

CITIZEN GUIDE
TO
ALABAMA RIVERS

Escatawpa,

Mobile,

and

Tombigbee

Volume 5

Summer 2004

CONTENTS

THE WATER ENVIRONMENT	3
THE RIVER BASINS	4
LIFE ALONG THE RIVERS	6
SPECIAL PLANTS AND ANIMALS	8
LAND USE IN THE RIVER BASINS	10
BALANCING ECONOMY AND ENVIRONMENT IN THE RIVER BASINS	12
WATER POLICY, LAW AND CITIZEN INVOLVEMENT	14
MORE INFO	16

Citizen Guide to Alabama Rivers

- Volume 1 Black Warrior and Cahaba*
- Volume 2 Alabama, Coosa and Tallapoosa*
- Volume 3 Chattahoochee and Coastal Plain Streams*
- Volume 4 Tennessee*
- Volume 5 Escatawpa, Mobile and Tombigbee*

This guide was written and produced by the Alabama Water Watch Program at Auburn University.

It was funded in part by the

U.S. Environmental Protection Agency, Region 4, the Alabama Department of Environmental Management and the Alabama Cooperative Extension System.

COVER. *American lotus plants (*Nelumbo lutea*) in the Mobile Delta, AL.* PHOTO: ADRIEN LAMARRE.

<http://images.usace.army.mil>

About these Guides

Alabama's rivers, streams and lakes are priceless in terms of their ecological, economic and social benefits.

The purpose of these guides is to provide an introduction to the unique historical and environmental significance of the rivers of Alabama and the intimate link between land use and aquatic ecosystems.

It is hoped that these guides will invite further investigation into our abundant but vulnerable water resources, enhance the dialogue among citizens and key decision makers, and help citizens move toward strategies of how to best manage and protect Alabama's waters.



WHITETOP PITCHER PLANT, *Sarracenia leucophylla*. Found in bogs throughout Baldwin and Mobile Counties.

PHOTO: FRED NATION

Series Editors: Wendi Hartup and Bill Deutsch

Contributors: Justin Ellis, Brooke Smith, and Eric Reutebuch

Reviewers: Norm Blakey, Eve Brantley, Jeff Garner,

Patti Hurley, Liz Langston, Tom Madigan,

Stuart McGregor, Jody Scanlan, and Rusty Wright

Unlabeled Photos and Graphics: Alabama Water Watch Program

THE WATER ENVIRONMENT

The World's Water Supply

If all the Earth's water fit into a **one liter** container,

❖ **970 mL** of the one liter container would be saltwater.



❖ **30 mL** (perfume container) would be freshwater in the atmosphere, lakes, rivers, polar ice caps, and groundwater.



❖ Only **2 drops** of the freshwater would be in lakes and rivers.



Alabama's Rich Water Resources

💧 Alabama contains more than 77,000 miles of streams, 3.6 million acres of wetlands and 560,000 acres of lakes, ponds and reservoirs.

💧 Alabama has more miles of navigable rivers (1,438 miles) than any other state.

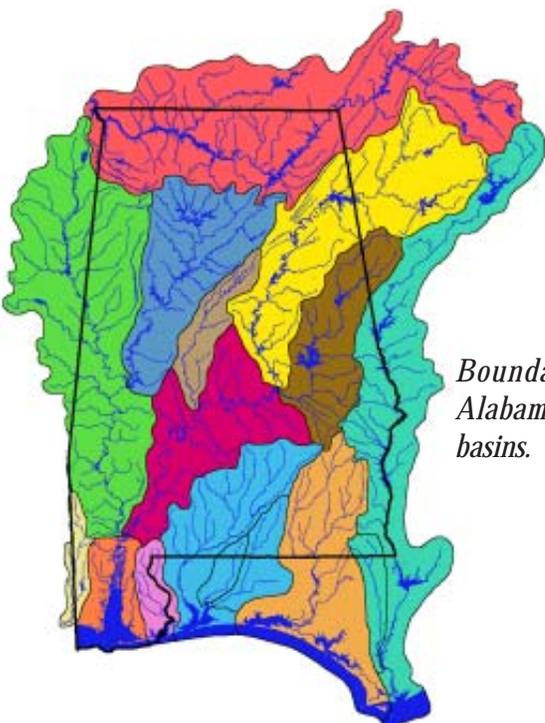
💧 About 8% of the water in the continental U.S. originates in or flows through Alabama.

💧 The Mobile Basin is the fourth largest watershed in North America, exceeded only by the Mississippi, Yukon and Columbia Basins.

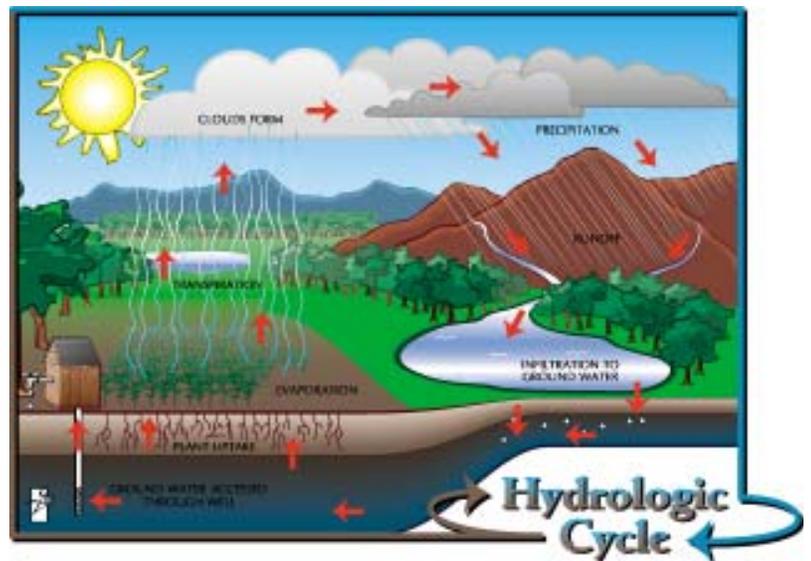
What is a Watershed?

