

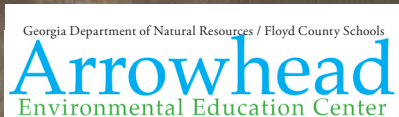
S T U D Y G U I D E

What's Your  
**E.Q.?**

The Upper Coosa River Basin

**E.Q.  
Bowl\***

Sponsored by



at

Arrowhead Environmental  
Education Center

May 20, 2017 • Armuchee, GA

*\*Environmental Quiz Bowl*



# Vocabulary

- **Algal bloom**-The rapid excessive growth of algae, generally caused by high nutrient levels and favorable conditions. Can result in de-oxygenation of the water mass when the algae die, leading to the death of aquatic flora and fauna. Algal blooms are numerous on the Coosawattee River and Carters Lake. Scientists believe the blooms are caused by run off from chicken farms. Chicken manure is high in nitrogen and phosphorus—nutrients that cause algae to grow.
- **Best management practices**- techniques that help prevent non-point source pollution and minimize impacts on streams and soils, for example, silt fences and retention ponds at construction sites and stream buffers at timber and farm operations.
- **Biodiversity**-the variety of species found in specific habitats. The Coosa River is home to more than 147 species of fish and has the largest diversity worldwide of freshwater snails and mussels, despite the documented disappearance of numerous mollusk species. The Coosa River is the historic home of 82 different species of freshwater snails, 26 of which are now believed to be extinct. The Etowah River has more imperiled species than any other river system of its size in the southeastern United States (17 fish species and 16 invertebrate species).
- **Biological oxygen demand (BOD)**- amount of oxygen consumed by microorganisms and chemicals in breaking down organic matter.
- **Condensation**- the process of gas changing to liquid.
- **Conductivity**--Conductivity is a measurement of water's ability to conduct an electric current and is a general measurement for water quality. The conductivity of a stream depends upon the presence of inorganic dissolved solids such as chloride, nitrate,



*Robert Redden pedestrian bridge at the confluence of the Etowah and Oostanaula rivers.*

sulfate, and phosphate or sodium, magnesium, calcium, iron, and aluminum. Presence of these inorganic solids will result in high conductivity in water. Organic compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity when in water. Each stream tends to have a relatively constant range of conductivity that, once established, can be used as a baseline for comparison with regular conductivity measurements. Significant changes in conductivity could then be an indicator that a discharge or some other source of pollution has entered a stream. Riverkeepers sometimes use this measurement to track down pollution problems.

- **Confluence**- the point at which rivers or streams meet, ex. Heritage Park where the Oostanaula and Etowah meet to form the Coosa.
- **Dissolved oxygen**-amount of oxygen measured in the water, adequate levels of dissolved oxygen are needed to support aquatic life. This is an important water quality measurement that helps determine the health of a stream or river.
- **Erosion**- wearing away of land by wind, water, or ice
- **Estuary**-An enclosed or semi-enclosed coastal body of water having an open or intermittently open connection to marine waters and fresh input from land runoff which measurably reduces salinity. Water levels vary in response to ocean tides and river flows. These are important areas because they provide habitat for seafoods like oysters, shrimps and crabs.
- **Evaporation**- the process of a liquid changing to a gas.
- **Fecal coliform**- group of bacteria that may indicate the presence of human fecal matter in the water.
- **Floodplain**- The portion of a river valley next to the river channel which is or has been periodically covered with water during flooding. Much of Rome is built in the floodplain of the Coosa River. Before the construction of levees and Allatoona Dam, downtown Rome flooded periodically.
- **Headwaters**-The source of a stream. The headwaters of the Coosa River are located in the Blue Ridge

Mountains of North Central Georgia and in the Cohutta Mountains of Northwest Georgia and Southeast Tennessee. These tiny streams form larger streams, which form the Etowah and Oostanaula rivers, which meet in Rome to form the Coosa. A drop of rain that falls in the Cohutta Wilderness might follow this path to Rome and beyond: Jack's River> Conasauga River> Oostanaula River> Coosa River> Alabama River> Mobile River> Mobile Bay> Gulf of Mexico.

- **Interbasin transfer**- physical transfer of water from one river basin to another. In the Coosa River Basin, water is taken from the Etowah River and transferred to the Chattahoochee River Basin for use in Atlanta.
- **Levee**- An embankment or raised area that keeps water from moving from one place to another. Levees are usually built to prevent flooding. The City of Rome is protected from flooding by an extensive levee which stretches more than a mile down the Oostanaula and Coosa rivers. While levees prevent flooding in some areas, they contribute to flooding in other areas.
- **Nitrogen**- another nutrient that can cause high levels of plant growth if high amounts are in the water, gets into water mainly from fertilizers
- **Non point source pollution**- pollution that cannot be tied to a single identifiable source. This pollution reaches our waterways when rainfall washes over the land and picks up pollutants. Non-point source pollution includes oil and heavy metals from roads and parking lots, fertilizer and pesticides from home gardens and farms, dirt washing off construction sites, drink cans, cups, bottles, fecal matter from domestic and wild animals, and toxins washing off industrial sites.
- **PCBs-Polychlorinated Biphenyls**- a toxic compound found in industrial waste. PCBs have been found in the Oostanaula River, Coosa River, Little Dry Creek and Horseleg Creek as a result of toxic PCB runoff from the General Electric Plant in Rome. PCBs cause cancer in animals and studies show that PCBs also cause cancer in humans. Many fish caught from the waterways in the Coosa River Basin are not safe to eat due to PCB contamination. The most common way that humans become contaminated with PCBs is by eating contaminated fish. PCBs were used at the General

Electric plant from 1953 until 1977. The federal government banned the use of PCBs.

- **pH**--is a measure of the acidic or basic (alkaline) nature of a water. The concentration of the hydrogen ion [H+] activity determines the pH. pH is measured on a scale of 0 to 14. Neutral water has a pH of 7. Acidic water has pH values less than 7, with 0 being the most acidic. Likewise, basic water has values greater than 7, with 14 being the most basic. A pH range of 6.0 to 9.0 appears to provide protection for the life of freshwater fish and macro invertebrates.
- **Phosphorous**-a nutrient that can cause high levels of bacteria and algae if high amounts are in the water, caused by agricultural runoff or wastewater
- **Point source pollution**- pollution originating from a single source, such as a pipe from a wastewater treatment facility. Once the leading cause of water pollution in the country, point source pollution <http://www.coosa.org/DeeratDuckPondforHolidayCardLowRes.jpg> has been corrected to a large degree during the past 30 years because of the Clean Water Act.
- **Precipitation**- moisture that falls from the sky
- **Recycling**- the process of collecting, sorting, and processing old materials into new materials. One of the largest users of recycled plastic bottles is Mohawk Industries located in Summerville, which turns plastic bottles into material used to make carpets.
- **Reservoirs** - a man-made lake or large body of water. The only natural lake in the state of Georgia is Banks



*Efforts by CRBI and other citizen groups to save the 80 acre Burwell Creek property in Rome from development resulted in over 70 acres being protected as urban greenspace by the Georgia Land Trust. The "Duck Pond" (above) is part of the remaining several acres that will be filled and developed.*



Lake in South Georgia. All other lakes in Georgia are created by dams. The Coosa River is dammed six times and there are dams on both the Etowah River (Allatoona Dam) and the Coosawattee (Carters Dam). Man-made lakes on the Coosa include Weiss Lake, H. Neely Henry Lake, Logan Martin Lake, Lay Lake, Mitchell Lake, and Jordan Lake

- **Riparian zone** - The zone adjacent to a water body where vegetation and natural ecosystems benefit from and are influenced by the passage and storage of water.
- **Sediment** - Sand, clay, silt, pebbles and organic material carried and deposited by water or wind. Sedimentation is the process by which sediment is deposited e.g. in waterways. Sediment is currently the leading cause of water pollution in Georgia.
- **Stream buffers** - areas along streams that cannot be disturbed. They are designed to keep sediment and other pollutants from reaching the stream. In Georgia, all streams are protected by a 25-foot buffer. Plants and trees within this 25-foot buffer cannot be destroyed without special permission from the state.
- **Tributary**- a stream that flows into a larger stream or body of water. Although small in size compared to the main body of a major river, small tributaries make up more than 80 percent of the total stream and river miles in the nation.
- **Water conservation**- the care, protection, preservation, and wise use of water, like taking short showers, turning off the faucet when you brush your teeth and watering your lawn early in the morning or at night rather than during the middle of the day.
- **Water cycle**- continuous recycling of water on earth through evaporation, condensation, and precipitation. The water currently found on Earth is the same water that was on the Earth millions of years ago. Yes, tyrannosaurus rex drank the same water you drink.
- **Watershed**-The land from which surface runoff drains into a stream channel, lake reservoir or other body of water, also called a drainage basin.
- **Wetland** -Area of seasonal, intermittent or permanent waterlogged soils or inundated land, whether natural or otherwise, fresh or saline, e.g. lake, swamp, damp land. Wetlands are important for clean water because they collect water and pollutants and store them. Wetlands help maintain flows in rivers and streams during droughts and they help reduce flooding during periods of heavy rainfall.

