba River	Perry	3150202170	Cahaba	Warrior-Cahaba	1343	0	0	0	1050	2500	1500	4500	498
Cahaba River	Perry	3150202140	Cahaba	Warrior-Cahaba	10533	0	0	0	1050	1500	6000	9000	22120
Oakmulgee Creek	Perry	3150202160	Cahaba	Warrior-Cahaba	4194	0	0	0	1050	5000	3000	9000	8913
Rocky Branch	Perry	3150202130	Cahaba	Warrior-Cahaba	776	0	0	0	1050	3000	1500	4500	1466
Cahaba River	Shelby	3150202050	Cahaba	Warrior-Cahaba	810	140000	420	1960000	84000	20000	1125	15000	8231

**Sediment Loads<sup>3</sup> (3/3)**

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	Cropland Sediment (Tons)	Sand & Gravel Pits Sediment (Tons)	Mined Land Sediment (Tons)	Developing Urban Land Sediment (Tons)	Gullies Sediment (Tons)	Critical Areas Sediment (Tons)	Streambanks Sediment (Tons)	Dirt roads & Road banks Sediment (Tons)	Woodland Sediment (Tons)
Cahaba River	Shelby	3150202030	Cahaba	Warrior-Cahaba	0	0	0	2046400	84000	25000	2250	26250	754
Cahaba Valley Creek	Shelby	3150202040	Cahaba	Warrior-Cahaba	2400	17500	15500	6000000	42000	100000	1500	30000	1887
Little Cahaba River	Shelby	3150202020	Cahaba	Warrior-Cahaba	68	0	0	1011800	16800	10000	750	15000	424
Shades Creek	Shelby	3150202060	Cahaba	Warrior-Cahaba	68	17500	15000	4000	8400	1250	300	7500	876
Shoal Creek	Shelby	3150202080	Cahaba	Warrior-Cahaba	3510	52500	315000	4000000	126000	40000	1500	30000	4387
Big Black Creek	St. Clair	3150202010	Cahaba	Warrior-Cahaba	0	35000	0	53640	0	1500	14850	0	3600
Little Cahaba River	St. Clair	3150202020	Cahaba	Warrior-Cahaba	0	0	0	5598	0	450	2100	0	495
Shades Creek	Tuscaloosa	3150202060	Cahaba	Warrior-Cahaba	1125	7000	14400	9600	4900	1500	150	3750	7502
Shultz Creek	Tuscaloosa	3150202110	Cahaba	Warrior-Cahaba	225	3500	0	1200	4900	750	120	16500	6813

<sup>3</sup> <http://www.swcc.state.al.us/watershedresults.asp>

Appendix C

Animal Information (1/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	# of Cattle in Watershed	Cattle AU in Watershed	# of Dairy in Watershed	Dairy AU in Watershed	# of Swine in Watershed	Swine AU in Watershed	# of Broilers in Watershed	Broiler-Poultry AU in Watershed	# of Layers in Watershed	Layer-Poultry AU in Watershed	# of Catfish Acres in Watershed
Cahaba River	Bibb	3150202070	Cahaba	Warrior-Cahaba	950	950	0	0	0	0	0	0	0	0	0
Haysop Creek	Bibb	3150202120	Cahaba	Warrior-Cahaba	1995	1995	0	0	0	0	0	0	0	0	0
Little Shultz Creek	Bibb	3150202100	Cahaba	Warrior-Cahaba	190	190	0	0	0	0	0	0	0	0	0
Oakmulgee Creek	Bibb	3150202160	Cahaba	Warrior-Cahaba	1140	1140	0	0	0	0	0	0	0	0	0
Rocky Branch	Bibb	3150202130	Cahaba	Warrior-Cahaba	1425	1425	0	0	0	0	0	0	0	0	0
Shades Creek	Bibb	3150202060	Cahaba	Warrior-Cahaba	0	0	0	0	0	0	0	0	0	0	0
Shoal Creek	Bibb	3150202080	Cahaba	Warrior-Cahaba	0	0	0	0	0	0	0	0	0	0	0
Shultz Creek	Bibb	3150202110	Cahaba	Warrior-Cahaba	665	665	0	0	0	0	0	0	0	0	0
Sixmile Creek	Bibb	3150202090	Cahaba	Warrior-Cahaba	2280	2280	0	0	0	0	0	0	0	0	0
Oakmulgee Creek	Chilton	3150202160	Cahaba	Warrior-Cahaba	1100	1100	0	0	0	0	0	0	0	0	1
Shoal Creek	Chilton	3150202080	Cahaba	Warrior-Cahaba	1100	1100	0	0	0	0	0	0	0	0	0
Sixmile Creek	Chilton	3150202090	Cahaba	Warrior-Cahaba	0	0	0	0	0	0	0	0	0	0	2