A **watershed** is the total land area that drains to a common point, such as a river, a lake or the ocean. Watersheds come in many sizes and small watersheds are contained within larger ones.

Very large watersheds are also called **basins**. The Coosa, Tallapoosa, Alabama, Cahaba, Black Warrior and Tombigbee Basins are all part of the greater Mobile Basin. We all live in a watershed, no matter how far we are from a river or lake.



Boundaries of Alabama's river basins.



The Hydrologic Cycle, or the Water Cycle, links land, air and water within a watershed. GRAPHIC: STEPHEN ADDUCI AND PERDUE PESTICIDE PROGRAMS

Nature's Water Recycling Program

When rain falls to the earth, it sinks into the ground (**infiltration**), returns to the air (**evaporation** and **transpiration**) or flows over the land surface (**runoff**). Surface runoff carries dissolved and suspended substances, such as chemicals and sediment. Land use activities in a watershed directly affect both *water quality* and *quantity*. Water is never created, it only recycles.



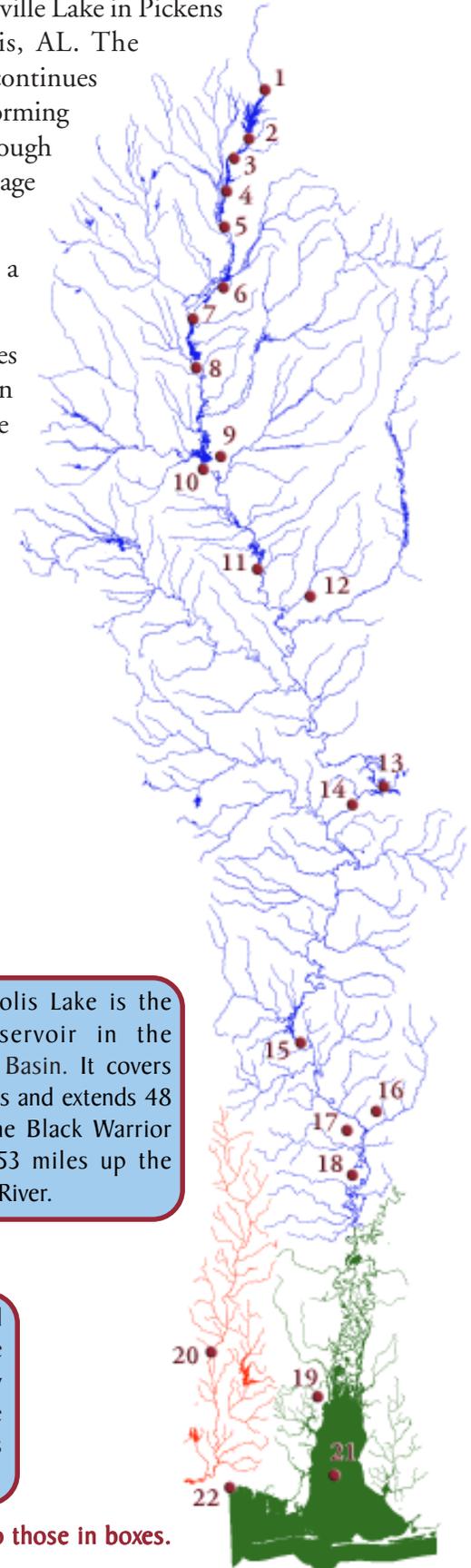
THE RIVER BASINS

The **Tombigbee River** (in **blue**) begins in Prentiss and Tishomingo Counties, MS. It then crosses the Mississippi/Alabama state line at Aliceville Lake in Pickens County, AL where it flows southeast to Demopolis, AL. The Tombigbee is joined by the Black Warrior River and continues

flowing south to merge with the Alabama River near Malcolm, AL, forming the Mobile-Tensaw River. The rivers within the **Tombigbee Basin** flow through 30 counties (15 AL and 15 MS) with over 50% of the 13,774 square-mile drainage area located in Alabama.

The **Mobile River** (in **green**) flows through 2 counties and encompasses a 1,457 square-mile watershed which empties into Mobile Bay.

The **Escatawpa River** (in **red**) begins in Washington County, AL, a few miles north of Yellow Pine, AL. It flows through 6 counties (2 AL and 4 MS) to join the Pascagoula River in Mississippi. Almost 70% of its 1,031 square-mile watershed is in Alabama.



1 The Jamie Whitten Lock and Dam (Tishomingo Co., MS) is the northernmost lock on the Tennessee-Tombigbee Waterway (see page 6). It is the 4th highest single lift lock in the nation, raising and lowering barges or pleasure boats 84 ft. The dam forms a 6,600-acre lake that joins the Divide Cut Canal and some of the Tennessee-Tombigbee Waterway with the Tennessee River.