# Wildlife

## Invertebrates

- **Caddisfly** - Aquatic insects that look like a green worm and live in a case attached to rocks. It is intolerant of changes to a stream brought on by pollution. If your stream has caddisflies, that's an indication that it is a healthy stream.
- **Crayfish** -A freshwater crustacean that resembles a lobster, crayfish hide beneath rocks and other debris on the streambed. They feed at night on snails, algae, insect larvae, worms, and tadpoles; some eat vegetation (various water plants). Dead fish, worms, corn, and salmon eggs are also favorites of the crayfish. They usually move slowly, but a flip of the tail sends a crayfish speeding through the water to escape danger.
- **Coosawattee crayfish** is a crayfish found nowhere in the world except the Coosawattee River Basin—a headwaters tributary of the Coosa.
- **Conasauga Blue Burrower Crayfish**—this blue crayfish inhabit a system of tunnels that may be very complex with several openings to the surface. Openings to the tunnels are often marked by piles of dirt or mud pellets (chimneys). Depending on the soil type and moisture content, these chimneys can reach heights of 6 inches or more. The Blue Burrower is listed by the State of Georgia as endangered and is known to exist in only one location along the Conasauga River.
- **Earthworms**-Working one acre of land, earthworms can create an inch of top soil every five years. Without earthworms, soil becomes compacted, air and water can't circulate in it, and plant roots can't penetrate it. Earthworms help water filter through the soil.
- **Interrupted Rocksnail** - This rare snail was thought to be extinct until it was discovered in the 1990s on the Oostanaula River. Today, scientists are breeding rocksnails in laboratories and restoring them to portions of the Coosa River Basin. Like mussels, snails are important for clean water. Rocksnails, like mussels, help keep our rivers clean, feeding off algae on rocks. They also become food for a host of other critters such as ducks, fish and turtles. The interrupted rocksnail is now listed as an endangered species.
- **Macro invertebrates** - These aquatic organisms lack an internal skeleton and are large enough to be seen with the naked eye. They include mayflies, stoneflies,

dragonflies, rat-tailed maggots, scuds, snails, and leeches. These organisms may spend all or part of their lives in water; usually their immature phases (larvae and nymphs) are spent entirely in water. The presence of certain macro invertebrates in a stream can be used to determine the health of a stream.

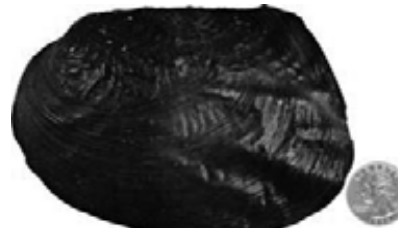
- **Mayfly** - Aquatic insect with feathery gills and a long tail. It is an intolerant species as well. Mayflies are an indication that a stream is healthy.
- **Mussels** - Mussels are natural filtration systems that help keep freshwater clean and clear. Georgia has 98 species of mussels, the most diverse mussel fauna of the 50 states. Eleven species native to the Coosa basin are currently listed or proposed for listing as endangered or threatened. 13 species are now extinct! Some of the species that are listed as threatened or endangered are the upland combshell, southern clubshell, finelined pocketbook, triangular kidneyshell, Alabama moccasinshell.

Mussels have a unique life cycle. Fertilized eggs called “glochidia” are released to the water and become attached to the gills of fish where they remain until they mature into juvenile mussels. Once the mussels reach the right size, they drop off the fish gills, fall to the river bottom and mature into adults. By this method, mussels populate other portions of a river system. In order to insure that the glochidia become attached to fish gills, the female mussels will often extend fleshy “lures” from their shell to attract fish. Many of the lures resemble small fish. When the larger fish come in close to examine the lures, or strike the lures, the mussel releases her glochidia into the water. Instead a meal, the fish get gills full of glochidia.

Because they filter nutrients out of the water, mussels literally help “clean” our rivers. Our rivers don’t flow as clean as they once did, partly because there are fewer mussels in our rivers.

There are fewer mussels in our rivers today because of pollution, and because the fish that are needed to host the glochidia are no longer found in abundance. Many mussels have adapted to using only a certain kind of host fish. If that host fish disappears from the river system, the mussels will soon follow.

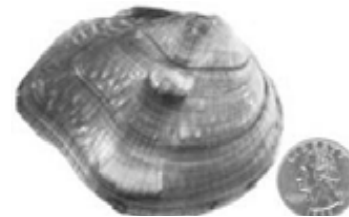
**Washboard Mussel** - Common to the Oostanaula River, washboards are large, heavy shelled, multi-ridged mussels that can grow to the size of a dinner plate (12 inches). Its shell is in high demand for the production of cultured pearls. Spherical pieces of the shell of the washboard mussel are inserted into a host



mollusk that then coats the “pearl” with the nacre that turns the former mussel shell into a shining pearl that you’d wear around your neck.



**Pistolgrip Mussel** - A common mussel found in the Oostanaula and Conasauga rivers. Pistolgrips are easy to identify because of their unique shape. They can be held in the hand much like a pistol. They can grow to be 8 inches in length. Like most mussels, pistolgrips rely on fish to host their “glochidia” (baby mussels). In the case of Pistolgrips, their preferred hosts are catfish.



**Three-horned Wartyback Mussel** - A common mussel found in the Oostanaula and Conasauga rivers. You’ll often find mounds of wartyback mussels at the entrances to otter dens along the banks of the river. They are a favorite food of otters. This mussel gets its name from its thick, heavy shell that has three large humps, or warts, on it. It grows to a size of 2-4 inches in length.



**Corbicula** - This non-native species is now the most common mussel found in the Upper Coosa River Basin. It is brown to yellow in color and very small compared with native mussels, growing to more

than 1-2 inches in length. It was first introduced to U.S. waters in 1938 in the Columbia River in the Pacific Northwest. Since then, the species has spread to all of the US. It reproduces rapidly and unlike native mussels, is very tolerant of different stream conditions. For this reason, it is the only mussel that is found in the mainstem of the Etowah River below Allatoona Dam. Changes to the river ecology as a result of the operation of Allatoona Dam have eliminated all native species from the river. The introduction of corbicula to U.S. rivers has been a blessing and a curse. While they have caused damage to pipes at industrial facilities, they have also replaced native mussels as a food source for other animals as native mussels have succumbed to pollution and other alterations to their habitat.

- **Rat-tailed maggots** - These 3/4 inch long whitish larvae are different from other fly maggots in having a 1/2 inch long "tail" that is used as a breathing tube when they are in the water. They thrive in even polluted streams. If your stream has these larvae, but no mayflies or caddis flies, your stream may be polluted.
- **Water penny** - An aquatic beetle larvae, this has a flat saucer body and 6 tiny legs on its underside.

## Birds

- **Anhingas** - A common resident of southern swamps, they are often called water turkeys or snake birds because of their swimming habits. Anhingas swim lower in the water than other waterfowl (usually with just the neck and head above the water line) because of denser bones and wet plumage. You'll often spot them sunning themselves on trees with wings outstretched in an effort to dry them. For food, they dive for fish, spearing them with the beak. In addition to being proficient swimmers, they are also excellent soarers and have been spotted several thousand feet in the air.
- **Bald Eagle** - Bald eagles can be found on the Coosa River at Weiss Lake and occasionally along the Oostanaula and Etowah Rivers. The Bald Eagle has been the national emblem of the United States since 1782 and a spiritual symbol for native people for far longer than that. Once endangered by hunting and pesticides, Bald Eagles have flourished under protection. Though considered very regal looking birds, their behavior is often less than noble. While they will hunt and capture live prey, they more often obtain their food by harassing and stealing food from other birds (like the Osprey) or by dining on carrion.

- **Canada Geese** - A familiar and widespread goose in the Coosa River Basin with a black head and neck, white chinstrap, light tan to cream breast and brown back. They often congregate in large numbers in rivers and in open areas including lawns and fields where they feed on seeds. Because they prefer their nests to have an open view around them, they often build nests on islands in our rivers.
  - **Great Blue Heron** - This tall, shore bird (over three-foot tall) hunts by standing in shallow waters and waiting for its prey to come to it. It has a wing span of about 70 inches, making it the largest water bird found in the Coosa Basin.
  - **Green Heron** - A small, stocky wading bird reaching lengths of 18 inches, the Green Heron is common along rivers and streams in the Coosa Basin. The Green Heron is one of the few tool-using birds. It often drops bait onto the surface of the water and grabs the small fish that are attracted. It uses a variety of baits and lures, including crusts of bread, insects, earthworms, twigs, or feathers. It feeds on small fish, invertebrates, insects, frogs, and other small animals.
  - **Kingfisher** - You'll often hear this bird's rattling cackle before you see it. It has a crested head and a large bill with blue wings, back and breast band. It feeds on small fish, aquatic insects and macro invertebrates.
  - **Osprey** - This "fish hawk" feeds almost exclusively on live fish which they catch by diving into local rivers and lakes. Ospreys have a wingspan of 4 to 6 feet, build large nests above water in large trees or artificial platforms and are excellent hunters. The bald eagle often steals the osprey's hard-earned catches by attacking the ospreys while in flight, forcing them to drop their fish. Ospreys are common to all portions of the Coosa River Basin.
  - **Owls** - Our only nocturnal birds of prey are the owls. In the Coosa Basin we have four native species of owl. Owls eyes see only in black and white but are extremely sensitive to low light conditions, allowing them to fly through the woods chasing prey in the middle of the night. Owls' hearing is particularly acute, allowing them to pinpoint the location of their prey before they can even see it. Owls are also well known for their ability to fly almost completely silently, allowing them to sneak up on their prey.
- Barn Owl** - has a distinctive heart-shaped face.  
**Barred Owl** - This medium to large owl has a very distinctive call often described as "Who cooks for you, who cooks for you all?". An opportunistic forager





*The Georgia owls display at Arrowhead Environmental Education Center. Clockwise from the left: Barred Owl, Great Horned Owl, Barn Owl, Screech Owl (red phase), Screech Owl (grey phase)*

its diet includes small rodents, opossums, birds, bats, frogs, crayfish, and other small animals... even fish.

**Eastern Screech Owl** - our most common owl in Georgia. This small owl nests in natural cavities and must compete with starlings, squirrels and other animals for these nesting sites.

**Great Horned Owl** - This large owl is a predator on many small mammals, especially mice and rabbits. It is named for its ear-like tufts of feathers.

- **Wild Turkey** - Common throughout the Coosa River Basin, the wild turkey was almost hunted to extinction by the early 1900s. Conservation efforts implemented after the 1930s have resulted in a dramatic increase in populations. By 2000, the nationwide population was estimated at 5.6 million, according to the National Wild Turkey Federation. Benjamin Franklin lobbied for the wild turkey to be named our national symbol instead of the bald eagle. He thought the turkey a more noble and beautiful bird than the thieving, carrion eating bald eagle. Turkeys feed on nuts, seeds, fruits, insects, and salamanders and are commonly seen in floodplain forests along the river. And, they do fly...on wingspans of more than four feet.