**Animal Information (2/3)**

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	# of Cattle in Watershed	Cattle AU in Watershed	# of Dairy in Watershed	Dairy AU in Watershed	# of Swine in Watershed	Swine AU in Watershed	# of Broilers in Watershed	Broiler-Poultry AU in Watershed	# of Layers in Watershed	Layer-Poultry AU in Watershed	# of Catfish Acres in Watershed
Cahaba River	Dallas	3150202170	Cahaba	Warrior-Cahaba	3960	3960	0	0	0	0	0	0	0	0	0
Oakmulgee Creek	Dallas	3150202160	Cahaba	Warrior-Cahaba	396	396	0	0	0	0	0	0	0	0	0
Big Black Creek	Jefferson	3150202010	Cahaba	Warrior-Cahaba	1000	1000	0	0	0	0	0	0	0	0	0
Cahaba River	Jefferson	3150202030	Cahaba	Warrior-Cahaba	0	0	0	0	0	0	0	0	0	0	0
Little Cahaba River	Jefferson	3150202020	Cahaba	Warrior-Cahaba	200	200	0	0	0	0	0	0	0	0	0
Shades Creek	Jefferson	3150202060	Cahaba	Warrior-Cahaba	1500	1500	0	0	200	80	0	0	0	0	0
Cahaba River	Perry	3150202150	Cahaba	Warrior-Cahaba	3570	3570	0	0	0	0	0	0	0	0	0
Cahaba River	Perry	3150202170	Cahaba	Warrior-Cahaba	1785	1785	0	0	0	0	0	0	0	0	300
Cahaba River	Perry	3150202140	Cahaba	Warrior-Cahaba	2500	2500	400	560	0	0	0	0	0	0	0
Oakmulgee Creek	Perry	3150202160	Cahaba	Warrior-Cahaba	1275	1275	0	0	0	0	0	0	0	0	0
Rocky Branch	Perry	3150202130	Cahaba	Warrior-Cahaba	1275	1275	0	0	0	0	0	0	0	0	0
Cahaba River	Shelby	3150202050	Cahaba	Warrior-Cahaba	600	600	0	0	0	0	0	0	0	0	0

### Animal Information <sup>4</sup> (3/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	# of Cattle in Watershed	Cattle AU in Watershed	# of Dairy in Watershed	Dairy AU in Watershed	# of Swine in Watershed	Swine AU in Watershed	# of Broilers in Watershed	Broiler-Poultry AU in Watershed	# of Layers in Watershed	Layer-Poultry AU in Watershed	# of Catfish Acres in Watershed
Cahaba River	Shelby	3150202030	Cahaba	Warrior-Cahaba	0	0	0	0	0	0	0	0	0	0	0
Cahaba Valley Creek	Shelby	3150202040	Cahaba	Warrior-Cahaba	500	500	200	280	0	0	0	0	0	0	0
Little Cahaba River	Shelby	3150202020	Cahaba	Warrior-Cahaba	140	140	0	0	0	0	0	0	0	0	0
Shades Creek	Shelby	3150202060	Cahaba	Warrior-Cahaba	70	70	0	0	0	0	0	0	0	0	0
Shoal Creek	Shelby	3150202080	Cahaba	Warrior-Cahaba	1000	1000	0	0	0	0	0	0	0	0	0
Big Black Creek	St. Clair	3150202010	Cahaba	Warrior-Cahaba	340	340	0	0	0	0	68000	544	0	0	0
Little Cahaba River	St. Clair	3150202020	Cahaba	Warrior-Cahaba	170	170	0	0	0	0	0	0	0	0	0
Shades Creek	Tuscaloosa	3150202060	Cahaba	Warrior-Cahaba	652	652	0	0	0	0	0	0	0	0	30
Shultz Creek	Tuscaloosa	3150202110	Cahaba	Warrior-Cahaba	435	435	0	0	0	0	0	0	0	0	0