Downstream of Whitten Dam, the following dams were developed for power generation:
 G.V. "Sonny" Montgomery Dam **2**
 John Rankin Dam **3**
 Fulton Dam **4**
 Glover Wilkins Dam **5**
 Amory Dam **6**
 Aberdeen Dam **7**
 John C. Stennis Dam **8**
 Tom Bevill Dam **10**
 Gainesville Dam **11**
 Howell Heflin Dam **14**
 Coffeeville Dam **15**

9 In 1866, when women of Columbus, MS, gathered to honor the fallen soldiers of the Civil War, they established the first Memorial Day which later became a national holiday.

12 Camp Aliceville (Aliceville, AL) was the former site of a German POW camp in WWII. As one of the largest camps in the U.S., it once held over 6,000 soldiers.

13 Demopolis Lake is the largest reservoir in the Tombigbee Basin. It covers 10,000 acres and extends 48 miles up the Black Warrior River and 53 miles up the Tombigbee River.

16 The Choctaw National Wildlife Refuge encompasses lakes, sloughs, bottomland hardwoods, and cropland. The refuge serves as a protected wintering area for more than 10,000 waterfowl, and up to 200 broods of wood ducks are produced annually in artificial nest boxes. Following a successful bald eagle hatching program in the early 1990s the refuge has hosted a nesting pair of eagles each winter. Other residents include wood storks, deer, turkey, opossum, American alligator, and beaver.

Numbers on the map correspond to those in boxes.



CYPRESS SWAMP ON THE TENN-TOM WATERWAY.

PHOTO: ADRIEN LAMARRE, <http://images.usace.army.mil>

Each year, tons of leaves and wood debris are brought into Mobile Bay, where they settle and decay. During summertime, decomposition accelerates and the oxygen supply rapidly depletes within the saltwater layer along the bottom. As the tide comes in, the bottom-dwelling fish, shrimp, and crabs are forced to move onto the shoreline and are eventually trapped in shallow water at the beach. This phenomenon is termed “Jubilee.” Usually Jubilees end at sunrise when oxygen is produced by photosynthetic activity of plant life in the water. The affected fish and shellfish then swim back to their bottom-water habitat, if they haven’t been snagged by eager seafood eaters!

17 St. Stephens was the first capital when Alabama became its own territory following the statehood of Mississippi. Washington County is also the oldest county in Alabama.

18 A large salt dome was discovered in 1948 at the town of McIntosh, AL. During the Civil War brines from salt springs and seeps in Washington, Clarke, and Choctaw Counties were evaporated to produce salt for the Confederacy. About 88,000 tons were produced and hauled to the Tombigbee River in wagons.



JUBILEE PHENOMENON. *Since the 1960s, Jubilees have occurred annually on the eastern shore of Mobile Bay.*

PHOTO: AUMERC, www.faulknerstate.edu/meer/SlideShows.htm

19 Mobile is one of the largest U.S. ports for ocean-going ships and is Alabama’s only port. Hundreds of cruising vessels or pleasure boats use this port to travel the 450-mile trip up the Tombigbee River to the Tennessee River. Also in Mobile, the Alabama State Docks are among the most modern and efficient seaport operations in the world. Up to 34 ocean-going vessels can use these docks simultaneously.

21 Mobile Bay is the 4th largest estuary in the U.S. and is the 2nd largest natural gas reserve in the world. It encompasses 413 square miles, averaging 10 ft. deep, 31 miles long and 24 miles wide at its southern end. It discharges 62,000 cubic feet of water per second. Over half of the state (43,701 square miles) drains to Mobile Bay and 4.85 million metric tons of sediment enters annually with 33% deposited in the Delta, 52% in the bay, and 15% flowing through to the Gulf of Mexico.

20 In the early 1980s, the Escatawpa was evaluated by the National Park Service to determine its suitability for designation as a Wild and Scenic River. Though the river was not recommended for reclassification, the National Park Service described the Escatawpa River as “the finest undeveloped blackwater stream in the nation.”



CANOEING ON THE ESCATAWPA RIVER.

PHOTO: www.alabamarivers.org

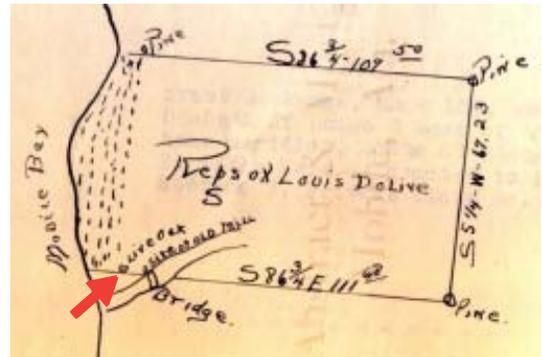
22 The Grand Bay National Wildlife Refuge (Jackson Co., MS and Mobile Co., AL) comprises 14,000 acres of tidal marsh and pine savanna habitat with unique species such as the gopher tortoise, red-cockaded woodpecker, and brown pelican.

Life Along the Rivers

Native Culture and Early Settlement

The **Tombigbee**, **Mobile** and **Escatawpa** Basins are rich in Native American history. The Choctaw Indians were a widely dispersed people spreading from Tennessee to Tampa, Florida. For much of the 19th century, the land between the **Tombigbee** and Black Warrior rivers was considered neutral hunting ground for the Choctaws to the west and the Creeks to the east. The Creeks also occupied portions of the Mobile-Tensaw swamplands.

