

# The Big Picture

Looking at the

# CHOCTAWHATCHEE

River and Bay

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Northwest Florida  
Water Management  
District



Morrison Spring

# About the Choctawhatchee Watershed

The Choctawhatchee River and Bay watershed covers a vast 5,350 square miles in two states. Forty-two percent is within Florida and the remainder drains southeastern Alabama. A **watershed** is an area that drains to a common point, in this case, the Choctawhatchee Bay. East Pass, near Destin, is the only direct link to the Gulf of Mexico, although the bay also joins with Santa Rosa Sound to the west and the Intracoastal Waterway to the east. According to legend, the bay once attracted pirates who repaired their boats along its shoreline and married Choctaw maidens.



The Choctawhatchee River is an **alluvial river**, characterized by a broad floodplain, seasonal flooding and a heavy sediment load. It is the fourth longest river in Florida and the third largest in annual average discharge. The Pea and Little Choctawhatchee rivers are its main tributaries in Alabama. Major tributaries within Florida include Holmes, Wrights, Sandy, Pine Log, Seven Runs and Bruce creeks. The river and its tributaries also receive substantial ground water from springs of the Floridan Aquifer. An **aquifer** is a formation of sediment or rock capable of holding and releasing water.

Choctawhatchee Bay is 27 miles long and covers 129 square miles. The bay is an **estuary**, characterized by the interaction, mixing and circulation of fresh and salt water. Its deepest point, north of Destin, is 43 feet. Its major source of fresh water is the Choctawhatchee River. Other direct tributaries are Turkey, Rocky, Swift and Alaqua creeks.

# Snails of a Karst Stream

Holmes Creek provides among the most diverse habitats and richest variety of fish and mollusks in the Choctawhatchee River basin. Its lower reach swells with azure springs, increasing average flow in the creek and providing distinctive stream havens for fish, reptiles and mollusks.

Holmes Creek is richer in freshwater snail species than any other river in the Florida Panhandle. Three as yet unnamed species of snails were found to be **endemic**, or confined, to the Holmes Creek, Choctawhatchee and Chipola river drainages.



Florida apple snail  
(*Pomacea paludosa*)



Morrison Spring

John Crowe

About a mile below the Highway 267A bridge is Burn-Out Spring, the first significant spring source of the creek. From here down are dozens of springs, seeps and sand boils worth exploring. The largest, Cypress Spring, is a second-magnitude spring (10-100 cubic feet per second). Other large springs within the Choctawhatchee River basin include Beckton Spring (Holmes Creek), Morrison Spring (Choctawhatchee River) and Ponce de Leon Springs (Sandy Creek).



Ponce de Leon Springs

John Crowe



Ponce de Leon Springs Run

John Crowe

Florida claims 600 freshwater karst springs, one of the largest concentrations on earth. **Karst springs** are created when slightly acidic rainwater dissolves through limestone, increasing openings in the block-like formations. Many of the springs cut through limestone of the Floridan Aquifer and are a transition between ground waters and surface waters. Protecting springs and their contributing regions is a priority for water managers statewide. For more on Florida's springs, see [www.tfn.net/Springs/Springbook](http://www.tfn.net/Springs/Springbook), or the DEP website at [www.dep.state.fl.us/springs/index.htm](http://www.dep.state.fl.us/springs/index.htm).

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# Protected Waters

The Choctawhatchee River and upper Rocky Bayou are designated **Outstanding Florida Waters** and are protected by state statute. Waters in state parks and conservation areas are also afforded this level of protection. Upper Rocky Bayou was also named a Florida **Aquatic Preserve** to protect and recognize its exceptional biology, beauty and scientific value.



Paul Thorpe

*Saltmarsh vegetation planted in 2000 as part of a District project at Eldredge Park, Okaloosa County, filters stormwater, stabilizes the shoreline and provides habitat for aquatic species.*

The endangered Okaloosa darter is found in several of the bay tributary streams. So are the Gulf sturgeon and several rare snails, reptiles and amphibians. Habitats range from seagrass beds, tidal marshes, sand bottoms and oyster beds to freshwater springs, spring runs, streams, lakes and wetlands. Other important habitats are steephead streams, coastal scrub communities and pine flatwood forests.



*Okaloosa darter (5.3 cm)*



*Gulf sturgeon (8 feet)*

# Watershed Issues

The combined population of Okaloosa, Walton, Holmes and Washington counties grew 23 percent in 10 years, the 2000 Census found. Most of this growth is concentrated in the coastal areas. During development careful planning is required to prevent habitat fragmentation and degradation from non-point source pollution.