<sup>4</sup> <http://www.swcc.state.al.us/watershedresults.asp>

Appendix D

Domestic Wastewater (1/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	Est. # of Septic Tanks	Est. # Septic Systems Failing	Est. Alternative Systems
Cahaba River	Bibb	3150202070	Cahaba	Warrior-Cahaba	840	252	0
Haysop Creek	Bibb	3150202120	Cahaba	Warrior-Cahaba	887	443.5	0
Little Shultz Creek	Bibb	3150202100	Cahaba	Warrior-Cahaba	233	69.9	0
Oakmulgee Creek	Bibb	3150202160	Cahaba	Warrior-Cahaba	187	56.1	0
Rocky Branch	Bibb	3150202130	Cahaba	Warrior-Cahaba	653	195.9	0
Shades Creek	Bibb	3150202060	Cahaba	Warrior-Cahaba	187	74.8	0
Shoal Creek	Bibb	3150202080	Cahaba	Warrior-Cahaba	93	32.55	0
Shultz Creek	Bibb	3150202110	Cahaba	Warrior-Cahaba	513	179.55	0
Sixmile Creek	Bibb	3150202090	Cahaba	Warrior-Cahaba	560	168	0
Oakmulgee Creek	Chilton	3150202160	Cahaba	Warrior-Cahaba	206	20.6	0
Shoal Creek	Chilton	3150202080	Cahaba	Warrior-Cahaba	225	22.5	0
Sixmile Creek	Chilton	3150202090	Cahaba	Warrior-Cahaba	75	7.5	0



**Domestic Wastewater (2/3)**

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	Est. # of Septic Tanks	Est. # Septic Systems Failing	Est. Alternative Systems
Cahaba River	Dallas	3150202170	Cahaba	Warrior-Cahaba	1000	300	0
Oakmulgee Creek	Dallas	3150202160	Cahaba	Warrior-Cahaba	90	18	4
Big Black Creek	Jefferson	3150202010	Cahaba	Warrior-Cahaba	0	0	
Cahaba River	Jefferson	3150202030	Cahaba	Warrior-Cahaba	0	0	
Little Cahaba River	Jefferson	3150202020	Cahaba	Warrior-Cahaba	0	0	
Shades Creek	Jefferson	3150202060	Cahaba	Warrior-Cahaba	0	0	
Cahaba River	Perry	3150202150	Cahaba	Warrior-Cahaba	367	146.8	0
Cahaba River	Perry	3150202170	Cahaba	Warrior-Cahaba	55	33	0
Cahaba River	Perry	3150202140	Cahaba	Warrior-Cahaba	184	73.6	0
Oakmulgee Creek	Perry	3150202160	Cahaba	Warrior-Cahaba	92	27.6	0
Rocky Branch	Perry	3150202130	Cahaba	Warrior-Cahaba	45	18	0
Cahaba River	Shelby	3150202050	Cahaba	Warrior-Cahaba	1900	95	40

### Domestic Wastewater<sup>5</sup> (3/3)

Watershed Name	County	Total HUC	Major Basin	5 Yr. Basin	Est. # of Septic Tanks	Est. # Septic Systems Failing	Est. Alternative Systems
Cahaba River	Shelby	3150202030	Cahaba	Warrior-Cahaba	5000	150	500
Cahaba Valley Creek	Shelby	3150202040	Cahaba	Warrior-Cahaba	9000	270	150
Little Cahaba River	Shelby	3150202020	Cahaba	Warrior-Cahaba	300	9	15
Shades Creek	Shelby	3150202060	Cahaba	Warrior-Cahaba	35	1.75	0
Shoal Creek	Shelby	3150202080	Cahaba	Warrior-Cahaba	3530	211.8	70
Big Black Creek	St. Clair	3150202010	Cahaba	Warrior-Cahaba	1600	240	80
Little Cahaba River	St. Clair	3150202020	Cahaba	Warrior-Cahaba	2600	390	208
Shades Creek	Tuscaloosa	3150202060	Cahaba	Warrior-Cahaba	760	38	0
Shultz Creek	Tuscaloosa	3150202110	Cahaba	Warrior-Cahaba	190	9.5	3

<sup>5</sup> <http://www.swcc.state.al.us/watershedresults.asp>

## Appendix E

# County Lists

### Lists of Endangered, Threatened, Proposed and Candidate Species for the Southeast Region

#### Bibb

- E - Red-cockaded woodpecker *Picoides borealis*
- E - Cahaba shiner *Notropis cahabae*
- T - Goldline darter *Percina aurolineata*
- T - Orange-nacre mucket mussel *Lampsilis perovalis*
- T - Fine-lined pocketbook mussel *Lampsilis altilis*
- E - Cylindrical lioplax snail *Lioplax cyclostomaformis*
- E - Flat pebblesnail *Lepyrium showalteri*
- T - Round rocksnail *Leptoxis ampla*
- T - Mohr's Barbara's buttons *Marshallia mohrii*
- E - Tennessee yellow-eyed grass *Xyris tennesseensis*
- C - Georgia rockcress *Arabis Georgiana*