The French were the first Europeans to establish a permanent settlement in the **Tombigbee Basin**, building the Fort Tombigbee (Tombecbe) in 1735. French explorer, Jean Baptiste LeMoyne established the first settlement in the **Mobile Basin**, naming it the city of Mobile and building it at a site called 27-Mile Bluff. The settlers later moved the city to its present-day location at the mouth of the river and the head of the bay.



1843 DEED OF THE VILLAGE POINT, DAPHNE, AL. *Based on the 1787 Spanish Land Grant to Dominic D'Olive. The Live Oak on the map (red arrow) was at least 50-60 years old and is believed to be where General Jackson stood in the branches and spoke to troops. It is currently one of the largest Live Oaks in Alabama at 95ft. tall and a circumference of 28 ft.* PHOTO: FRED NATION



SIEGE OF FORT BLAKELEY, AL. *This fort rests on the eastern bank of the Tensaw River and is an important Civil War site. The war ended on April 9, 1865 with General Robert E. Lee's surrender at the Appomatox Courthouse in Virginia. However, the last combined-force battle actually ended six hours later at Ft. Blakeley when the Union Army of 16,000 soldiers overpowered the Confederate's 4,000 soldiers.*

PHOTO: www.siteone.com/tourist/blakeley

The Tennessee-Tombigbee Waterway

When the construction of the Tennessee-Tombigbee Waterway (Tenn-Tom) began in 1972, it was the largest earth moving project in history and required the excavation of more than 100 million dump truck loads of soil. One of the most challenging features of the waterway, the Divide Cut, took eight years to construct. This 27-mile canal connected the Tombigbee River with Pickwick Lake on the Tennessee River. The major features of the waterway are 10 locks and dams, a 175 ft. deep canal connecting the Tennessee River with the Tombigbee River, and a 234-mile inland water route to the Gulf of Mexico. With the navigational benefits of the Tenn-Tom came the disruption of riverine ecosystems and extinctions of several aquatic organisms. Connecting two major river basins also increased the risk of spreading invasive exotic species, such as the zebra mussel.



TENN-TOM WATERWAY CONSTRUCTION. *Pictured is the northernmost section of the waterway.*

PHOTO: <http://images.usace.army.mil>



TOMBIGBEE TOWBOAT. *Photo series showing a tugboat going under a bridge on the Tombigbee River.*

PHOTOS: <http://koti.mbnet.fi/~soldier/towboat.htm>

A Fluke Boating Incident

In 1978, the boat called the ‘Motor Vessel Cahaba’ left Birmingham with a load full of coal and headed south on the Tombigbee. When the vessel approached the Old Rooster Bridge just south of Demopolis, the crew realized they could not pull their load under the bridge because the water was at a record high stage (about 73 ft.). They decided to let their barges loose to drift under the bridge, navigate their boat through a safer area, and reattach to their barges. They released their barges safely, but at the last minute the current pulled their boat toward the bridge. Because the water was moving so fast, it sucked the boat under the bridge with Captain Jimmie Wilkerson still inside. The boat reappeared on the other side of the bridge relatively unharmed, righted itself because it was ballasted with 3-4 ft. of cement in the bottom, and the engine was restarted. The captain didn’t get control soon enough and smashed into the barges, causing further damage; however, no one was harmed in the incident.

NATIVE SONS AND DAUGHTERS

Famous folks from the **Escatawpa**, **Mobile** and **Tombigbee** Basins include:

- ❖ **Hank Aaron** (Mobile) - baseball player, 1982 National Baseball Hall of Fame
- ❖ **Jimmy Buffet** (Pascagoula, MS) - singer, songwriter, *Margaritaville*
- ❖ **Winston Groom** (Mobile) - writer, *Forest Gump*
- ❖ **Sonny James** (Hackleburg) - country singer, *Southern Gentleman*
- ❖ **Elvis Presley** (Tupelo, MS) - singer, actor, “King of Rock-n-Roll”
- ❖ **Waldo Semon** (Demopolis) - inventor of PVC pipe, awarded 116 U.S. patents
- ❖ **Edward O. Wilson** (Mobile) - scientist, Harvard University professor, “Father of Biodiversity”

An Emerging Economy

The groundwater in much of west Alabama, especially in the Black Belt region, is naturally salty. This water is generally unsuitable for drinking, but it is a valuable resource for farm-raised catfish, an important industry of west Alabama. In addition to traditional catfish production, farmers in Greene and Lowndes Counties have recently started culturing the Pacific white-legged shrimp, a marine species. The saline water and rich soils make shrimp growing possible. If this venture proves successful, other saltwater delicacies like redfish and snapper might be grown. These inland saltwater ponds could jump-start businesses in economically depressed counties, to process, package, ship and sell the new products.

SPECIAL PLANTS A

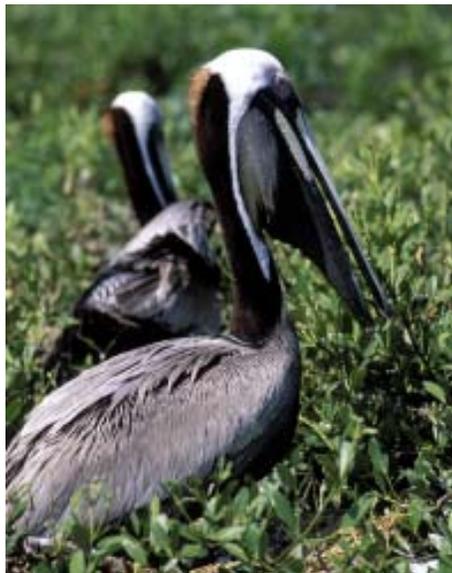
The Mobile-Tensaw Delta is the nation's second largest river delta and is 10 miles wide, 40 miles long and includes 250,000 acres of marsh, an undisturbed cypress-tupelo swamp and old-growth bottomland hardwood forests. The Delta has a variety of habitats including sedge beds, natural levees and an extensive forest with a large, shallow interior lake connected by various streams and bayous. The Mobile-Tensaw Delta functions like a sponge, filtering sediments and pollution. This highly productive delta provides habitat for over 50 rare plants and animals. The delta provides opportunities for canoeing, fishing, bird watching and nature study.

