

# LOWER SAVANNAH RIVER ENVIRONMENTAL RESTORATION STUDY

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**REFERENCE:** *Proceedings of the 1993 Georgia Water Resources Conference*, held April 20 and 21, 1993, at The University of Georgia, Kathryn J. Hatcher, Editor, Institute of Natural Resources, The University of Georgia, Athens, Georgia.

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**Abstract.** Congress has authorized several projects along the Lower Savannah River, including the existing navigation project which was authorized by the Rivers and Harbors Act of March 3, 1881. The Reconnaissance Report for the Lower Savannah River Basin Environmental Restoration Study reviewed the problems and opportunities of environmental restoration in the Lower Savannah River basin due to impacts from the Savannah River Basin below Augusta inland navigation project. This paper discusses the study's process and its conclusions.

## STUDY BACKGROUND

The Savannah River forms the boundary between the states of Georgia and South Carolina. This study is concentrating on the Lower Savannah River, which includes the Savannah River and surrounding wetlands from near Augusta, Georgia, to the upper end of the Savannah Harbor. The authorized navigation project for the Savannah River between Augusta and Savannah provides for a navigation channel 9 feet deep and 90 feet wide from the upper end of Savannah Harbor to the head of navigation at Augusta just above the 13th Street bridge, a distance of 181 miles. This navigation project is known as the Savannah River Below Augusta project.

The Lower Savannah River Basin provides a home for at least 9 threatened and endangered species. Equally important, there are at least 10 candidate species in this area currently being reviewed for possible addition to the Endangered and Threatened Species List under the Endangered Species Act of 1973, as amended. Restoration of fish and wildlife habitat by improving flow through the wetlands improves water quality and fish and wildlife habitat. This restoration may prevent some of the candidate species from becoming threatened or even endangered.

**Study Purpose and Scope.** The study purpose is to determine if modifications should be made to the cutoffs and other structures constructed as part of the Savannah River Below Augusta (SRBA) Project in order to environmentally restore the Lower Savannah River and surround

ing wetlands and enhance fish and wildlife habitat and water quality.

The reconnaissance phase included (1) formulating and evaluating alternatives to determine if restoration measures could be accomplished by increasing flow throughout some of the cutoff bends and oxbows; (2) evaluating various related problems and defining potential solutions; (3) determining if there is a Federal interest in the implementation of solutions; and, (4) determining whether the planning should proceed into the next planning phase (feasibility phase).

## SITE SELECTION

Along the Lower Savannah River, there are 40 cutoff bends and oxbows. Because limitations of this type of study, resources were not available to study each of these areas in detail. Therefore, we developed a weighted priority process to identify the most important areas for further study.

To implement this process, the Corps of Engineers, United States Fish and Wildlife Service, Georgia Department of Natural Resources, and South Carolina Wildlife and Marine Resources Department were assembled as a combined agency team to screen these sites. This team included biologists, a hydraulic engineer and study manager. The team conducted several boat trips down the Lower Savannah River at different times of the year. During those boat trips, each cutoff bend/oxbow was examined for its environmental importance, and the team determined how much, if any, restoration work needed to be done on that particular area. Many areas were functioning well, therefore, no restoration work would be required. Several needed some restoration work, but ranked low on the priority list for various reasons.

All of the sites being investigated were weighted for their importance. Each agency determined which cutoff bends/oxbows would benefit most from restoration of some kind. Each site was ranked in a proposed action matrix. The highest ranked sites were selected for analysis. From this process twelve sites emerged as the best for more detailed analysis. This selected group was collectively believed to represent the best overall chance of success in

terms of purpose, importance and implementation. However, in recommending sites for analysis for the feasibility study, the original 12 sites were further reduced to two due to cost-sharing considerations. These two sites are: Hickory Bend (Cut #3), and Flat Ditch Point (Cut #4). These are located at river mile 40.9 and 41.3, respectively.

The Savannah National Wildlife Refuge, which is in the lower portion of the study area, includes over 26,000 acres of hardwood swamp, fresh water marsh, impoundments, and estuarine marsh. All of this area benefits by improving flow through cutoff bends #3 and #4 because this water ultimately filters down into the refuge and provides important habitat for wintering waterfowl, wading birds, and endangered species. Development and recent weather patterns have impacted the refuge through reduced runoff and lower water levels. If such conditions occur during critical nesting or spawning times, some species may be severely impacted.