#### Chilton

- T - Bald eagle *Haliaeetus leucocephalus*
- E - Red-cockaded woodpecker *Picoides borealis*
- E - Wood stork *Mycteria americana*
- E - Alabama canebroke pitcher plant *Sarracenia rubra ssp.alabamensis*
- T - Painted rocksnail *Leptoxis taeniata*

#### Dallas

- T - Bald eagle *Haliaeetus leucocephalus*
- E - Wood stork *Mycteria americana*
- E - Red-cockaded woodpecker *Picoides borealis*
- E - Alabama sturgeon *Scaphirhynchus suttkusi*
- E - Southern clubshell mussel *Leurobema decisum*
- E - Heavy pigtoe mussel *Pleurobema taitianum*
- T - Orange-nacre mucket mussel *Lampsilis perovalis*
- T - Fine-lined pocketbook mussel *Lampsilis altilis*

#### Jefferson

- T - Flattened musk turtle *Sternotherus depressus*
- E - Watercress darter *Etheostoma nuchale*
- E - Cahaba shiner *Notropis cahabae*
- PE - Vermilion darter *Etheostoma chermocki*
- E - Upland combshell mussel *Epioblasma metastriatum*
- T - Fine-lined pocketbook mussel *Lampsilis altilis*
- E - Triangular kidneyshell mussel *Ptychobranthus greenii*
- T - Orange-nacre mucket mussel *Lampsilis perovalis*

- E - Plicate rocksnail *Leptoxis plicata*

- E - Leafy prairie clover *Dalea foliosa*

#### Perry

- T - Bald eagle *Haliaeetus leucocephalus*
- E - Red-cockaded woodpecker *Picoides borealis*
- E - Cahaba shiner *Notropis cahabae*

#### Shelby

- E - Gray bat *Myotis grisescens*
- E - Indiana bat *Myotis sodalis*
- E - Cahaba shiner *Notropis cahabae*
- T - Goldline darter *Percina aurolineata*
- T - Painted rocksnail *Leptoxis taeniata*
- E - Tulotoma snail *Tulotoma magnifica*
- E - Southern clubshell mussel *Pleurobema decisum*
- E - Triangular kidneyshell mussel *Ptychobranthus greenii*
- E - Southern acornshell mussel *Epioblasma othcaloogensis* (P)
- T - Fine-lined pocketbook mussel *Lampsilis altilis*
- T - Orange-nacre mucket mussel *Lampsilis perovalis*
- T - Alabama moccasinshell mussel *Medionidus acutissimus*
- E - Cylindrical lioplax (snail) *Lioplax cyclostomaformis*
- E - Flat pebblesnail *Lepyrium showalteri*
- T - Round rocksnail *Leptoxis ampla*

#### St. Clair

- E - Tulotoma snail *Tulotoma magnifica*
- E - Southern acornshell mussel *Epioblasma othcaloogensis*
- E - Triangular kidneyshell mussel *Ptychobranthus greenii*
- E - Southern pigtoe mussel *Pleurobema georgianum*
- T - Fine-lined pocketbook mussel *Lampsilis altilis*
- E - Upland combshell mussel *Epioblasma metastriatum*
- E - Southern clubshell mussel *Pleurobema decisum*
- E - Alabama leather flower *Clematis socialis*

**Key to codes on list.** E – Endangered, T – Threatened, CH - Critical Habitat has been designated, PE - Proposed to be listed as Endangered, PT - Proposed to be listed as Threatened, PCH - Proposed Critical Habitat, C - Candidate Species (P) - Possible Occurrence



