The Nature Conservancy
Protecting nature. Preserving life.™
nature.org

Savannah River

Southeastern United States

The Nature Conservancy's work on the Savannah River, the border between Georgia and South Carolina in the southeastern United States, has evolved into a model for sustainable dam operations and management worldwide. As a key site in the Sustainable Rivers Project, a national partnership between the Conservancy and the U.S. Army Corps of Engineers, the Savannah exemplifies the application of innovative science to protect the ecological health of the river, while addressing the growing needs of people, such as drinking water, power generation and flood control.

A River System Imperiled

Originating in the Blue Ridge Mountains of north Georgia where the Seneca and Tugaloo rivers converge, the Savannah River used to flow freely for more than 483 kilometres to the Atlantic Ocean. A biologically rich system, the Savannah and its natural communities – shoals, floodplain forests and estuaries – help support coastal Georgia's $22.4US million commercial fishing industry. More than 75 species of rare plants and animals, including 18 species of fishes listed as species of concern, are found in the river. Of particular note are the robust redhorse, which was previously believed to be extinct, recreational fish such as American Shad and striped bass, and the endangered shortnose sturgeon.

However, the health of the river, its floodplain and estuary are in jeopardy. In 1937 the construction of the New Savannah Bluff Lock and Dam was completed for barge navigation from Savannah to Augusta, Georgia. Then, between 1954 and 1986, three large dam and reservoir systems – the J. Strom Thurmond, Hartwell, and the Richard B. Russell projects – were built further up the river removing critical shoals habitat and obstructing the free flow of water. The changes caused by dams are unraveling the ecosystem, and threaten to do the same to those who depend on it for their livelihood.

By altering the natural, seasonal flows of the Savannah, the three large dams cause an imbalance of fresh and salt water in the estuary, inhibiting the development of blue crabs, finfish, oysters and shrimp – the mainstays of the commercial fishing industry. The altered water flow also disrupts the growth and maturation of the floodplain forests, degrades the water quality of the river, and undermines the survival of fish, mammals, and birds which depend on the river and its forest. Sturgeon and other native migratory fish populations have suffered a drastic decline in the Savannah River due to the dams, which have removed 96 percent of their spawning habitat and now obstruct passage upstream to their remaining spawning grounds.

A Partnership for People and Nature

Realizing the need to manage the Savannah River for the maximum benefit of both people and nature, The Nature Conservancy and the U.S. Army Corps of Engineers are pioneering innovative water management practices and research to answer the crucial question: "How much water does a river need?" The process began in April 2003, when the two groups convened a workshop with more than 50 leading scientists from the Georgia and South Carolina state governments, federal agencies, academic institutions and other

Top photo: Savannah River (© Mark Godfrey/TNC)

non-governmental organizations. Using historical data, the team defined the seasonal water flows needed to support the freshwater, floodplain and estuary. Based on this information, they devised a flow prescription – a plan for executing a series of seasonal controlled releases designed to rejuvenate more than 320 kilometers of river, 28,000 hectares of bottomland hardwood forests and 8,000 hectares of estuary. Through this process, the Conservancy and its partners have gained valuable insight into the water flow patterns necessary to support native wildlife, while still providing valuable services to people such as water supply, flood control and power generation.

Using Science to Save a River

In March 2004, the flow prescription was put to the test with the release of the first controlled flood. For five days, the Army Corps of Engineers released 450 cubic meters per second (cms) of water from the Thurmond Dam, a sizable increase from the existing daily release of 130 cms. The timing and the duration of the water releases are designed to more closely mimic natural seasonal flows that existed prior to the dams. Several controlled floods have since been orchestrated including one in March 2006, at which time engineers increased the flow to at least 650 cms during a five day period.

Scientists are continuing to measure the ecological responses to the controlled floods, including monitoring benefits to floodplain forest regeneration, assessing floodplain invertebrates and fish, and measuring the impacts on salinity in the estuary. Scientists are also tracking the breeding migration patterns of shortnose sturgeon.

By tracking sturgeon with ultrasonic tags, scientists can follow the fish during their spawning run to see if the flood can help move them upriver into adequate spawning habitat. In a pilot study in March 2005, four sturgeon were tagged in the Savannah River but none of these fish moved past the lock and dam, One of the sturgeon was discovered to have swam back out to sea and then north to the Santee-Cooper river system in South Carolina, a total distance of more than 450 kilometers. This information suggests that the Savannah River sturgeon may be a source of genetic diversity for other river systems.

Project scientists have concluded that controlled water releases alone will not provide enough flow to allow sturgeon to bypass the dam to their historic spawning ground. Alternative solutions, such as enhancing spawning habitat downstream of the dam, are being considered. Scientists continue to tag fish to further gauge the migration patterns of the species in relation to flow patterns. The data compiled from the tagged fish is proving essential to helping the Conservancy and its partners study alternate solutions to ensure this ancient fish can thrive in the Savannah.

Research Has Worldwide Applications

Experts are applying lessons learned from the Savannah to river systems around the world that are impaired by dams, including China's Yangtze River where dams are currently under construction to provide hydropower generation and flood control. In fact, in May 2005, a delegation of 20 Chinese officials visited sites along the Savannah River, including the estuary, the floodplain and the New Savannah Bluff Lock and Dam, to learn about ecologically sustainable dam management and how the Conservancy works in conjunction with the Army Corps of Engineers. The trip was a fact-gathering mission for them, so they can see sustainable water management practices in action and then use that information to help manage rivers in China.

Looking to the Future

Water managers and scientists are far from fully restoring the Savannah River system. Much work lies ahead to re-establish more natural patterns of river flows and monitor the responses to inform future management.

The Nature Conservancy is relying on the generous support of donors to further fund this important research, which will not only help to restore the Savannah River but will also influence the sustainable management of river systems throughout the world.

The Nature Conservancy

2424 Spruce Street, Suite 100

Boulder, Colorado 80302

Phone: (303) 541-0344

E-mail: sustainablewaters@tnc.org

nature.org/freshwaters