- **Wood Duck** - The Wood Duck is one of the most stunningly pretty of all waterfowl. Males are iridescent chestnut and green, with ornate patterns on nearly every feather; the elegant females have a distinctive profile and delicate white pattern around the eye. They

live in wooded swamps, and nest in holes in trees or in nest boxes put up around lake margins. They are one of the few duck species equipped with strong claws that can grip bark and perch on branches.

## Mammals

- **Gray Myotis Bat**- This bat is critically endangered in Georgia. It once flourished in caves all over the southeastern United States, but due to human disturbance, Gray Bat populations declined severely during the early and mid portion of the 20th century. Gray Bat populations were estimated at approximately 2 million bats around the time they were placed on the Endangered Species list. By the early 1980s populations of Gray Bats dropped to 1.6 million. With conservation efforts in place, in 2002, Gray Bat populations were estimated to have reached 2.3 million bats. Gray Bats are cave obligate (or cave dependent) bats, meaning that with very few exceptions (in which cave-like conditions are created in man-made structures) Gray Bats only live in caves, not in abandoned barns or other structures. Thus, any disturbance to these cave habitats can be extremely detrimental to Gray Bat populations.
- **River Otter** - Found throughout the basin, these creatures are known for their playfulness. They like to slide down muddy banks in the summer and icy slides in the winter. They eat fish which they catch while swimming underwater. Their web feet and strong tails help them swim. They communicate with one another through chirps, chatters, chuckles and screams.
- **Beaver** - A nocturnal animal and North America's largest rodent. They are found throughout the Coosa Basin. They eat grasses, leaves, fruits, and aquatic vegetation in the spring and summer. They also eat bark and cambium of trees (the softer growing tissue under the bark of trees). They prefer maple, aspen, birch, poplar, willow and alder. Beavers have microorganisms in their cecum (a sac between the large and small intestine) that digest these cellulose-based materials. The ponds which they build on small streams help maintain healthy river systems.
- **Muskrat** - The American Indians called this animal "Musquash" Muskrats can stay under water for up to 15 minutes. Like beavers they build lodges. They eat everything including cattail roots, clams, crayfish, frogs, rough fish, and carrion (dead animals). They become a meal for foxes, mink, great-horned owls, herons, and hawks.

# Reptiles



*Box Turtle*

- **Box Turtle** - a common land tortoise of the Coosa Basin. It is found from Maine to Michigan in the north and Florida to Texas in the south. The shell of the Box Turtle is adapted to close up (like a box) to protect the turtle from would-be predators.
- **Corn Snake** - also called the Red Rat Snake, this reptile uses constriction to subdue its prey. It is found throughout the southeastern states. It gets its name from the days when they were often found around corn cribs where they preyed on rats and mice.
- **Gopher Tortoise** - a keystone species because it digs burrows that provide shelter for 360 other animal species. Native to South Georgia, these reptiles are threatened by predation and habitat destruction. It is the state reptile of the State of Georgia. A Longleaf Pine ecosystem is ideal for this tortoise.



*Rat Snake*

- **Rat Snake** - one of the most common large snakes of the Coosa Basin, this reptile uses constriction to kill its prey. Sometimes when frightened it vibrates its

tail in dry leaves, a form of mimicry, which makes it sound like a rattlesnake.

- **Common Snapping Turtle** - a large freshwater turtle. Its natural range extends from southeastern Canada, southwest to the edge of the Rocky Mountains, as far east as Nova Scotia and Florida and as far southwest as northeastern Mexico. This species and the less common and larger **Alligator Snapping Turtle** are the only two Snapping Turtles found in North America. Common snappers are noted for their fierce disposition when out of water, their powerful beak-like jaws, and their highly mobile head and neck. In some areas they are hunted very heavily for their meat, a popular ingredient in turtle soup. These turtles have lived for up to 47 years in captivity, while the lifespan of wild individuals is estimated to be around 30 years.
- **Venomous snakes** - Of the 40+ native snake species known in Georgia, only six are venomous: the **Eastern Diamondback Rattlesnake**, **Timber Rattlesnake** (also known as the **Canebrake**), **Pigmy Rattlesnake**; **Eastern Coral Snake**; **Cottonmouth** (also known as the **Water Moccasin**) and **Southern Copperhead**. All are pit vipers except the Coral Snake which is not found in the Coosa Basin.

## Amphibians

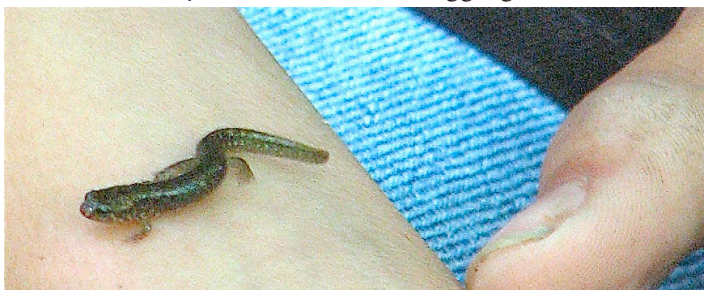
- **Barking Tree Frog** - 5 to 7 centimeters long, the Barking Tree Frog is the largest native tree frog in the United States. It is found from Virginia to south Florida and eastern Louisiana, usually in coastal areas. The frog is known for its loud, strident barking call. It burrows in the sand, especially when the temperature is hot. It also spends time high up in trees, especially during the day when it is less active.
- **Green Tree Frog** - green medium-sized frog, up to 6 cm (2.5 in) long. Their bodies are usually green in shades ranging from bright yellowish olive to lime green. The darkness of the color can change depending on lighting or temperature. The Green Tree Frog came the Georgia State Amphibian as the result of a proposal that began with the fourth grade classes at Armuchee Elementary School in Floyd County. The Green Tree Frog is found in every county in Georgia.
- **Grey Tree Frog** - a small arboreal frog native to much of the eastern United States. This frog is variable in color, camouflaging themselves from gray to green, depending on the substrate they are sitting on. The degree of mottling varies. They can change from nearly black to nearly white.



- **Hellbender** - a species of giant salamander that is endemic to eastern North America. Hellbenders are ecologically significant for many reasons, including their uniqueness. These salamanders are much larger than any others in their endemic range, they employ an “unusual” means of respiration (which involves cutaneous gas exchange through capillaries found in their dorsoventral folds), and they fill a particular niche—both as a predator and prey—in their ecosystem which either they or their ancestors have occupied for around 65 million years.

- **Mudpuppy** - also known as waterdogs are aquatic salamanders. Their name originates from the misconception that they make a dog-like barking sound. They range from southern central Canada, through the midwestern United States, east to North Carolina and south to Georgia and Mississippi.

- **Seepage Salamander** - a small, terrestrial species of salamander endemic to small areas of Tennessee, North Carolina, Georgia, and Alabama. Its natural habitats are temperate forests, intermittent rivers, and freshwater springs. It gets its name from the seepages around which it lives. It is very similar in its appearance and life history to the pygmy salamander. The seepage salamander is lungless and respire through its skin and the lining of its mouth. One of the smallest salamanders in the genus, it measures only 1-2 inches in length. The seepage salamander is currently listed as Near Threatened, with its numbers declining in most of states in which it is found. It is threatened by habitat loss from logging.



*Unidentified salamander near Armuchee Creek*

- **Slimy Salamander** - The Slimy Salamander is typically an overall black in color, with many silvery spots or gold spots across its back. They are usually 12-17 cm long, but can grow to 20.6 cm. Males are not easily distinguished from females, though females tend to be slightly larger, are territorial, and will fight aggressively for territory. Their preferred habitat is in moist soil or leaf litter beneath stones, rotting logs or

other debris near a permanent water source. They will sometimes make use of other animal’s burrows. Their diet consists mostly of ants, beetles, sow bugs, and earthworms, but they will eat most kinds of insect.

## Fish



- **Amber Darter** - A federally endangered species, this slender-bodied fish is generally less than 2.5 inches in length and is found in the Conasauga River and Etowah River. The fish’s upper body is golden brown with dark saddle-like markings, and its belly is a yellow-to-cream color. The throats of breeding males are blue in color. The amber darter feeds primarily on snails and insects.

- **American eel** - This catadromorous (species that live in the rivers but swim to sea to spawn) species lives its adult life in the rivers of the Atlantic and Gulf Coasts but swims to the Sargasso Sea near the Bahamas to spawn. After spawning the adults die. The young eels born alone in the vast ocean then find their way back to coastal rivers where they grow to be adults. Eels grow to be between 2 and five feet long. In some cultures, eels are considered a delicacy.

- **Blue Shiner** - A threatened species, it is found only in the upper Coosa River drainage in Georgia, and in Alabama in Little River, Choccolocco Creek and Weogufka Creek. It inhabits small to medium streams over rocky substrate with moderate to slow current.

- **Brook Trout**-The only native trout to Georgia, it lives in the mountain streams of North Georgia and feeds on small insects. They require clean, cold water for survival, and the females lay their eggs in gravel beds on stream bottoms. Excessive silt in a stream can cover these eggs and prevent incubation

- **Catfish**-The largest catfish ever caught in Georgia weighed 63 pounds and 8 ounces and was caught on the Altamaha River. There are more than 2200 species of catfish swim the waters of the world, amounting to approximately 8% of the total number of fishes. Catfish have an excellent sense of smell. They have taste buds located around their mouths, lips and especially barbels, but also distributed over their entire bodies. Catfish merely need to brush against a potential food

item to taste it! It is a myth that a catfish can sting a person with its whiskers although they can inflict injury with their sharp pectoral and dorsal spines. Historically, Native Americans used the sharp spines of catfish for sewing needles.