**Appendix F  
303 (d) Listing**

**Draft 2002 §303(d) List for Alabama**

WaterbodyID	Waterbody Name	Support Status	Type of Water	Rank	River Basin	County	Uses	Causes	Sources	Date of Data	Size	Downstream / Upstream Locations	1996 303(d)?	TMDL Date
AL/03150202-020_01	Lee Branch	Non	R	H	Cahaba	Shelby	Fish & Wildlife	Pathogens	Urban runoff/Storm sewers	1996-99	2.5 miles	Lake Purdy / Its Source	No	2005
AL/03150202-030_03	Patton Creek	Partial	R	L	Cahaba	Jefferson	Fish & Wildlife	OE/DO	Urban runoff/Storm sewers	1993 1997	5.0 miles	Cahaba River / Its Source	Yes	2003
AL/Cahaba_R_02	Cahaba River	Partial	R	H	Cahaba	Jefferson Shelby	Outstanding AL Water Public Water Supply Fish & Wildlife	Siltation Other habitat alteration	Urban runoff/Storm sewers	1993	36.9 miles	US Hwy. 280 / I-59	No	2003
AL/Cahaba_R_03	Cahaba River	Partial	R	H	Cahaba	Shelby	Outstanding AL Water Fish & Wildlife	Nutrients Siltation Pathogens Other habitat alteration	Municipal Urban runoff/Storm sewers Land development	1993-97	26.5 miles	Shades Creek / Buck Creek	Yes	2003
AL/03150202-060_04	Cooley Creek	Partial	R	M	Cahaba	Jefferson	Fish & Wildlife	Pathogens	Pasture Grazing Onsite wastewater systems	1996	3.8 miles	Mill Creek / Its Source	No	2001
AL/03150202-060_02	Mill Creek	Partial	R	M	Cahaba	Jefferson	Fish & Wildlife	Pathogens	Pasture Grazing	1996	5.4 miles	Mud Creek / Its Source	No	2001
AL/03150202-060_03	Mud Creek	Partial	R	M	Cahaba	Jefferson	Fish & Wildlife	Pathogens	Pasture Grazing	1996	3.7 miles	Tannahill Iron Works / Its Source	No	2001
AL/03150202-060_01	Shades Creek	Non	R	L	Cahaba	Jefferson	Fish & Wildlife	Siltation OE/DO Other habitat alteration Pathogens Turbidity	Collection system failure Hwy/road/bridge construc. Land development Urban runoff/Storm sewers Removal of riparian veg. Bank/shoreline modification	1990-93 1997	35.0 miles	Cahaba River / Its Source	Yes	2001
AL/Cahaba_R_04	Cahaba River	Partial	R	H	Cahaba	Bibb Shelby	Outstanding AL Water	Nutrients Other habitat alteration	Municipal Urban runoff/Storm sewers Land development	1990 1992 1993	24 miles	AL Hwy. 82 / Shades Creek	No	2003
AL/03150202-170_01	Dry Creek	Non	R	M	Cahaba	Dallas	Fish & Wildlife	Pathogens	Pasture Grazing	1996	4.5 miles	Dallas Co. Rd. 201 / Its Source	No	2001
AL/Cahaba_R_01	Cahaba River	Partial	R	H	Cahaba	Jefferson Shelby	Fish & Wildlife	Nutrients Siltation	Urban runoff/Storm sewers Municipal	1993	17.4 miles	Buck Creek / US Hwy. 280	No	2003

**Appendix G  
CRA – Strategy**

**ii. Strategies for Protection - Physical Measures**

**Pollutant (Stressor) No.1:                      *Sediment/Siltation***

**Related Activity (Source of Stressor) No. 1:            Construction Site Run-off**

**Strategies:**

1. Utilize existing regulations regarding sediment in run-off (Regulatory Authorities: ADEM, Stormwater Management Authority, counties, municipalities and water boards).
2. Education/Outreach to construction contractors, grading contractors, and developers. Also, need to work closer with Stormwater programs.
  - a. Proper installation and maintenance of BMPs
  - b. Certification of contractors
3. Facilitate adoption and enforcement of erosion control measures. Provide incentives for those that are compliant.
4. Establish a monitoring program to determine effectiveness of BMPs.
5. Assist regulatory agencies in TMDL development and implementation.

**Related Activity (Source of Stressor) No. 2:            Stream bank Modifications/Riparian Removal (resulting in bank erosion)**

**Strategies:**

1. Advocate the use of stream corridor buffers (Jefferson County greenways, TNC, other municipalities, water boards).
2. Proper installation and maintenance of BMPs for activities near stream corridor.
3. Restoration and revegetation of affected stream corridors.
4. Demonstration projects.
5. Minimize impervious surfaces in future construction and retrofit existing structures when feasible.
6. Revegetate denuded areas in floodplain.
7. Promote stormwater detention in basin.

**Related Activity (Source of Stressor) No. 3:            Residential Run-off**

**Strategies:**

1. Minimize impervious surfaces in future construction and retrofit existing structures when desirable.
2. Construct check-dams in drainage conveyances.
3. Utilize grassy swales in drainage conveyances.
4. Encourage the use of on-time site preparation, temporary cover and retention of existing vegetation.
- 5.

**Related Activity (Source of Stressor) No. 4:            Unpaved roads**

**Strategies:**

1. Identify other unauthorized uses for future consideration.
2. Inventory existing roads for surface. Summarize the length and proximity of dirt roads to feeder streams, tributaries, and main stem of the river. Use this information for the prioritization of education and outreach related to this topic.
3. Investigate alternative surface treatments from traditional road materials to “salts”, polymers to place a lower maintenance surface or one that extends the interval between maintenance. Promote the best alternatives with demonstrations and model programs.