**Nonpoint source pollution** occurs when stormwater scours roads, parking lots, roofs and some agricultural and forestry lands. It sends sediment, fertilizer, bacteria, pesticides, heavy metals, oils and greases into streams, lakes and coastal waters. Urban bayous exhibit degraded water and sediment quality and certain streams may fill up with sediment, suffocating water bottom communities. After storms, high levels of bacteria often collect in water bodies near septic systems or areas of intense development.

A number of **point sources**, which are discharges from domestic or industrial wastewater treatment plants, also release treated wastewater at several sites in the watershed.

In 1999 and 2000, Choctawhatchee Bay experienced a persistent **red tide**, a plankton bloom that can discolor the water and release toxins that kill aquatic life and irritate human breathing. Many fish and approximately 49 dolphins were killed in the bay and nearby gulf waters. Studies continue as to why red tide was so intense and persistent in the bay during that time. A decline in general water quality may be a factor.

Another regional water resource issue is that coastal drinking water sources will be insufficient to meet growth needs in coastal Okaloosa, Santa Rosa and Walton counties. When ground water is over-pumped for many years, salt water can intrude and make the aquifer unusable for human consumption. The Northwest Florida Water Management District is developing computer models that will help predict the potential for salt water intrusion and evaluate sustainable withdrawal rates from wells in the region. The District is also working with local governments and utilities to identify alternative sources of fresh water while sustaining our streams, estuaries and aquifers. Among the alternatives are the inland Sand and Gravel Aquifer and inland well fields of the Floridan Aquifer. A regional water supply plan, approved in 2001 to help identify and evaluate alternative sources, is available online at [www.state.fl.us/nwfwmd/pubs/r2wsp/rwsp.htm](http://www.state.fl.us/nwfwmd/pubs/r2wsp/rwsp.htm).



Destin stormwater discharge.

John Crowe



Destin bridge, East Pass.

John Crowe

There have been 13 major floods of the Choctawhatchee River over the last century. Floods are important to the ecosystem because they maintain wetlands, store water in the floodplain for gradual release and carry detritus, other nutrients and energy towards the bay and gulf. Floods, however, can damage communities built in the floodplain. For example, much of Caryville was relocated after two major floods in the 1990s.



*Caryville during a 1990s flood.*

Fortunately most of the Choctawhatchee River floodplain has been acquired by the Northwest Florida Water Management District. This public ownership provides opportunities for recreation and other uses, while protecting floodplain functions and natural habitats. It also reduces the economic impacts of flooding.