- **Cherokee darter** - A federally threatened fish species found only in the Etowah River basin. It is a tiny white/yellow fish with dark blotches on its sides. It likes clear water flowing over large gravel, cobble, and small boulders. It doesn't like silt (dirty water) or the still water created by dams.
- **Crappie** - Centre, Alabama and Weiss Lake is known as the Crappie Capital of the World because of the excellent crappie fishing on the lake. Crappie are sunfish that grow to be about a foot long and usually weigh a pound or less.
- **Etowah darter** - A federally endangered species. This tiny fish is found no where else in the world except in the Upper Etowah River and two tributaries to the Etowah—Long Swamp and Amicalola Creeks. Like the Cherokee darter, the Etowah darter is intolerant of dams and silt.
- **Gar** - primitive fish covered with hard scales has a long jaw with needle like teeth. Anglers who try to catch gar often use frayed nylon rope instead of hooks because the gar's teeth become entangled in the strands of the rope. Native Americans used the sharp gar teeth as points for arrows, and even used the jaws filled with sharp teeth to discipline their children by raking the arms and legs of disobedient children.



- **Holiday darter** - A species of concern found in the Conasauga River. Only recently discovered, it is known for its colorful green and red markings.
- **Lake sturgeon** - Once extinguished from the Upper Coosa Basin, the lake sturgeon was recently reintroduced into the Coosa River by the Georgia Department of Natural Resources, this is the only species of sturgeon that spends its entire life cycle in

freshwater. They have a long snout, bony plates and whiskers. They can grow to weigh more than 100 pounds and live to be 50 to 90 years old. Their roe is prized as caviar.

- **Striped bass** - This large fish is the most sought after sport fish in the Coosa River Basin because of its tremendous size and fighting ability. The world record striped bass weighed over 78 pounds. Striped bass spawn on the Coosa, Oostanaula and Etowah Rivers in the spring time. Fertilized eggs drift down river for about two days before hatching into fry.

## Plants

- **Cardinal Flower** - Often seen along the banks of the Etowah and Oostanaula rivers in the late summer and early fall. This tall wildflower (reaching heights of up to 6 ft.) has showy red flowers at the end of its long stalk. Each flower has three spreading lower petals and two upper petals. The lower portion of the erect stem is lined with lance-shaped leaves. Cardinal flower depends on hummingbirds for pollination. Its common name alludes to the bright red robes worn by Roman Catholic cardinals.
- **Catalpa Tree**—This medium-sized tree seen occasionally along river banks in the Coosa Basin grows to 40-50 feet in height and is best known for its showy white flowers that it produces in the late spring, and later, for its long, slender pods which dangle from the ends of limbs. They look like long, thin, cylindrical pencils or cigars and can reach lengths of 16 inches. Catalpa trees are the only host for the catalpa sphinx moth which lays its eggs on the tree. The larvae that emerge are the “catalpa worms” that are a favorite bait of anglers because the worms are irresistible to catfish.



*Coosa Barbara Button.*



- **Coosa Barbara Buttons** - in Georgia found only in the Coosa Prairies, this plant is critically endangered. A search for this plant resulted in the “discovery” of the Coosa Prairies by botanist Jim Allison.
- **Dog hobble** - a plant common to stream banks in the Southern Appalachians. Like its close relatives rhododendron and mountain laurel, this member of the heath family is an evergreen making it easy to identify during the winter months. In the early spring, it produces clusters of small, white bell-shaped blossoms. Its common name is derived from its dense tangle of arching branches that make traveling through it difficult. Hunters say that bears run through stands of dog hobble to distance themselves from pursuing hounds. The leaves and flower nectar are highly poisonous to humans and animals.
- **Cypress** - This evergreen conifer is generally found near swamps or some other body of water. It is generally recognized by its roots that extend “knees” above the water in order for the tree to breathe.
- **Georgia Rockcress** - Another rare species of the Oostanaula River, Georgia Rock Cress, as the name implies grows on the rocky bluffs overlooking the Oostanaula River. In the early spring (March/April), rock cress’ inconspicuous white blooms appear on hillside and rock bluffs. Rock cress is included on Georgia’s list of threatened species.
- **Large Flowered Scullcap** - a rare plant found along Blacks Bluff on the Coosa and in Marshall Forest.
- **Longleaf pine** - This tree is the legendary Southern Yellow Pine. It used to cover 30 to 60 million acres of the southeastern US, but 200 years of logging and land clearing have greatly reduced its range. This tree takes 100 to 150 years to become full size and can live up to 300 years. Fire plays a major role in the development of this tree. The endangered Red-cockaded Woodpecker depends on it for survival.



- **Pawpaw** - This native tree common in floodplain forests is known for its tasty fruits that come ripe from September until the first frost. Use your nose to find the fruits; they give off a strong fruity aroma when ripe. The trees grow to a height of 30 feet and the leaves have a medium green upper surface and a

lighter green lower surface. They tend to droop, giving the tree a sleepy appearance during the summer. The fruits grow in clusters of up to six. They are 2-6 inches long with an elongated or rounded shape. The thin green skin turns yellowish black when ripe. The flesh is rich and sweet like a custard. They were a favorite food of Native Americans and sustained the Lewis & Clark expedition at times.

- **River birch** - This tree is known for its light reddish brown cinnamon bark that peels and flakes off the tree. It is often seen in parks and golf courses. It produces a cone like fruit.
- **River cane** - Among the most common riparian plants in the Coosa River Basin, the “canebrakes” you see along our rivers today are just a fraction of what you might have seen in the 1700s. Botanist William Bartram described canebrakes “rolling to the horizon like an ocean.” In fact, scientists estimate that river cane has been eliminated from 95 percent of its original habitat due to land development for agriculture and other purposes. Canebrakes provide habitat and food for wildlife and help stabilize river banks. Their destruction has likely contributed to the pollution of our streams as they also play a critical role in slowing stormwater and filtering pollutants. For Native Americans, river cane was a critical raw material. They used it for nearly everything, fashioning it into spears, arrows, baskets, homes, mats, knives, torches, rafts, tubes and drills. It propagates primarily through rhizomes, with these spreading roots leading to dense clusters of plants like this. However, it’s not so effective propagating through its seeds. River cane flowers sporadically (every 30 to 40 years) and its seeds have a low germination rate. The canebrakes also lend their name to the canebrake rattlesnake because this venomous snake is commonly found along the borders of swamps and wetlands— also the preferred habitat of river cane.



- **River Oats** - A common native grass along the banks of our rivers and streams. As the name implies, at the end of the grass’s stalks, you’ll find seeds that resemble oats. River oats don’t reach a height of more

than three feet, but they play an important role in stabilizing river banks, preventing erosion. They also serve as a food source for many songbirds and mammals.

- **Sycamore** - A very large shade tree with a massive trunk and a wide crown of large crooked branches. This deciduous tree has a smooth almost white bark when mature. The bark often flakes off in irregular pieces to give the tree a mottled appearance.
- **Watercress** - This aquatic perennial herb is generally found floating or standing in slow moving shallow water. It is sometimes used as a salad green and has a peppery flavor.
- **Willow** - This deciduous tree flourishes in cold, wet ground. Aspirin was originally made from the bark of this tree. These trees are valuable in erosion control along riverbanks because of their rapid growth. The bark of this tree is generally soft.

## River History

**Battle of Resaca** - One of the key battles of the Civil War was fought just up Camp Creek from the Oostanaula. It illustrates the importance of rivers in warfare. On May 14, 1864 Confederate troops formed a line from the Oostanaula near here north and east to the Conasauga River. Union troops attacked the line, but with Camp Creek splitting the battlefield and endowed with “quicksand in places and steep muddy banks,” the obstacle aided the Confederates in repelling the attacks. The following day, Gen. William T. Sherman opted to send troops 10 miles downstream on the Oostanaula where they crossed at Lay’s Ferry. This flanking maneuver threatened the Rebels’ communications and supply lines, forcing the Confederates to abandon their position on the north side of the river and flee across the Oostanaula in the dead of the night. The army crossed on a bridge where the U.S. 41 bridge now stands, burning it after crossing to slow Union troops.

**Interstate Highways** - Perhaps no other modern-day development has done more to change the face of Georgia than the construction of I-75. Like the steamboat routes and railroads of the 1800s and early 1900s, the interstate highway system has shaped our culture and fueled our economy. Georgian, Lucius D. Clay of Marietta, was tapped by President Eisenhower in 1954 to map out the nationwide

system...an appointment that contributed to three major interstates converging on Atlanta. In the 1970s Dr. Philip Greear, a renowned ecologist who taught at Shorter College, led a successful effort to lessen the environmental impact of the highway by changing the route between north Cobb County and Cartersville. If not for that citizen intervention, I-75 would have been built over Lake Allatoona.

**Oostanaula Pearl Rush** - Around 1897, farmer Jack Bennett collected a basket full of mussels from Johns Creek in search of freshwater pearls. He found several pea-sized gems and sent them off for appraisal and sale. A short time later, he received a check in the mail for \$189 (that’s the equivalent of more than \$5,000 today). Soon there after, the rush was on. Sadly, today we may still be feeling the impacts of that pearl rush as well as pollution and the construction of dams. There were once 43 species of mussels found in the upper Coosa River basin; today only 27 remain and several of those are endangered. Today, you would be hard pressed to find mussels in great enough abundance to find quality pearls. Georgia Department of Natural Resources mussel specialist Jason Wisniewski reported that when he surveyed Johns Creek in 2015, he found only a handful of mussels in the very headwaters of the creek.

- **Etowah Indian Mounds** - This historic site located at the confluence of Pumpkin vine Creek and the Etowah River near Cartersville consists of seven mounds constructed by Native Americans during the Mississippian Culture (1000-1500 AD). Hernando Desoto first visited these mounds in 1540. Chief priests or leaders of the tribe or community lived atop these mounds in temples.
- **Gold Rush on the Etowah** - The first Gold Rush in United States took place in 1928 along the Etowah River in North Georgia. One of the earliest gold rush towns was Auraria near the Etowah River. The Gold Rush led to the establishment of a U.S. Mint in nearby Dahlonega. Between 1838 and 1861, the mint produced almost 1.5 million gold coins worth more than \$6 million.
- **Mining Tunnel on the Etowah** - One of the signs of the gold rush on the Etowah is a quarter-mile tunnel that was blasted through a mountain ridge forming a large bend in the river along the Dawson-Lumpkin County Line. The tunnel was built to divert the flow of the Etowah so that miners could dig for gold in the main river channel. The tunnel was begun in



the 1890s, but wasn't completed until 1932 when dynamite and jackhammers were used to finish the task. They never found much gold in the river there, but today canoeists and kayakers love to ride through the dark tunnel of roaring water.