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4. Develop and present training to road maintenance crews in the basin about how to perform maintenance in a way that is less intrusive and results in decreased sediment load in the waterways.
5. Incorporate watershed sensitive unpaved road maintenance training in the Association of County Commissioners' training program and in the Auburn University – Engineering Extension Technology Transfer program.

**Pollutant (Stressor) No. 2:                      *Hydrologic Alterations affecting Loss of Use and Aquatic Habitat***

**Related Activity (Source of Stressor) No. 1:                      *Impervious Surfaces***

**Strategies:**

1. Minimize impervious surface areas in future construction and retrofit existing structures when feasible.
2. Reduce run-off velocities from existing impervious surfaces using BMPs.
  - a) Retention ponds
  - b) Swales

**Related Activity (Source of Stressor) No. 2:                      *Water Withdrawals***

**Strategies:**

1. Study water budget mass balance to account for withdrawals, discharges, and groundwater influences.
2. Evaluate natural flow scenarios.
3. Initiate water conservation.
  - a) Education and Outreach
  - b) Irrigation alternatives (Ex. Xeriscaping – landscaping with slow-growing, drought tolerant plants to conserve water and reduce yard trimmings)
  - c) Stormwater reuse

**Related Activity (Source of Stressor) No. 3:                      *Flood Plain Management***

**Strategy:**

1. Minimize fill-in in the floodplain.

**Pollutant (Stressor) No. 3:                      *High Nutrients affecting Loss of Use and Aquatic Habitat***

**Related Activity (Source of Stressor) No. 1:                      *Nutrients from Point Source Discharges***

**Strategies:**

1. Assist regulatory agencies in TMDL development and implementation.
2. Water Quality Modeling of nutrient budget.
3. Jefferson County voluntarily constructing Biological Nutrient Removal (BNR) at Cahaba WWTP (expected completion October 2006).
4. Long term monitoring of nutrients, and explore relationship to periphyton, macro invertebrates, and fishes.
5. Use of constructed wetlands to purify runoff.
6. Identify and rehabilitate failed septic systems and explore potential for alternative/advanced systems.
7. Explore alternatives for wastewater disposal.
8. Phosphate detergent ban.

**Related Activity (Source of Stressor) No. 2:                      *Nutrients from Non-point Source Discharges***

**Strategies:**

1. Assist regulatory agencies in TMDL development and implementation.

2. Water Quality Modeling of nutrient budget.
3. Education/outreach to commercial/consumers/homeowners regarding fertilizer and insecticide applications.
4. Education/outreach to commercial/ fertilizer dealers and applicators regarding proper storage (prevent fertilizer from storage area runoff, covered area, etc.).
5. Long term monitoring of nutrients, and explore relationship to periphyton, macro invertebrates, and fishes.
6. Use of constructed wetlands to purify runoff.
7. Identify and rehabilitate failed septic systems and explore potential for alternative/advanced systems.

**Pollutant (Stressor) No. 4: Pathogens/Bacteria**

**Related Activity (Source of Stressor) No. 1: Faulty On-site Septic Systems  
Strategies:**

1. Education/Outreach to homeowners regarding maintenance of on-site septic systems.
2. Assess the practicality of sewer extensions to un-sewered areas in the basin to eliminate on-site septic systems and some small treatment systems.
3. Demonstration projects of alternative methods of on-site treatment systems.
4. Identify and rehabilitate failed septic systems and assess the practicality of alternative/advanced systems.

**Related Activity (Source of Stressor) No. 2: Sanitary Sewer Overflows  
Strategies:**

1. Sewer system operators report sanitary sewer overflows to ADEM.
2. Sewer system operators develop Capacity Assurance, Management, Operation and Maintenance (CMOM) program in conjunction with ADEM.
3. Sewer system operators should make every effort to eliminate overflows when feasible.

**Related Activity (Source of Stressor) No. 3: Livestock Practices  
Strategies:**

1. Alternative watering methods.
2. Education and outreach to farmers.

**Pollutant (Stressor) No. 5: Toxic Substances**

**Related Activity (Source of Stressor) No. 1: Runoff from Impervious Surfaces  
Strategies:**

1. Construct wetlands for pretreatment of stormwater run-off from impervious surfaces (both new construction and retrofit existing problem areas where feasible).
2. Use alternative pavements in lieu of impervious surfaces in new construction where applicable.
3. Reforestation
4. Constructed Wetlands
5. Brownfield remediation
6. Promote Phyto remediation to address site specific issues
  - a) Grass
  - b) Landscape
7. Trees
8. Inventory and monitor sources of potential toxic substance release and strategies for responding.