Alabama ranks in the top ten in the nation for the most types of Nature Conservancy of Alabama, there are over 4,000 species of 350 species of freshwater mollusks (snails and mussels) in Alabama more threatened or endangered species than any state except Hawaii.

Each species is a masterpiece. It deserves that rank in the fullest sense: a creation assembled with extreme care and genius.

E.O. Wilson

WITNESS, *Endangered Species of North America*



BROWN PELICAN, *Pelecanus occidentalis*. A species that was near extinction, but because of conservation has made a significant comeback. PHOTO: RYAN HAGERTY, <http://images.fws.gov/>

Estuaries
An estuary is defined as an area where a river meets the sea. They are transitional zones where freshwater and saltwater mix, forming brackish water environments. Estuaries are considered important because they are nursery grounds for many aquatic animals and have exceptional biological diversity and productivity. Weeks Bay, located near Fairhope, AL, has the highest federal classification for water quality (Outstanding Natural Resource Water).



EASTERN INDIGO SNAKE, *Drymarchon corais couperi*. This federally-listed snake uses tortoise burrows as refuge and is considered the longest snake in North America at 8.5 ft. Over-collecting for the pet trade, farming and development have contributed to their rare occurrence in Alabama. Currently they are more common in Florida and Georgia. PHOTO: DR. DAN W. SPEAKE, <http://images.fws.gov/>

The resurrection fern, *Polypodium polypodioides*, is an epiphytic plant because it lives on the branches of large trees such as cypress trees and live oaks. Often found in the company of other plants such as Spanish moss and wild pine, they can survive long periods of drought by curling up and appearing dead. When just a little water is present, the fern will uncurl and reopen, appearing to resurrect. This tiny plant has even been taken on a space shuttle mission to study how it resurrects.

GREENFLY ORCHID, *Epidendrum conopsum*. This plant lives and grows on branches of live oaks, bald cypress and tupelo gum trees. It is the only epiphytic orchid in the U.S. that grows outside of Florida and can be found from Louisiana to North Carolina. Timber harvest is the major threat to these plants. PHOTO: FRED NATION



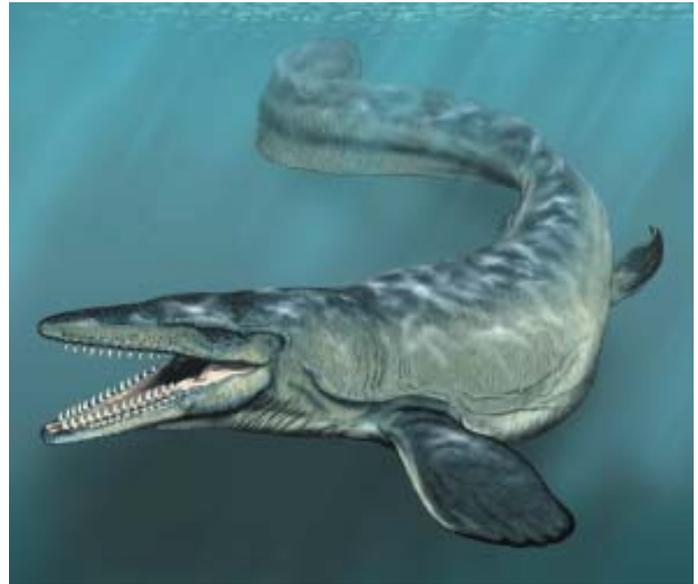
AND ANIMALS

native plants and animals. According to The plants, 850 species of vertebrates and nearly na. In spite of high biodiversity, Alabama has waii.

ALABAMA BEACH MOUSE, *Peromyscus polionotus ammobates*. This unique mouse lives only on the coastal dunes of Baldwin Co., AL, from the western tip of the Fort Morgan Peninsula eastward to the Perdido Bay inlet. They used to live on Ono Island until foxes were brought in for a local hunt club and development overtook the island. Real estate development has caused most of their decline. PHOTO: [THREATENED AND ENDANGERED SPECIES OF ALABAMA: A GUIDE TO ASSIST WITH FORESTRY ACTIVITIES](#)



RED-COCKADED WOODPECKER, *Picoides borealis*. A federally-listed endangered species that is dependent on large stands of old pine. Artificial nesting sites in trees have resulted in a large increase in the population. Some have been exported from Alabama to other states for reestablishing the species. PHOTO: JOHN AND KAREN HOLLINGSWORTH, <http://images.fws.gov/>



TYLOSAURUS, *Plioplatecarpus*. A 50-ft. long mosasaur, once found in ancient seas along the Black Belt region of Alabama and Mississippi; about 88 million years ago during the Cretaceous Period. PHOTO: CARL BUELL

The Alabama Coastal Birding Trail is a series of five driving loops, with several birding sites. One of those loops is on Dauphin Island, a barrier island just off the coast of Mobile (14 mi. long, 2.5 mi. wide). More than 345 bird species have visited the 164-acre Audubon Sanctuary during migration season. During a spring fallout, when a cold front moving southward brings rain and northerly winds, migrating birds literally fall from the sky to rest in the woodlands.