- **Lock and Dam** - This facility, constructed between 1910 and 1913, was designed to allow boats to travel upriver to Rome from Alabama. Before its construction Horseleg Shoals often prevented the passage of steamboats to Rome. When completed the lock and dam created a navigable channel from Rome all the way to Mobile Bay on the Gulf of Mexico. The advent of railroads, improved roads and other transportation advances resulted in the river and lock and dam being used very little, and in 1941, the lock ceased operation. But in the heyday of river navigation, steamboats carried passengers, mail, supplies and agricultural products (especially cotton) from Rome to points down river in Alabama.
- **New Echota** - At the confluence of the Coosawatee and the Conasauga rivers, the Cherokee legislature established its capital in 1825. The site that was a symbol of much hope for the Cherokee would, 10 years later, come to symbolize tragedy. It was here in 1835 that the Treaty of New Echota was signed. The treaty ceded all Cherokee land east of the Mississippi to the federal government and led to the forced removal of the Cherokee in 1838. Establishing the tribal capital at New Echota enraged Georgia's leaders, and when gold was discovered on the nearby Etowah River in 1828, the state's efforts to remove the Cherokee intensified. Georgia passed laws forbidding the Cherokee legislature to meet and prohibiting Cherokees from testifying in court cases involving white people. In 1832, the state gave away Cherokee land to white settlers in a land lottery and for the next six years, the Georgia Guard conducted a form of vigilante justice against the Cherokee. The oppressed natives took their fight against these injustices all the way to the Supreme Court and the Court ruled in their favor, but Georgia, and President Andrew Jackson, ignored the ruling. In 1838, New Echota became the site of a Cherokee removal fort—where U.S. soldiers held Cherokee people before forcing them west. Today, the Cherokee Nation does govern itself. The 200,000-strong tribe (second largest in the country) is centered in Oklahoma where some 70,000 live in a 7,000 square mile “jurisdictional service area.”
- **Chieftain's Museum** - Located on the Oostanaula River in Rome, Chieftain's Museum was once home to the Cherokee leader Major Ridge who operated a ferry, trading post and a working plantation complete with numerous crops, orchards and slaves. Major Ridge would eventually sign the Treaty of New Echota with the U.S. government, selling all Cherokee land in Georgia to the U.S in 1835. In 1839, Major Ridge was killed by fellow tribesmen who were angered by this betrayal. **Ironically, as a Cherokee Council member, Ridge had promoted a law prescribing death to anyone who sold tribal lands.**
- **John Ross Footbridge** - Completed in 2007 the footbridge is named for Chief John Ross who operated a plantation and ferry near this location in the early 1800s. The son of a Cherokee mother and Scottish father, Ross was elected principal chief of the Cherokee in 1828, and served until his death in 1866, through the Cherokee removal from the Southeast to Oklahoma. At the base of the bridge on river left is the site a steamboat landing. The remains of a barge or wharf can be seen at low water.
- **Robert Redden Footbridge** - This footbridge originally carried the locomotives of the Chattanooga, Rome & Columbus Railroad which was completed in 1888. It was built as a swing bridge with a pivot on the center pier to allow the passage of steamboats. It is now named in memory of the self-taught artist who became famous for his pen and ink drawings of historic sites in Northwest Georgia. In recent years, the bridge has become Rome's version of Pont del'Archeveche, Paris' famed love lock bridge over the Seine River with couples placing padlocks on the bridge as testaments to their love.
- **Rome's ECO Center & Ridge Ferry Park** - Housed in a circa 1893 water pumping station, this environmental education center opened in 2011. It houses numerous aquariums (including a 3,000 gallon tank) featuring native fish, turtles, snakes, alligators and frogs. The center sits in Ridge Ferry Park, the city's premier park. An 1852 account describes this as “Riverbank Farm” a thriving plantation operated by Dr. George M. Battey where he grew corn, wheat and cotton and cultivated a three-acre vegetable garden and raised cows, chickens, ducks, geese and pigeons.
- **Fish Weirs** - There are dozens of fish weirs along the Etowah River in Bartow and Floyd counties. These V-shaped rock dams were constructed by Native

Americans 500 to 1000 years ago. They were used to capture fish.

- **Flood of 1886** - During Rome's most devastating flood water was more than 10-feet deep in places on Broad Street and a riverboat actually steamed up the thoroughfare. Floods were so troublesome for the city that in the late 1800s, downtown merchants abandoned some first floors bringing in fill dirt to raise the level of Broad Street. The first floors of some of downtown's historic buildings are actually original second floors.

- **Rome's Levee system** - The levee which protects Rome's "Fourth Ward" was completed in 1939 and is made to withstand flood levels of up to 42 feet on the Oostanaula River. Prior to its completion, the Fourth Ward flooded regularly. The levee system is 100 feet wide at the base and stands 18-feet high. It cost \$391,080 to build. The former Central of Georgia railroad once ran atop one section of the levee. In 2010 when the city moved the floodgate on the levee to its current location, old railroad ties and trestle sections were unearthed. Allatoona Dam on the Etowah, completed in 1950, and Carters Dam on the Coosawattee, completed in 1977, further mitigate flooding problems in Rome.

- **Birthplace of Stock Car racing** - Dawson County is known as the birthplace of stock car racing, and the streams and rivers of Dawson County, as well as the rich, flat farmland along the river played an important role in the development of auto racing. How? Moonshine—the illegal whiskey that was distilled in the hidden hollows of the county. Making whiskey required a good source of clean water like that found in pristine mountain streams so many moonshine stills were built along these streams. Whiskey was made from the corn that was grown in the rich farmland along the rivers. To carry the illegal whiskey to market, moonshiners began "souping up" their automobiles to out run the police. Soon moonshiners began challenging one another to races to see who had the fastest car. The earliest races were held in farm fields along the Etowah River in the 1930s. Raymond Parks of Dawsonville, a former moonshiner, was one of the first to own and race cars. He would become one of the founders of NASCAR and a car he owned won the first NASCAR championship in 1949. NASCAR has its roots along the Etowah River. Dawson County's most famous NASCAR driver is Bill Elliott, known as Awesome Bill from Dawsonville.

- **Old Federal Road** - This road was the first developed route through the Cherokee land of North Georgia and passed across the Etowah, Coosawattee and Conasauga rivers. It was commissioned by the federal government, but was largely built by the Cherokee who would benefited from the road by charging travelers a price for ferries across rivers and for lodging along the route.

- **Battle of Taliwa** - Around 1755, where Long Swamp and the Etowah meet in Cherokee County, the Battle of Taliwa was fought. Some 500 Cherokee Indians under the direction of Oconostota defeated a larger band of Creeks. Among the Cherokee warriors, there was at least one heroine, Nancy Ward or "Nan'yehi"—the 18-year-old wife of the Cherokee known as "Kingfisher" When Kingfisher was slain in the battle, she took up his gun and continued the fight. Reportedly, her courage led the Cherokee in a rout of the enemy. So complete was the defeat that the Creeks retreated permanently south of the Chattahoochee River, and Nancy Ward earned the title of honor: "Beloved Woman." Nancy later married Bryant Ward, a white man who took up residence amongst the Cherokees. She became an outspoken supporter of peace with white settlers. She died in 1822.



- **Edgewater & Crescent Farm on the Etowah River In Canton** - The home and farm of Gus Coggins in the 1800s borrow their names from the Etowah River. The 400-acre farm was encircled by the Etowah in form of a crescent moon. Coggins was a farmer, horsebreeder and businessman after the Civil War. Because former slaves could be employed cheaper than comparable white laborers, Coggins, like many



businessmen, hired blacks instead of whites. This drew the ire of unemployed whites who began forming vigilante groups whose purpose was to punish white businessmen who hired blacks. The vigilante groups often burned his barns and stables. Groups like the one terrorizing Coggins and his employees grew into what we commonly refer to as the Ku Klux Klan. Historians believe that in response, Coggins constructed a massive fire-proof stone barn (with materials harvested from the Etowah River) in 1906 to house his best horses. Today what came to be known as the “Rock Barn” still stands and has been renovated into the home of the Cherokee County Historical Society—a visible reminder of the South’s culture of violence and fear following the Civil War.

- **Bartow-Carver Camp & Segregated State Parks**

- In the separate but equal days of the segregated south, what is now Bartow-Carver Camp on Lake Allatoona was George Washington Carver State Park—established in 1950 as the state’s first “park for Negroes.” John Atkinson, a black man from Atlanta, arranged to lease the property from the federal government who operated the lake for a private, blacks-only resort, but Bartow County refused him a license to run such an establishment. It was then that Gov. Herman Talmadge—under pressure from protest from black veterans of World War II—offered to make the facility a “State Park for Negroes.” It remained a state park until 1975 when Bartow County took over the lease and operation of facilities. During its 25 years as Carver State Park, it hosted entertainment events including appearances by Ray Charles and Little Richard. Future Atlanta Mayor Andrew Young and his family frequently water skied there and Coretta Scott King and her children also visited.

- **Town Of Etowah** - Beneath the deepest portion of Lake Allatoona near the dam sit the remains of the town of Etowah—founded around the Cooper Iron Works. Etowah was a thriving, backwoods industrial

complex from the early 1840s until the 1864 when the town was destroyed by Union forces during the Civil War. Etowah’s founders utilized water power from the Etowah and the locally abundant iron ore deposits to create a mining and manufacturing center. At its heyday in the late 1850s, the town had a workforce of 600 which made railroad tracks from the iron ore extracted from nearby hills and the flour mill produced up to 300 barrels of flour a day. After the Civil War, the town was never rebuilt. Today, the town’s remains, with the exception of the furnace located near the base of the dam, rests beneath the water of Lake Allatoona. This is the only settlement along the Etowah River to bear its name.