## Appendix H

### Glossary Acronyms and Abbreviations

A&I	Agriculture and Industry (water supply use classifications)	ASWCC	Alabama Soil and Water Conservation Committee
ACES	Alabama Cooperative Extension System	ASWCD	Alabama Soil and Water Conservation Districts
ADAI	Alabama Department of Agriculture and Industries	AWF	Alabama Wildlife Federation
ADCNR	Alabama Department of Conservation and Natural Resources	AWPCA	Alabama Water Pollution Control Act
ADE	Alabama Department of Education	AWRI	Alabama Water Resources Institute
ADECA	Alabama Department of Economic and Community Affairs	AWW	Alabama Water Watch
ADEM	Alabama Department of Environmental Management	AWWA	Alabama Water Watch Association
ADIR	Alabama Department of Industrial Relations	BCA	Business Council of Alabama
ADOT	Alabama Department of Transportation	BMP	Best Management Practices
ADPH	Alabama Department of Public Health	BSA/GSA	Boy and / or Girl Scouts of America
AEC	Alabama Environment Council	SBAC'S	Citizen Advisory Committee
AEMC	Alabama Environment Management Commission	CAFO	Confined Animal Feeding Operation
AEPA	Alabama Egg and Poultry Association	CAWV	Certified Animal Waste Vendor
AFA	Alabama Forestry Association	CBEP	Community Based Environmental Protection
AFC	Alabama Forestry Commission	CERS	Center for Environmental Research and Service - Troy State University
AFO	Animal Feeding Operation	CLP	Clean Lakes Program
AGCA	Associated General Contractors of Alabama	Co-Ag (AU)	College of Agriculture - Auburn University
AHBA	Alabama Home Builders Association	COE	United States Army Corps of Engineers
ALFA	Alabama Farmers Federation	CPESC	Certified Professional in Erosion and Sediment Control
ANHP	Alabama Natural Heritage Program	CRA	Comparative Risk Assessment
APC	Alabama Power Company	CRP	Conservation Reserve Program
APPC	Alabama Pulp and Paper council	CSGWPP	Comprehensive State Groundwater Protection Plan
ARA	Alabama Rivers Alliance	CVA	Clean Vessel Act
ARS	Agricultural Research Service	CWA	Clean Water Act
ASG	Alabama Sea Grant Extension Program	CWAP	Clean Water Action Plan
ASMC	Alabama Surface Mining Commission	CWP	Clean Water Partnership
ASSESS	ADEM Strategy for Sampling Environmental Indicators of Surface Water Quality Status	DO	Dissolved Oxygen
		DC	District Conservationist
		EMAP	Environmental Monitoring Assessment Program

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EPA	Environmental Protection Agency	RWC	Receiving Water Concentration
EQIP	Environmental Quality Incentives Program	S	Swimming and Other Whole Body Water Contact Sports (water use classification)
EWP	Emergency Watershed Protection Program	SH	Shellfish Harvesting (water use classification)
F&W	Fish and Wildlife (water supply use classification)	SMZ	Streamside Management Zone
FIP	Forestry Incentives Program	SOP	Standard Operating Procedures
FSA	Farm Services Agency	SRF	State Revolving Fund of Alabama
FWPCA	Federal Water Pollution Control Act	SWCC&D	Soil and Water Conservation Commission and Districts
GIS	Geographical Information System	SWCD	Soil and Water Conservation District
GPS	Global Positioning System	SWCP	State Wetland Conservation Plan
GSA	Geological Survey of Alabama	SWCS	Soil and Water Conservation Society
HBAA	Home Builders Association of Alabama	TMDL	Total Maximum Daily Loads
HOBOS	Homeowners and Boat Owners Association	TNC	The Nature Conservancy of Alabama
ICFAA	International Center for Fisheries and Allied Aquaculture - Auburn University	TSI	Trophic State Index
IECA	International Erosion Control Association	TVA	Tennessee Valley Authority
IPM	Integrated Pest Management	USACE	U.S. Army Corps of Engineers (a.k.a. COE)
MERC - AU	Marine Extension and Research Center - Auburn University	USCOE	United States Army Corps of Engineers
MOA	Memorandum of Agreement	USDA	U.S. Department of Agriculture
NMFS	National Marine Fisheries Service	USDA-FS	United States Department of Agriculture - Forest Service
NOAA	National Oceanic and Atmospheric Administration	USDA-NRCS	Natural Resources Conservation Service
NPDES	National Pollutant Discharge Elimination System	USDI	United States Department of the Interior
NPS	Nonpoint Source	USEPA	United States Environmental Protection Agency
NRCS	National Resources Conservation Service	USFS	U.S. Forest Service
NWI	National Wetland Inventory of the USFWS	USFWS	U.S. Fish and Wildlife Service (Department of the Interior)
OAW	Outstanding Alabama Water (water use classification)	USGS	United States Geological Survey
ONRW	Outstanding National Resource Water (water use classifications)	UWA	University of West Alabama
OSM	United States Bureau of Mines - Office of Surface Mining	WBNEC	Weeks Bay National Estuarine Center
PALS	People Against A Littered State	WBNERR	Weeks Bay National Estuary Research Reserve
PS	Point Source	WCAMI	Wetlands Conservation and Management Initiative
PWS	Public Water Supply (water use classification)	WHIP	Wildlife Habitat incentives Program
QAC	Quality Assurance / Control	WMA	Watershed Management Authorities
RC&D	Resource Conservation and Development	WRP	Wetlands Reserve Program
RD	Rural Development	WQ	Water Quality