AMERICAN ALLIGATOR, *Alligator mississippiensis*. Found through most of Alabama, but most common on the coast.

PHOTO: DICK BAILEY, <http://images.fws.gov/>



ALABAMA RED-BELLIED TURTLE, *Pseudemys alabamensis*. Designated as the state reptile, this turtle has a 15 inch. shell (carapace) with a reddish belly and a prominent notch at the tip of the upper jaw, bordered on each side by a toothlike cusp. The unusual mouth feature is not found in any other turtle in Alabama. Red-bellied turtles are only found in tributaries of the Mobile-Tensaw Delta. PHOTO: <http://media.duc.auburn.edu/>

Land Use in the River Basins

The water quality and quantity of the **Escatawpa**, **Mobile** and **Tombigbee** Basins are influenced by a variety of urban and rural land uses. The land use map shown on page 11 was generated from 1992-93 satellite images. The river basins are outlined in white and Alabama counties are designated in black. The **orange** line represents the Fall Line, which is the border between the East Gulf Coastal Plain and upland provinces. The vast majority of the three basins is Coastal Plain. A small portion of the northeastern **Tombigbee Basin** is in the Cumberland Plateau province.

FORESTS make up half or more of the land use in the basins and timber is the number one industry. Many areas of west Alabama are owned by large timber or paper companies which have allowed this area to remain undeveloped, thus protecting many species. Forest types include oak-pine, oak-gum-cypress and loblolly-shortleaf pine. Many of the forests in the **Mobile** and **Escatawpa** Basins are composed of either needle-leaved evergreen trees like slash and long leaf pine or broad-leaved deciduous trees like tupelos, sweet bay, red maple and ashes.

WETLANDS are abundant in the southeast and support a diverse community of plants such as red maple, black willow, buttonbush and the endangered Fen orchid. Wetlands receive stream overflow, which reduces downstream flooding and erosion, and creates habitat for fishes, amphibians and other animals. They are also valuable as sources of carbon for the stream environment, for filtering runoff that enters the groundwater, and for recycling nutrients. Wetlands cover about 8% and 11% of the **Escatawpa** and **Tombigbee** Basins, respectively, compared to 20% of the **Mobile Basin**. In the **Tombigbee Basin**, at least 50,000 acres of bottomland hardwood wetlands are found in the Sipsey River swamp, making it one of the largest wetlands in Alabama. In the **Mobile Basin**, wetlands include estuaries, sinkhole ponds, river swamps, freshwater marshes and pitcher plant bogs.

In southern Alabama, Mississippi, and the panhandle of Florida, there are thousands of Citronelle Ponds. Citronelle Ponds are forested, depression wetlands occurring on relatively flat, uneroded surfaces along the Gulf coast of the U.S. Most are temporarily flooded, typically from early winter to late spring. The organisms of Citronelle Ponds can tolerate water fluctuation as well as frequent drying and include a large diversity of crustaceans and insects. Most are isolated and scattered amid lands used for agriculture and forestry. All of the water in the ponds comes from rain and runoff. Citronelle Ponds help prevent flooding, recharge groundwater and maintain water quality. The great majority have been destroyed or significantly altered.

LAND USE PERCENTAGES

	Escatawpa	Mobile	Tombigbee
 Forest	64	49	62
 Agriculture	22	15	22
 Urban/Suburban	1	7	1
 Clearcut/Barren	3	3	3
 Wetland	8	20	11
 Open Water/Lakes	1	4	1
 Quarry/Mining	<1	0	<1



A CITRONELLE POND IN ESCAMBIA COUNTY, AL.

PHOTO: GEORGE FOLKERTS

MS AL

AGRICULTURE

forms the second highest proportion of land use in the three basins (15-22%). The Black Belt region is known for its rich soils and is found in the middle portion of the **Tombigbee Basin**. These soils historically were ideal for growing cotton. Today, agriculture in the **Tombigbee** primarily consists of soybean, corn, hay and cotton as well as livestock (hogs, cattle, poultry) and catfish farms. Agriculture in the **Mobile Basin** includes peanuts, cotton, horticultural ornamental nurseries (shrubs, flowers, etc.), corn, soybeans, and aquaculture (catfish, shrimp and oysters). Sod production is also becoming more frequently cultivated in this area. Many farmers rotate cotton and soybean crops with wheat while others rotate sod with peanuts.

URBAN/SUBURBAN

areas only make up about 1% of the **Escatawpa** and **Tombigbee** Basins. Local economies in the **Tombigbee Basin** depend on such resources as sand, gravel, natural gas, and timber and such recreational uses as hunting, fishing and boating rather than the type of businesses and industries found in urban areas. The **Escatawpa Basin** is primarily forested in the headwaters, agricultural in the mid-section and is urbanized in the lower portion in Pascagoula, MS. The **Mobile Basin** is 7% urbanized and the environment is impacted by nonpoint and point source pollution due to urban sprawl. A large increase in impermeable surfaces in urban/suburban areas results in runoff problems, sewage overflows and local flooding.