- **Salt peter Mines of the Civil War** - A critical supply needed by armies during the Civil War was nitrate for the production of gunpowder. The nitrate-rich soil on the bottom of caves of Northwest Georgia was an important source of nitrate for the Confederates. Several “salt peter” mines were located along the Etowah River. iRavenel Cave in Floyd County was particularly useful because it was near the Etowah, and water was important to the process of extracting nitrate. Miners who worked in these caves were known as “peter monkeys” and earned 60 cents a day for their labor. Ravenel Cave was mined during 1861 and 62, but the nearby, and larger, Kingston Saltpeter Cave produced Confederate gunpowder until Sherman’s invading troops destroyed the operation.
- **Carter’s Quarters on the Coosawattee River** - Some of the richest farmland in Northwest Georgia was located where Talking Rock Creek meets the Coosawattee River in Murray County. The land now is under the water of the Carters Lake Re-regulation Reservoir, but in the 1800s the land owned by Farrish Carter was a huge plantation. In 1850, he used 403 slaves to work fields of wheat, rye, oats, corn, tobacco, peas, beans, potatoes, rice and cotton. Carter became a very wealthy and influential man. The bounty of “Carters Quarters” influenced the federal government to build small rock dams along the Oostanaula River in the 1870s that would allow steamboats to travel some 70 miles from Rome to Carters Quarters to pick up the area’s farm products. Carter’s Dam on the Coosawattee is named in honor of Farrish Carter as is the City of Cartersville along the Etowah River in Bartow County.
- **Euharlee Covered Bridge** - This bridge over Euharlee Creek was built in 1886 by Washington King, the

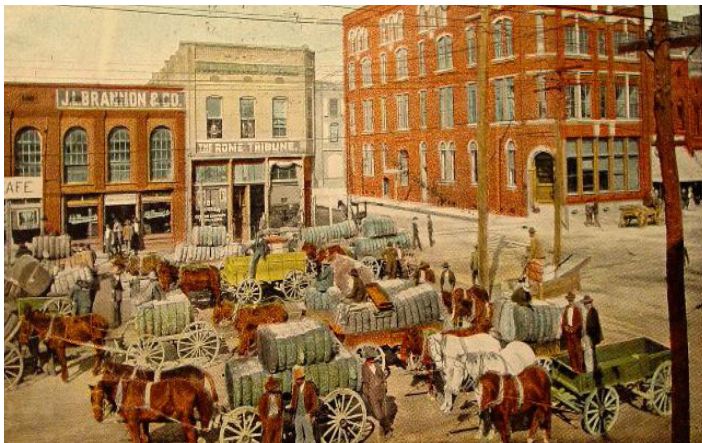


son of freed slave and notable bridge builder, Horace King, and carried passengers until 1976. Euharlee was originally called Burgess Mill after a grist mill located on the creek near the bridge. Later it became known as Euharleeville, but in 1870, residents dropped the “ville” to become just plain Euharlee. The Indian word “Euharlee” translates to “she laughs as she runs.”

- **The Dixie, the Cotton Block, and Steamboats in Rome** - One of the last paddlewheel steamboats to travel on the Coosa, the “Dixie” burned and sank while docked at a wharf along the banks of the Coosa River in Rome in 1914. During low water, you can still see the remains of the boat sticking out of the mud along the banks of the river. The “Cotton Block”—the first block of Broad Street north of the Etowah River earned its name because this is where farmers brought their cotton bales to load onto steamboats headed down river.



*The Grand Prairie of the Coosa Valley Prairies*



## Geography & Place Names

- **Armuchee Creek** - A tributary of the Oostanaula River that flows through northern Floyd County. Its name comes from the Cherokee word for “hominy.”
- **Big Cedar Creek** - A tributary of the Coosa River, this creek drains parts of Southern Floyd County. Cave Spring is a major source of Big Cedar Creek.

- **Black’s Bluff Preserve** - Located along the Coosa River west of Rome, this Nature Conservancy Preserve is home to the endangered large-flowered skullcap, a perennial herb in the mint family, and the state-endangered limerock arrow-wood, which grows almost exclusively in northwest Georgia. The Preserve is also home to the cave salamander, which can be found in limestone caverns.
- **Cartecay River** - This river flows through Gilmer County and joins the Ellijay River in Ellijay to form the Coosawattee River. Cartecay is believed to be an Indian word meaning “bread valley.”
- **Cave Spring** - This popular water source in the town by the same name forms the headwaters of Little Cedar Creek which flows to Big Cedar Creek and the Coosa River.
- **Chattooga River** - This Coosa River tributary begins in Walker County and flows through Chattooga County near Summerville and then on to Weiss Lake in Alabama. The Chattooga used to run blue because of the textile plants located along the river. Today, most of those problems have been corrected.
- **Cohutta Wilderness** - The Cohutta Wilderness covers 36,977 acres (about 60 square miles) that spill over the Georgia/Tennessee border. The Cohutta Mountains hold the headwaters streams of the Conasauga River.
- **Conasauga River** - This 90-mile long river flows out of Georgia, into Tennessee and back into Georgia. It hosts some 90 fish species and 25 species of mussels.



It also provides the water for the production of two-thirds of the carpet manufactured in the US.

- **Coosa Valley Prairies** - This 700-acre piece of land in Western Floyd County is home to more than 41 rare and endangered animals and plants, including the whorled sunflower, once thought to have disappeared 100 years ago. The Coosa Valley Prairies consists of a unique combination of prairie habitats, from wet to dry, which are located within a woodland community dominated by oaks, pines and prairie herbs. It is owned by Temple-Inland Company which is working with the Nature Conservancy to preserve this rare habitat.
- **Coosawattee River** - This river rises near Ellijay and is dammed to create Carters Lake. It joins the Conasauga in Gordon County to form the Oostanaula. Canoe trips on the Coosawattee inspired Jack Dickey to write the novel *Deliverance*. The Coosawattee is formed by the confluence of the Cartecay and Ellijay rivers.
- **“Dead River”** - This 19-mile section of the Coosa River was bypassed when Weiss Dam was constructed between Centre and Gadsden. Instead of the river’s flow going through the original channel below Weiss Dam, the majority of the river’s flow is diverted to a channel for the purposes of producing electricity. This leaves little water in the original channel, and that 19-mile section has come to be known as “Dead River.” Alabama Power Co. which operates Weiss Dam has agreed to begin diverting more water to Dead River in an effort to restore habitat and reintroduce several species of mussels and fish.
- **Desoto Falls** - These falls are located on the West Fork of the Little River near Mentone, Alabama. The West Fork plunges 100 feet off a Lookout Mountain cliff into a beautiful canyon. The falls are named after the Spanish explorer Hernando de Soto who passed through this area in the 1500s.
- **Dykes Creek** - A tributary of the Etowah River in Floyd County, it is named for Dr. G.J. Dykes who settled in Rome in 1836.
- **Ellijay River** - This river flows through Gilmer County and joins the Cartecay River in Ellijay to form the Coosawattee. Ellijay is a Native American name but its meaning is not fully understood. Botanist William Bartram who traveled through the area in the 1770s recorded the name of the rivers as “Allagac.”
- **Euharlee Creek** - This tributary of the Etowah River drains parts of Polk and Bartow counties. It is known for the covered bridge spanning it. Euharlee is a Cherokee word that means “she laughs as she runs.”
- **Hightower Gap** - This dip in the Blue Ridge along the Appalachian Trail and the Tennessee Valley Divide in North Georgia holds the spring that begins the Etowah River. The Etowah flows 160 miles from this spot about 3000 feet above sea level to Rome where it joins the Oostanaula River. The Tennessee Valley Divide is a ridgeline that separates the Coosa River Basin from the Tennessee River Basin. Thus rain falling on the north side of Hightower Gap flows downhill to Rock Creek and from there to the Toccoa River and Lake Blue Ridge, then on to the Ocoee River in Tennessee, then the Hiwassee, Tennessee, Ohio, Mississippi and finally the Gulf of Mexico—a journey of nearly 2,000 miles. Rain falling on the Etowah side of the ridge takes a quicker route to the sea. It flows down the Etowah to Rome and on to the Coosa and Alabama rivers before reaching Mobile Bay—a journey of about 760 miles, yet Mobile Bay and the mouth of the Mississippi are separated by only 100 miles.
- **Little River Canyon** - One of the deepest canyons east of the Mississippi. The Canyon, located in North-east Alabama, is carved by Little River which flows for most of its length atop Lookout Mountain. The Canyon offers sanctuary to a number of rare plants and animals such as the Green Pitcher Plant (a carnivorous rare and endangered plant), the Kraal’s Water Plantain (an aquatic plant found nowhere else in the world), and the Blue Shiner (a blue minnow that is rare and endangered). Little River is a tributary of the Coosa and empties into Weiss Lake.
- **Marshall Forest** - Located in Rome, this is the only virgin forest (never cut for timber) within a city’s limits in the United States. It is also probably the only virgin forest in the Ridge and Valley Province which extends from Pennsylvania to Alabama. It is named after Maclean Marshall, naturalist and philanthropist, who inherited the forest from his family who had purchased the forest in 1880. It is home to over 300 species of plants, as well as numerous animals, mushrooms, and other living organisms.
- **Pumpkinvine Creek** - This winding tributary of the Etowah River flows through Cobb and Paulding counties. The creek meets the Etowah opposite the

Etowah Mounds. It may have been named after a Cherokee by the name of Pumpkin Vine.