**Cahaba River Basin Management Plan**

Summary of ADEM's Water Use Classifications and Water Quality Criteria (WRAS Guidance: Useful Things to Know)

Rank	Classification	Sewage, Industrial Waste or Other Waste	pH (s.u.)	Temperature (°F)	Dissolved Oxygen (mg/l)	Bacteria (colonies/100 ml)	Turbidity (NTU)	Toxicity, Taste, Odor & Color
1	Outstanding National Resource Water (ONRW)	No new or expanded point source discharges shall be allowed.	The water quality criteria are contingent upon the use classification of the specific waterbody that has been assigned the ONRW designation. For example, Little River has been Designated as an ORW waterbody, however it has been classified by ADEM as a PWS, S & F&W, therefore the applicable water criteria associated with the PWS, S & F&W classification apply.					
1	Outstanding Alabama Water (OAW)	No new or expanded point source discharges allowed, unless no other Feasible alternative can be demonstrated to the satisfaction of the Department	6.0-8.5	Shall not exceed 90°F; (86°F); Maximum instream rise above ambient conditions shall not exceed 5°F; (4.0/1.5°F) iii	Shall not be less than 5.5	Fecal coliform group shall not exceed a geometric mean of 100 (coastal waters) and 200 (all other waters)	Shall not exceed 50 NTUs above background	Must meet all toxicity requirements, not affect propagation or palatability of fish/shellfish, or affect aesthetic values
2	Public Water Supply (PWS)	Must be treated or controlled in accordance with ADEM Rule 335-6-10-.08	6.0-8.5	Shall not exceed 90°F; (86°F) Maximum instream rise above ambient conditions shall not exceed 5°F; (4.0/1.5°F)	Shall not be less than 5.0	1000 geometric mean 2000 max. single sample (year-round) [100 (coastal waters) and 200 (all other waters) Jun-Sep] iv	Shall not exceed NTUs above background	Shall not render waters unsafe or unsuitable for drinking supply or food processing; must meet all toxicity requirements, & not affect fish palatability
3	Swimming and Other Whole Body Water-Contact Sports (S)	Must be treated or controlled in accordance with ADEM Rule 335-6-10-.08	6.0-8.5	Shall not exceed 90°F; (86°F) Maximum instream rise above ambient conditions shall not exceed 5°F; (4.0/1.5°F)	Shall not be less than 5.0	Fecal coliform group shall not exceed a geometric mean of 100 (coastal waters) and 200 (all other waters)	Shall not exceed 50 NTUs above background	Shall not render the water unsafe for water-contact; not exhibit acute or chronic toxicity; not impair fish palatability, or affect the aesthetic value
4	Shellfish Harvesting (SH)	Must be treated or controlled in accordance with ADEM Rule 335-6-10-.08	6.0-8.5	Shall not exceed 90°F; (86°F) Maximum instream rise above ambient conditions shall not exceed 5°F; (4.0/1.5°F)	Shall not be less than 5.0	Shall not exceed 50 NTUs above background	Shall not exhibit acute or chronic toxicity; not affect marketability or palatability of fish and shellfish, or affect the aesthetic value	

**Cahaba River Basin Management Plan**



In Cooperation with:  
Cawaco Resource Conservation & Development Council, Inc.,  
USDA-NRCS