SUNSET ON DOG RIVER, MOBILE BASIN. PHOTO: ADRIEN LAMARRE, <http://images.usace.army.mil>

Balancing Economy and Environment in the River Basins

Abundant water, timber, rich soils, minerals, and other natural resources have been important for boosting Alabama's economy, creating jobs and providing necessary products for all of us. The way these natural resources are extracted, managed and used can cause environmental problems that negatively affect human health and our quality of life. More than half of these problems come from nonpoint source pollution that enters streams from broad areas of both urban and rural portions of a watershed. Possible problems may include...

Agriculture

- ❖ Excess nutrients and bacteria from animal wastes, including wastes from CAFOs (Concentrated Animal Feeding Operations)
- ❖ Runoff of pesticides, fertilizers, and other chemicals from cropland and pastures

Nitrogen and phosphorus are essential nutrients for plant and animal growth, but excessive amounts in waterbodies can stimulate algal blooms and aquatic weeds. These blooms and subsequent die-offs of plants can impair water suitability for uses including drinking, swimming and fishing.



ALABAMA PASTURE. *Over the last few decades in Alabama, conversion of rowcrop agriculture to pasture has reduced soil erosion and pesticide runoff to streams.* PHOTO: www.aces.edu

Dams

- ❖ Change natural river flow patterns and levels
- ❖ Drastic changes in water temperature and oxygen in streams from dam releases
- ❖ Alter wetland habitats
- ❖ Extinction of animals dependent on flowing water



TOM BEVILLE LOCK AND DAM ON TOMBIGBEE RIVER.

PHOTO: ADRIEN LAMARRE, <http://images.usace.army.mil>

Forestry Practices

- ❖ Erosion and runoff from improper logging practices
- ❖ Alter vulnerable headwater stream ecosystems

Erosion and sedimentation have been a problem in Alabama as far back as colonial settlement. In the 1930s, the Soil Conservation Service, now called the Natural Resources Conservation Service (NRCS), was formed to address erosion problems and other land use issues.



SOIL EROSION AND STREAM SEDIMENTATION FOLLOWING A FOREST CLEARCUT. PHOTOS: RUSSELL WRIGHT

Invasive Exotics

- ❖ Replace native plant and animal communities
- ❖ Harm ecosystem functions
- ❖ Expensive to control

Invasive exotics are introduced into ecosystems where they did not evolve and often spread rapidly, replacing native species. People are usually the culprits responsible for introduction of non-natives. Examples of invasive species include fire ants, hydrilla, Eurasian milfoil, popcorn trees, water hyacinth, purple loosestrife, privet, common carp, Asian clam, and zebra mussels.

WATER HYACINTH, *Eichhornia crassipes*. *This freshwater floating plant is native to tropical Brazil but has become one of the worst invasives in the U.S. It can grow rapidly to block waterways, limit boat traffic, deny sunlight to submerged plants and fish and out compete marsh plants for resources. One acre can yearly deposit as much as 500 tons of rotting plant material on the bottom of a waterway.* PHOTO: GORDON RICHARDSON,



www.capetownskies.com

Mercury is often used by manufacturers to produce materials such as chlorine, thermometers, paint and batteries. Industries that burn coal as fuel release mercury into the air. Mercury may be converted to methylmercury and enter the food chain. Because mercury lasts so long in the environment, it can accumulate in predaceous fish, like mackerel, and can be hazardous to human health. Government regulations now limit the use of mercury in various products and industrial processes. The U.S. EPA classified Mobile Bay as an "Area of Probable Concern" due to the presence of toxins, such as mercury, in fish.

Industrial Discharge

- ❖ Toxic chemicals
- ❖ Heavy metals
- ❖ Thermal pollution



AN INDUSTRY PIPE IS A POINT SOURCE DISCHARGE.

Urban/Suburban/ Rural Development

- ❖ Concrete and asphalt reduce infiltration of water to soil, inhibiting groundwater recharge
- ❖ Runoff from paved areas and lawns, including pet wastes, enters storm drains and flows directly to streams untreated
- ❖ Inadequate and failing septic systems contaminate water with pathogens



ERODED SOIL WASHING INTO STORM DRAINS AND CREEKS.

PHOTO: MICHAEL MULLEN



BMPs CAN DRAMATICALLY REDUCE EROSION AND STREAM SEDIMENTATION.



INADEQUATE BMPs CONTRIBUTE TO SOIL EROSION. PHOTOS: ADEM

Solutions to many environmental problems are achieved through Best Management Practices (BMPs), education, good planning, and enforcement. Specific BMPs for each land use activity may be obtained from the NRCS, Office of Surface Mining, Alabama Forestry Association, Alabama Cooperative Extension System or ADEM.

WATER POLICY, LAW AND CITIZEN INVOLVEMENT

There are many water policies and laws from various federal, state and local agencies that are sometimes difficult to understand. Virtually all water quality protection laws in Alabama stem from the federal Clean Water Act, passed by the U.S. Congress in 1972. Since that time, the quality of our nation's waters has improved dramatically with cooperative efforts of federal, state, tribal and local governments and the general public. Much cleanup work remains to be done, however.

The Clean Water Act is subdivided into many sections that influence Alabama's water. Three of the main sections are:



A great egret stalks lunch among cypress shoots in the Weeks Bay National Estuarine Research Reserve.

PHOTO: www.photolib.noaa.gov/nerr/nerr0209.htm

Section 319
Provides federal funds through the U.S. EPA to ADEM for educational and technical assistance and programs such as Alabama Water Watch and the Clean Water Partnerships.
(www.epa.gov/region4/water/nps/grants/index.htm)

Section 305
Requires an assessment of waterbodies every two years to determine whether designated uses are being met. The Biennial Water Quality Report to Congress, or the 305(b) Report, provides summary information about the quality of the state's waters.