*The ancient fish weir at the Etowah Mounds and the confluence of the Etowah River with Pumpkinvine Creek.*



*Whitmore's Bluff*

- **Tennessee Valley Divide** - This is the irregular ridgeline in North Georgia that separates the streams flowing to the Tennessee River from those flowing to the Chattahoochee and Coosa river basins. The Etowah River, Jacks River, Cartecay River and Ellijay River all rise on the southern and western slopes of the Tennessee Valley Divide.
- **Terrapin Creek** - This tributary of the Coosa River in Cherokee County Alabama is home to several threatened and endangered mussel species including the Southern acornshell, Ovate clubshell, Southern clubshell, Upland combshell, Triangular kidneyshell, Coosa moccasinshell, Southern pigtoe, Fine-lined pocketbook, Georgia pigtoe. It is also a favorite destination of canoeists and kayakers.
- **Weiss Lake** - Weiss Lake is formed by Weiss Dam which was built in 1961 to control floods, provide electricity, support navigation and supply drinking water.
- **Whitmore's Bluff** - These limestone cliffs rising 250 feet above the Oostanaula River just north of Rome are home 334 species of plants including federally-protected Georgia Rockcress, Lanceleaf Trillium (imperiled) and Three-flowered Hawthorn (threatened). Trilliums derive their name from the three leaves that form an umbrella at the top of a foot-long stem. The flowers perch above the "umbrella" in the center of the the three leaves. Hawthorns flourish in Northwest Georgia because of the area's limestone. As the name suggests, the branches of hawthorns have many thorns. They are popular plants in landscaping and erosion control and their fruits are often used to make preserves and wines.

## Uses of the River

- **Carpets** - In Dalton and surrounding communities, water from the Conasauga and other rivers and streams is used to produce carpets. About 65 percent of all the carpet made in the United States is made using water from Coosa River tributaries
- **Crop Irrigation** - Water from the Coosa and its tributaries is used to irrigate numerous farm crops including corn, cotton, soybeans and sod.
- **Electricity** - Much of the electricity we use in Northwest Georgia is a result of the Coosa River and its tributaries. Allatoona Dam on the Etowah produces enough electricity to light 17,000 homes each year, and Georgia Power's Plant Bowen on the Etowah uses 40 million gallons of the Etowah each day to produce 20 percent of the electricity which the company sells in Georgia. Georgia Power's Plant Hammond in Coosa and Oglethorpe Power's Rocky Mountain Project on Armuchee Creek also utilize water to produce electricity.
- **Paper Products** - At the Temple-Inland Paperboard & Packaging Plant, about 20 million gallons of the Coosa are used each day to produce the cardboard products we use on a daily basis.



- **Pet Food** - In Cherokee County, water from the Etowah River is used to turn chicken parts (feet, heads, entrails) into pet food at the Gold Kist Rendering Plant.
- **Recreation** - Water recreation is an important part of our local economy. Lake Allatoona on the Etowah River generates about \$90 million each year for the communities surrounding the lake.
- **Sand** - Sand dredging operations are found along the Coosa and many of its tributaries. These operations pull sand from the river bottom and sell it for use in making cement and other building materials. Sand dredged from the Etowah River is used on the baseball diamond at Turner Field in Atlanta.
- **Wastewater** - In addition to supplying most of us with drinking water, the Coosa River and its tributaries also carry away what we flush down toilets and wash down sinks. Rome's wastewater treatment plant processes about 10 million gallons of wastewater each day before releasing the treated water to the Coosa.
- **Clean Water Act** - An act passed by the U.S. Congress in 1972 to control water pollution. Because of the Clean Water Act, it is now illegal to dump untreated sewage into our rivers and streams. Before this Act, fishermen on the Coosa would sometimes reel in wads of toilet paper when they cast their lines into the river.
- **Drugs in Our Drinking Water** - Tests conducted by federal agencies on the drinking water in many American cities have found elevated levels of pharmaceutical chemicals—things like hormones, antibiotics, mood stabilizers and other drugs. These drugs get in our water in several ways: people often flush un-used or old pills down the toilet. When this happens the drugs dissolve in the water and eventually get to a stream or river where downstream another community might draw water out of that same river. Drugs thrown out in the trash can also dissolve and get into groundwater beneath landfills and then enter our rivers and streams. Some of these drugs pass from our bodies when we urinate or defecate. With many more people taking medications and the world's population growing, steps are needed to prevent further contamination of our water sources.

## Other Facts

- **Coosa River Basin Initiative** - CRBI is the official Riverkeeper organization for the Upper Coosa River Basin. Organized over 20 years ago this volunteer group, headquartered in Rome works to preserve, protect and restore the water resources of the basin through education, advocacy, monitoring, and restoration.
  - **Arrowhead Environmental Education Center** - Arrowhead is a joint project of Floyd County Schools and the Georgia Department of Natural Resources. It provides environmental field trips at the center and outreach lessons in schools.
  - **Alabama-Coosa-Tallapoosa** - The watershed that stretches from the North Georgia Mountains to Mobile Bay on the Gulf of Mexico. Major tributaries of the Coosa River in Georgia include the Etowah, Oostanaula, Coosawattee and Conasauga Rivers. Major tributaries of the Coosa in Alabama include the Chattooga and Little Rivers. Major tributaries of the Alabama River, besides the Coosa, include the Tallapoosa and Cahaba Rivers. The Alabama River joins the Tombigbee River to form the Mobile River which flows into Mobile Bay on the Gulf of Mexico.
- To prevent this kind of water pollution:
1. Never flush drugs down the toilet
  2. Dispose of drugs at approved locations. Hospitals sponsor drug drop off days regularly.
- **Meeting Water Needs** - As Georgia and Alabama's population grows, communities will need more water. Metro Atlanta (the City of Atlanta and the area around it) has a population of 5 million people now, but by 2050 that population is expected to grow to 9 million. The area uses about 500 million gallons per day right now, but by 2050, the area may need up to 1.2 billion gallons per day. Water planners are trying to find ways to meet these water needs. Here are some of the ideas and the pros and cons of each:
    - a. Build new reservoirs
      - Pros: Reservoirs can store large amounts of water. Can regulate flows downstream during droughts
      - Cons: Very expensive to build, destroy habitat for endangered species and other aquatic animals, can reduce flows to downstream communities, must take people's property to build dam and reservoir.
    - b. Drill new wells to pump water from the ground
      - Pros: Ground water is cleaner and less expensive to treat for drinking than water taken from rivers.

Cons: North Georgia has very little groundwater so not much water can be pumped.

c. Enact water conservation rules and projects

Pros: Water conservation measures are the least expensive way to make new water, can be completed without damaging rivers and streams, help consumers save money on water and energy bills in home, not as controversial as building new reservoirs

Cons: Difficult to get citizens to voluntarily participate in water conservation programs.

**Types of Water Conservation Programs:**

1. Replacing old toilets with “low-flow” or high efficiency toilets and urinals.
2. Replacing old dishwashers and clothes washing machines with new water saving models.
3. Pricing water so that the more water a home or business owner uses, the more they pay per gallon.
4. Rain and moisture sensors on landscape irrigation systems so that the irrigation system does not turn on if the lawn and flower beds are moist from rain.



*Students at Armuchee Elementary construct water barrels from donated soft drink barrels.*

- 
5. Education programs that teach children and adults ways to save water
  6. Rain catchment systems like rain barrels or cisterns that collect rain water in containers for use in homes or on lawns and gardens
  7. Fixing leaking pipes in city water lines and in homes and businesses. (Many cities in the Coosa River Basin lose more than 20 percent of the water they pump from our rivers before it ever reaches a home or business).

d. Interbasin Transfers from other rivers nearby like the Tennessee River

Pros: Tennessee River is largest water source in this portion of the Southeast

Cons: Neighboring states of Tennessee and Alabama depend on water from the Tennessee and will object to Georgians taking large amounts of water from the river. Building pipeline and pumps to carry water long distances (Tennessee to Atlanta) is very expensive (more than \$2 billion) and requires large amounts of energy (electricity or fuel) to pump the water. Too much water removed from a river can cause health problems for the river and the animals that depend on it. In some areas of the country where large amounts of water have been “transferred” the rivers begin to run dry.

e. Desalination of Ocean Water

Pros: Abundant water source

Cons: The process of removing salt from the water requires large amounts of energy (electricity or fuel). It is five times more expensive to treat saltwater for drinking compared with freshwater. The byproducts of salt removal can increase salinity of nearby water and threaten wildlife.

- **Mercury in Our Fish** - Mercury is a natural element that can be dangerous to humans and animals if taken into the body. Mercury in humans can cause damage to the brain and nervous system. Most of the mercury that gets into our fish arrives in our rivers when mercury in the air falls to the earth and into our rivers. The mercury then works its way into the river’s food chain. When we eat fish contaminated with mercury, the pollutant builds up in our bodies. Mercury in the air comes mostly from burning coal at power plants to generate electricity. In the Coosa River Basin, we have two large coal-fired power plants that emit mercury. Some fish caught in streams and rivers in the Coosa River Basin have been found to have high levels of mercury.

Ways to reduce mercury levels in fish include:

1. Require coal-fired power plants to remove more mercury from their smokestack emissions.
2. Invest in cleaner energy like wind and solar power
3. Reduce energy use in homes and businesses through conservation practices
4. Stop new coal-fired power plants from being built



- **Popeye** - The popular comic character Popeye has his origins on the Coosa River. Tom Sims, the creator of Popeye, was the son of a boat captain who operated ships on the Coosa River for the U.S. Army Corps of Engineers including one called the “Leota”. The stories of Popeye are drawn from Sims’ childhood on the Coosa. Sims said, “Fantastic as Popeye is, the whole story is based on facts. As a boy I was raised on the Coosa River. When I began writing the script for Popeye I put my characters back on the old ‘Leota’ that I



knew as a boy, transformed it into a ship and made the Coosa River a salty sea.

- **Water Wars** - In 1990; Georgia and Alabama began disputing who had the right to use water in the Coosa River and its tributaries. Georgia wants to take more water from the rivers to meet water needs in Metro Atlanta, but Alabama wants the water to flow downstream to meet its needs. People in both Alabama and Georgia recognize that to have economic growth and prosperity,

water is needed. Water is used in many industrial and manufacturing processes to make products we use; it is used to produce electricity at coal-fired power plants and dams; and it is needed for use in homes.