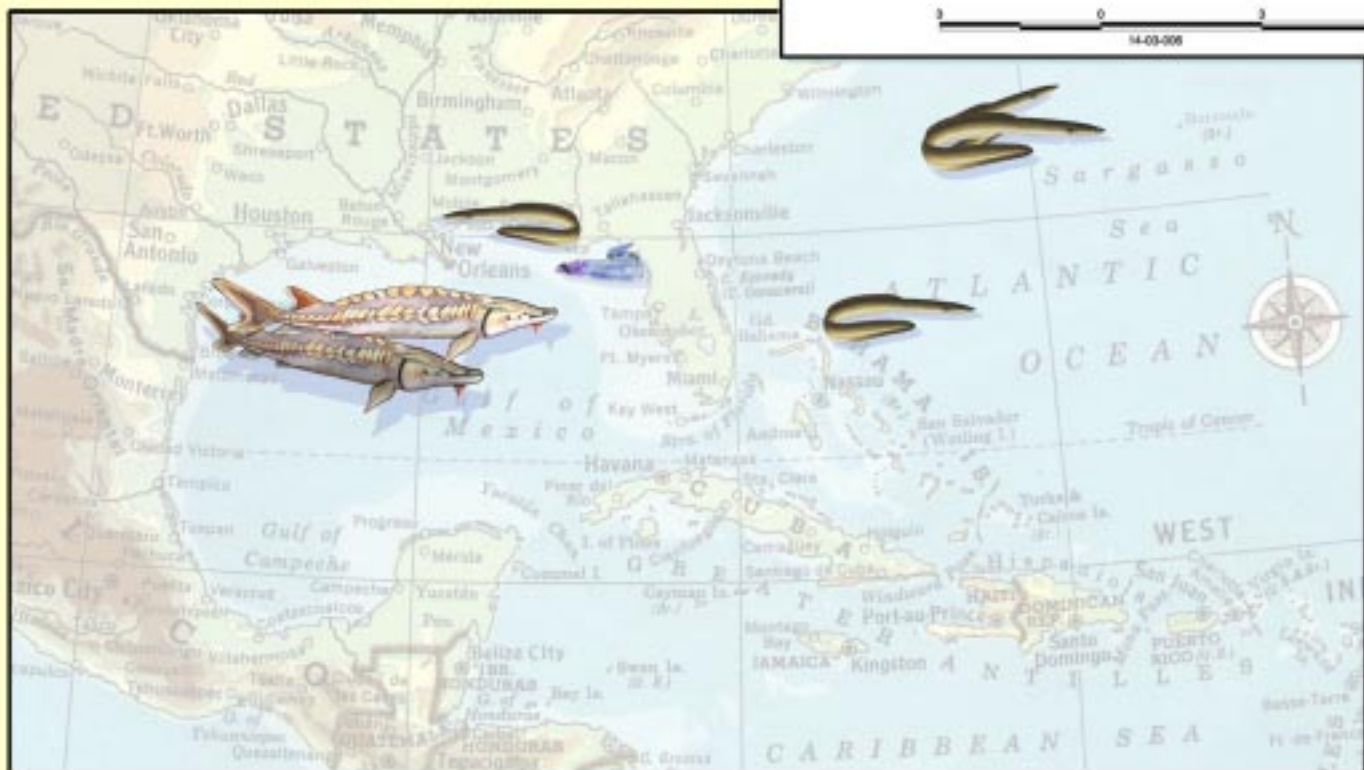
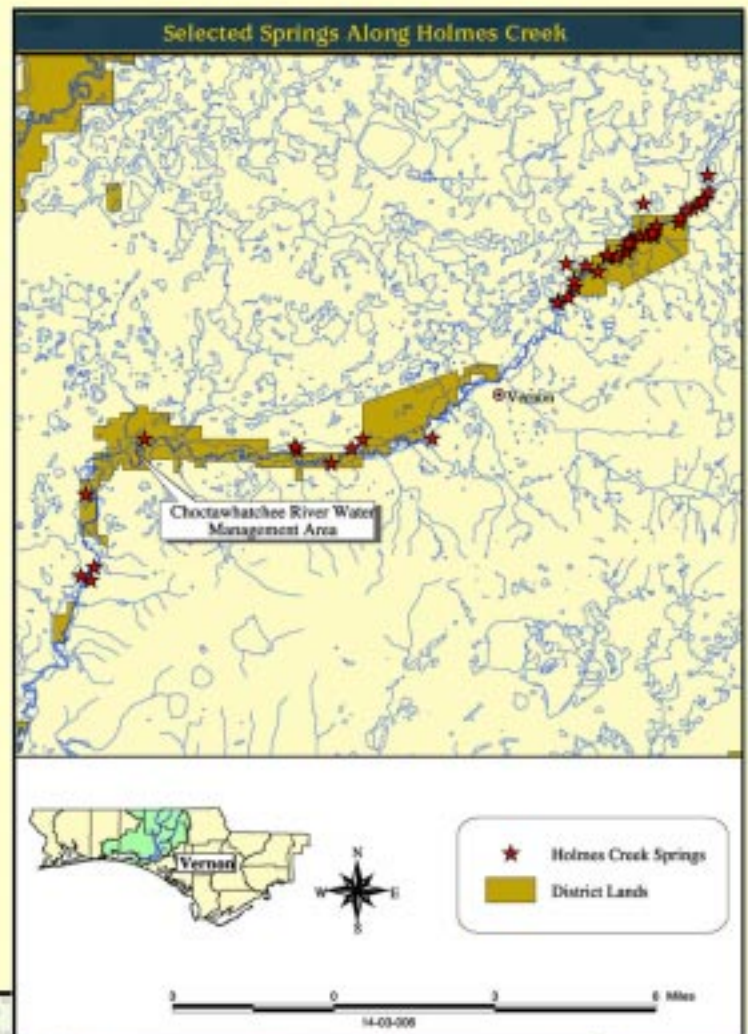
*East Pass, Destin.*

# Choctawhatchee's Role in the Larger Ecosystem

The Gulf sturgeon and American eel are among the most intriguing visitors to the Choctawhatchee basin. Eels, or *Anguilla rostrata*, are reported to be the only **catadromous** North American fish. That is, they migrate from fresh to salt water to spawn. By contrast, Gulf sturgeon, *Acipenser oxyrinchus desotoi*, are **anadromous**, marine fish that travel to fresh water to spawn.