Section 303
Charges states and tribes with setting specific water quality criteria and developing pollution control programs to meet them. Designated uses may include drinking water, recreation, aesthetics, irrigation, fishing, swimming or a combination of these and other activities.
Waterbodies that do not meet water quality standards for their designated water use classification are included in a 303(d) list (www.epa.gov/waters). EPA requires ADEM to develop total maximum daily loads (TMDLs) for each waterbody included on the 303(d) list. The TMDL is the maximum quantity of a pollutant that can enter a waterbody without adversely affecting the designated use classification of the waterbody.

Partnerships of local citizens, landowners, business, industry and governmental agencies have a high potential for restoring degraded habitats and protecting water quality.

Citizens can do much to protect their watershed by:

- ❖ Becoming aware of key water issues
- ❖ Practicing neighbor-to-neighbor persuasion to reduce pollution
- ❖ Engaging in public outreach and education
- ❖ Participating in watershed-based protection plans, including the TMDL process
- ❖ Becoming part of a citizen group
- ❖ Being the “eyes and ears” for environmental changes and pollution
- ❖ Advocating policy changes and enforcement

Many water-related citizen groups have formed within the **Escatawpa**, **Mobile** and **Tombigbee** Basins. Several monitor water quality as Alabama Water Watch volunteers (marked with *). Although citizen groups come and go, most groups listed here have existed for several years and have significantly improved environmental education and protection.

The Alabama Clean Water Partnership (ACWP) was created in 2000 to coordinate stakeholders for the restoration and protection of river basins in accordance with the Clean Water Act. Resulting Watershed Management Plans will represent the diverse interests of all stakeholders. Citizens may contact ACWP or ADEM to get involved in the:

Coastal River Basins Clean Water Partnership
Alabama-Tombigbee River Basin Clean Water Partnership

ESCATAWPA

Escatawpa River Society

MOBILE

- Alabama Coastal Foundation**
- Bon Secour River Protective Association*
- D'Olive Bay, Creek and Lake Restoration and Preservation Committee*
- Dog River Clearwater Revival**
- Fairhope Water Watch**
- Fly Creek Preservation Project*
- Fowl River Protection Association*
- Friends of the Tensaw River*
- Little Lagoon Preservation Society*
- Milkhouse Creek Concern Group*
- Mobile Bay Watch/Baykeeper*
- Sans Souci**
- University of South Alabama Eco-Club**
- Weeks Bay Water Watch**
- Weeks Bay Watershed Project*
- Weeksbay Watershed Protective Association*

TOMBIGBEE

- Hamilton High School**
- West Central Alabama Action Committee*



CITIZEN ACTION ON THE COAST



A VOLUNTEER CLEANUP IN THE WEEKS BAY WATERSHED.

More Info

For further information about Alabama's waterways or how to get involved in protecting your watershed, contact:

Alabama Clean Water Partnership
866-346-8426 www.cleanwaterpartnership.org

Alabama Cooperative Extension System
334-844-4444 www.aces.edu

Alabama Department of Agriculture and Industries
334-240-7100 www.agi.state.al.us

Alabama Department of Conservation and Natural Resources
334-242-3486 www.dcnr.state.al.us

Alabama Department of Economic and Community Affairs
334-242-5591 www.adeca.state.al.us

Alabama Department of Environmental Management
334-271-7700 www.adem.state.al.us

Alabama Department of Industrial Relations
334-242-8990 www.dir.state.al.us

Alabama Forestry Association
334-265-8733 www.alaforestry.org

Alabama Land Trust
256-447-1006 www.allandtrust.org

Alabama Soil and Water Conservation Committee
334-242-2622 www.swcc.state.al.us

Alabama Surface Mining Commission
205-221-4130 www.surface-mining.state.al.us

Alabama Water Watch
888-844-4785 www.alabamawaterwatch.org

Geological Survey of Alabama
205-349-2852 www.gsa.state.al.us

Legacy, Inc.
800-240-5115 www.legacyenvd.com

Mobile Bay National Estuary Program
251-431-6409 www.mobilebaynep.com

Mobile River Basin Coalition
251-348-2309



In 1819, when Alabama entered the Union, its leaders designed a great seal that featured the state's waterways. In adopting this symbol they affirmed their belief that the future of Alabama lay with its rivers. It did, and it still does.

Harvey Jackson, III
Rivers of History

National Agricultural Library Water Quality Information Center
301-504-5755 www.nal.usda.gov/woic

The Natural Heritage Program
334-834-4519 www.natureserve.org/nhp/us/al

Natural Resources Conservation Service
334-887-4552 www.al.nrcs.usda.gov

The Nature Conservancy of Alabama
205-251-1155 <http://nature.org>

Northwest Alabama Resource Conservation and Development Council
256-383-1446 www.rcdnet.org

U.S. Army Corps of Engineers - Mobile District
251-690-2505 www.sam.usace.army.mil

U.S. Environmental Protection Agency (Region 4)
202-272-0167 www.epa.gov

U.S. Fish and Wildlife Service
334-441-5181 <http://daphne.fws.gov>

U.S. Geological Survey
888-275-8747 www.usgs.gov

The Water Course (Alabama Power Company)
800-280-4442

Weeks Bay National Estuarine Research Reserve
251-928-9792 www.weeksbay.org