- **Weiss Lake Pollution** - Weiss Lake in Alabama collects all the water that drains out of North Georgia in the Coosa River Basin. It also collects all the pollution. One pollution problem in Weiss Lake is algae blooms. Algae are plant-like organisms that grow in water when levels of nutrients (phosphorus and nitrogen) become elevated. When algae blooms die, the decaying matter can cause oxygen levels in the water to go down and cause fish to die. The problem is too much nutrient material is washing into Weiss Lake. To stop this pollution problem, Georgia and Alabama are trying to find ways to reduce the amount of phosphorus entering our rivers and streams.

Here are some ways to reduce phosphorus in rivers:

1. Make sewage treatment plants remove more phosphorus before pumping water back into our rivers
2. Have farmers reduce the amount of fertilizer they place on their fields
3. Have chicken farmers better manage disposal of chicken litter (manure) taken from chicken houses

(example: trucking it to other areas of the state where more fertilizer (manure) is needed to grow crops)

4. Ban the use of washing detergents for dishes and clothers that contain phosphorus
5. Ban use of fertilizer containing phosphorus on home landsapes
6. Collect stormwater that washes off of city streets, industrial facilities and other areas and treat it to remove phosphorus.
7. Reduce stormwater run off by “building green” (design buildings, streets and landscapes to collect rainwater and allow the water to soak into the ground rather than wash off to storm drains and to our streams.

- **Biggest water users in the Coosa Basin:**

Cobb-Marietta Water Authority 50 million gallons per day (MGD) which withdraws from Lake Allatoona (Etowah River) This is the largest water user in the Coosa Basin. Cobb-Marietta Water Authority supplies water users Cobb outside of the Coosa River Basin in Metro Atlanta. Each day about 23 million gallons of water is taken from the Coosa and transferred to the Chattahoochee River Basin.

City of Dalton, 54 MGD, which withdraws from the Conasauga River and other tributaries

Georgia Power’s Plant Bowen, 40 MGD, which withdraws from the Etowah

Temple-Inland Paperboard and Packaging Plant, 30 MGD, which withdraws from the Coosa River

City of Calhoun, 28 MGD, which withdraws from the Oostanaula and Coosawattee Rivers

City of Cartersville, 18 MGD, which withdraws from Lake Allatoona (Etowah River)

City of Rome, 16 MGD, which withdraws from the Oostanaula & Etowah Rivers.

- **Water facts:**

Amount of water on earth that is freshwater: 3 %

Amount of fresh water on earth in rivers, lakes and streams as surface water: less than 1 %

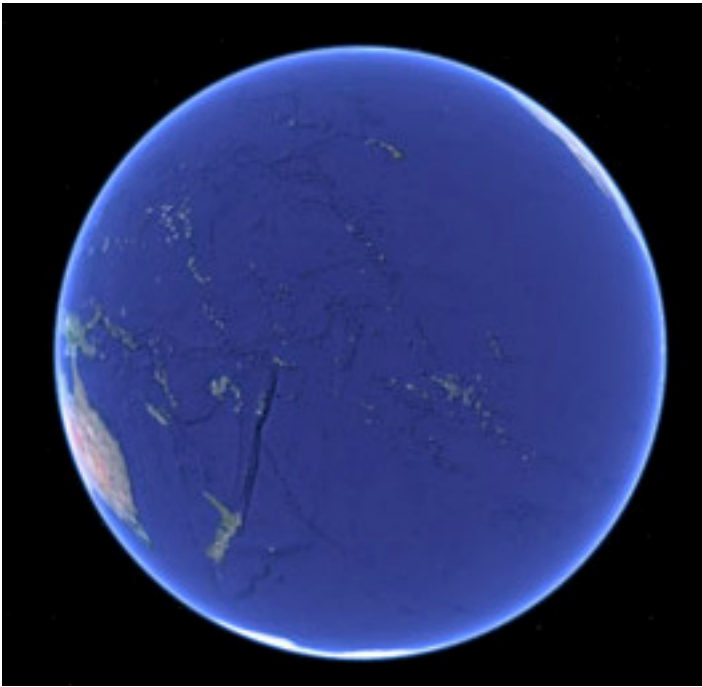
Amount of water on earth that is frozen freshwater at the polar ice caps: 2%

Amount of water on earth that is saltwater: 97%

How much water is the human body? 60-70%

How much of the brain is made up of water? 75%

How much water does it take a cow to produce 1 eight ounce glass of milk? 49 gallons



*Seen from space the Earth is mostly blue ocean. The photo above is centered on the Pacific Ocean.*

State Amphibian - AL: Red Hills Salamander (endangered), GA: Green Tree Frog (Armuchee Elementary School students played a part in introducing legislation in 2005 to name the green tree frog the state amphibian).



• **Geographic Provinces of the Upper Coosa Basin**

**Blue Ridge** - The Blue Ridge geographic province is located in North Central and Northeast Georgia and includes the headwaters of the Etowah and Coosawattee Rivers. The terrain is rugged mountains and ridges ranging from 3000 to 4700 feet in elevation.

**Ridge & Valley** - This geographic province runs from the Tennessee-Georgia border southwest into Alabama generally following the course of the Coosa River to Birmingham, Alabama. The ridge and valley is typically broad and open with scattered ridges and hills. Elevations throughout the area range from 700-800 feet above sea level.

**Piedmont** - The Etowah River flows through the Piedmont geologic region in Dawson, Forsyth and Cherokee counties. The rolling hills and ridges of the Piedmont range in elevation from 1200-2400 feet.

**Appalachian/Cumberland Plateau** - The Appalachian/Cumberland Plateaus in Georgia and Alabama are characterized by long, flat-top mountains like Lookout and Pigeon Mountains. Lookout Mountain runs from the Tennessee River near Chattanooga southwest toward Weiss Lake in Alabama. The Little River has its origins atop Lookout Mountain and flows along the length of the mountain before descending to the Coosa Valley and emptying into the Coosa. These long mountain ridges reach elevations of up to 2200 feet. Steep cliffs, or escarpments, are common along the sides Lookout and Sand mountains.

How much water does a person need to survive each day? Less than one gallon  
 How much water does the average person in the United States use each day? More than 100 gallons

How much water do you use in an average 5-minute shower? About 20 gallons

How much does a gallon of water weigh? 8.5 pounds

How much water does the City of Rome pump from the Oostanaula each day? About 16 million gallons

How much water is transferred out of the Coosa Basin each day to meet the needs of water users in the Chattahoochee Basin in Atlanta? 23 million gallons

On average, how much water flows past Rome each day in the Coosa River? 4.5 billion gallons per day. During peak flows more than 9 billion gallons of water can flow past Rome in one day.

• **State Symbols Alabama & Georgia**

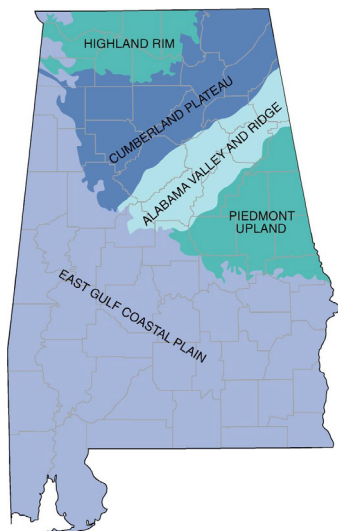
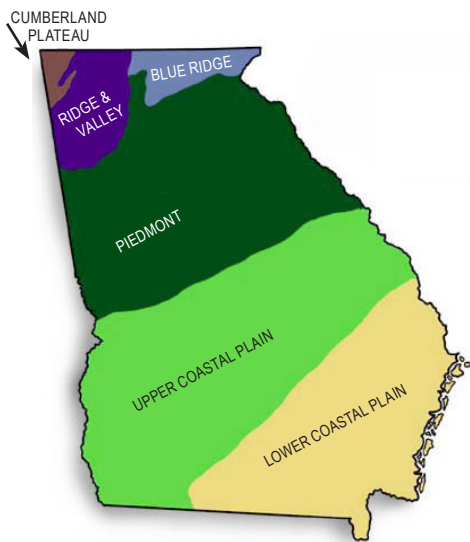
State Bird - AL: Northern Flicker “Yellowhammer”, GA: Brown Thrasher

State Fish - AL: Large-mouth Bass. GA: Large-mouth Bass (also state fish of Florida and Mississippi)

State Wildflower - AL: Oak-leaf hydrangea  
 GA: Azalea

State Reptile - AL: Alabama Red-Bellied Turtle (endangered), GA: Gopher tortoise (endangered)





## State Standards

**Participation in the CRBI Environmental Quiz Bowl helps to reinforce many of the State Standards, especially in science and social studies.**

### Science:

- computation (mental and paper) S4CS2
- ideas of system, model, change, scale S4CS4
- communicate scientific ideas S4CS5, S4CS8.b
- water cycle S4E3
- skepticism in science S4CS1
- measurement S4CS2.c
- some very old knowledge is still applicable S4CS7.b
- science involves different kinds of work S4CS8.d
- ecosystems S4L1.a, S4L1.b
- changes in the environment S4L1.c

- survival and extinction S4L2
- adaptations S4L2.a

### Social Studies:

- US landforms & manmade features SS4G1
- conflict and compromise SS4H2
- how pre-Columbian Americans used and adapted to their environment SS4H1.b
- European exploration of the southeast SS4H2.b
- citizenship SS4CG1.c
- how physical systems affect human systems SS4G2
- freedom of expression SS4CG2
- functions of government SS4CG3
- civic involvement SS4CG4
- impact of steamboat & locomotive SS4H6.b

### SPECIAL NOTE

*Additional and/or updated information may be sent to coaches at any time. In addition to these facts, students will be asked to work math problems associated with water resources.*

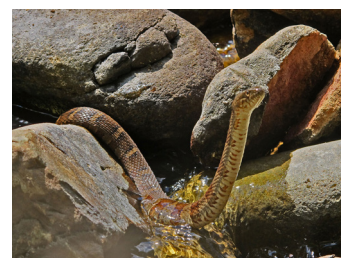
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#### Front Cover:

*Northern Watersnake (Nerodia sipedon) in the Conasauga River. Photo by Amos Tuck, former Coosa Riverkeeper*



# The Upper Coosa River Basin