Among eels, it is predominately females that migrate, during the "glass eel" stage, into upper stream reaches. After a decade or more, they return with the estuarine males to the Sargasso Sea, south-west of Bermuda, to spawn. Both the American and European (*A. anguilla*) eels are thought to begin and end their lives there, in the "United Nations of Eels."

Gulf sturgeon are found in coastal rivers along the Gulf of Mexico, but populations have been reduced by fishing and habitat loss, often due to dams and channel dredging. They are now a federally protected species. In spring, sturgeon migrate from estuarine waters to the Choctawhatchee and Pea rivers to spawn. A major summer congregation area is just below the confluence of Holmes Creek with the Choctawhatchee River in Florida.



# Planning for Storms and Growth

Local governments play some of the most important roles in protecting the watershed. Several, such as Okaloosa and Walton counties and the cities of Niceville and Destin, have developed stormwater master plans. All local governments guide land use development through comprehensive planning programs. Public and private utilities are working to reduce reliance on septic systems in priority areas near the bay and to improve efficiency in water use and reuse of treated wastewater.

Since 1996, the Northwest Florida Water Management District has had a Surface Water Improvement and Management (SWIM) program for the Choctawhatchee River and Bay system.

Through it, the District works with local governments to design and implement stormwater treatment, promote awareness of watershed resources and values, conduct habitat restoration and work with partners in the watershed to better understand and protect the river and bay system.

The Choctawhatchee Basin Alliance (CBA) has promoted ecosystem management, public awareness, stormwater improvements and habitat restoration. A number of activities have been supported by, and coordinated with, the District. Through volunteer efforts and state funding assistance, the CBA continues to participate in water quality monitoring activities throughout the bay and several coastal dune lakes. It conducts water quality analysis, performs public outreach and makes recommendations for protecting and improving the bay's water quality.

The Northwest Florida Water Management District has acquired over 57,000 acres in the river and bay

watershed to help protect watershed functions and habitats and maintain public access and use. As mitigation for wetland impacts due to state road development, the District has acquired and is restoring important wetland systems on Live Oak Point and in Devils Swamp.

Additionally, the State of Florida protects and provides public access to outstanding natural habitats in a number of state parks and forests within the watershed.



John Crowe

Clearwater Park Stormwater Facility was designed by District Engineers.

Public lands, including the Eglin AFB reservation, protect a quarter-million acres within the watershed. Pristine beaches and salt spray and wind pruning are features of Grayton Beach, Henderson Beach and Topsail Hill Preserve state parks, all popular camping beaches. Along the bay are Fred Gannon Rocky Bayou State Park and Eden Gardens State Park, with its century-old Wesley house and gardens. Visitors to Falling Water State Park can gaze down a 67-foot waterfall into a smooth-walled “chimney” sink. Ponce de Leon Springs State Park attracts swimmers, as it vents 14 million gallons a day at a constant 68 degrees.



Roomie Hudson

Falling Waters State Park.



Joe Foltman

Ponce de Leon Springs State Park.

Private citizens can help protect water resources through personal practices conducted in our everyday lives. One of the most important steps is to learn about our water bodies. This adds to the enjoyment of living and playing on the water. Learning about our bays, streams, lakes and wetlands and the plants and animals that make them home can provide many personal insights into their value. It can teach us how to preserve them for future generations.

State forests include Point Washington and Pine Log. The Greenway Trail network expects to connect Grayton Beach, Deer Lake and Topsail Hill with neighborhoods and schools along more than 27 miles of coastal trail, with branches to Holmes Creek and Pine Log State Forest.



Faith Eide

Grayton Beach State Park.

With other agencies, the District has developed a handbook for restoring private shoreline habitats, *Shoreline Protection and Restoration, A Northwest Florida Homeowner's Guide*. The DEP also has developed a *Waterfront Property Owners Guide*, available from DEP and the District, to guide best management practices for all citizens. DEP and the District also teamed with Florida Fish and Wildlife Conservation Commission and Sport Fish Restoration on a *Boater's Guide to Choctawhatchee Bay*, available online at [www.floridamarine.org](http://www.floridamarine.org). For more information, the District's SWIM plan and other publications may be downloaded from [www.state.fl.us/nwfwmd/pubs/publist.htm](http://www.state.fl.us/nwfwmd/pubs/publist.htm). The CBA also has extensive information available at [www.basinalliance.org/](http://www.basinalliance.org/).