## PROBLEM IDENTIFICATION

**Objectives.** In response to the Congressional resolution authorizing the reconnaissance study, the objectives of this study focused on restoring the environment of the Lower Savannah River and the surrounding wetlands, and on improving fish and wildlife habitat.

The following objectives were developed for this study: (1) restoration of spawning habitat for important fisheries, (2) restore flow to freshwater wetlands, and (3) restore overall environmental quality of the Lower Savannah River, while maintaining navigability.

**Problems and Opportunities.** Related water resources related problems were identified, and several visits were made to the study area to survey the navigation project and discuss any problems and concerns that the resource agencies may have. As a result of these efforts, the following specific problems and opportunities were identified: 1) Habitat Degradation, 2) Water Quality, 3) Flow Regime, and 4) Access.

## FORMULATION OF ALTERNATIVES

### Types of Improvement Alternatives

After identifying the 12 cutoff bends for detailed investigations, proposed actions were suggested by the combined agency team for each cutoff bend. Hydraulic feasibility of each proposed measure was also addressed by the COE. The possible alternatives considered for each site were: (1) full restoration of cutoff bend and cut closure, (2) construction of wing walls, (3) open upper end of cut and stabilize, improve access, dredging lower en-

trances, and survey and monitoring. As stated previously, the 12 were redefined down to two cutoff bends and complete closure and full restoration of these two sites were recommended by the agency team.

### Alternatives To Improve Water Quality and Habitat

**Full Restoration Cut Closure.** Full restoration of all navigational cuts was not considered for several reasons: (1) the impact restoration would have on navigation; (2) the cost associated with full restoration is high; and (3) full restoration may actually result in a loss of habitat. Many of the oxbows provide significant benthic habitat for fish species. Full restoration would, in some cases, result in a negative impact to these resources by creating additional main-stream habitat at the expense of still-water habitat.

Cut #3 has been proposed for closure in an attempt to improve water quality in Bear Creek and, therefore, in Abercorn Creek where the city of Savannah's water intake facility is located. Additionally, Bear Creek flows through significant palustrine forested wetlands. Increased flow to this creek would result in hydrologic improvements to this wetland system.

Likewise, closure of Cut #4 would result in increased contact between the river and associated wetlands. As this cut is quite long and has significant sedimentation problems, closure was determined to be the best option.

**Method of Total Closure.** Two methods of total closure were analyzed. The first involved total closure of an existing cut by use of a permanent diversion structure accompanied by dredging a pilot channel. There would be no impact on navigation with this method of closure.

The second method involved total closure of the existing cut by use of a diversion structure only; no dredging of a pilot channel would be performed. This option would take additional time, but would result in the least amount of potential environmental damage resulting from dredging and disposal. Also, as the cut would not be completely closed off from the reopened channel, additional oxbow habitat would be created to replace that which is lost during cut closure. However, if this second method of closure is used, deauthorization or modification/relocation of the authorized navigation channel would be reviewed in the feasibility phase.

**Alternatives to Improve Flow Regime.** This study did not examine means to improve the overall flow regime of the Savannah River. Instead, it examined improving the flow in the vicinity of each site by diverting flow through the cutoff bends. Altering the present flow regime has many potential benefits for fish and wildlife and for recreation in the lower river. However, these factors must be balanced with upstream needs and are beyond the scope of this report, which includes only restoration of flow throughout the Lower Savannah River.

## FINDINGS AND CONCLUSIONS

Based on the results of the reconnaissance study, the following findings and conclusions were developed.

- When navigation cuts were constructed, a large segment of the river (approximately 13 percent) was removed from contact with the main river channel, especially during low flow.
- The cutoff bends have accumulated large amounts of organic materials, leading to reduced dissolved oxygen levels during low flow and warm water conditions leading to negative impacts to fish recruitment and habitat loss.
- Impacts to Bear Creek, Mill Creek, and associated wetlands have occurred due to construction of navigation cuts and maintenance of the main river channel. Flow to Bear Creek has been impacted by construction of cut #3. Mill Creek has been impacted by the construction of cut #4 and by blockage from sediments.
- All of the above factors reduce the duration and depth of flooding in the upper portion of the Savannah National Wildlife Refuge and privately-owned wetlands. Therefore, flushing of detritus and nutrients from these wetlands is reduced.
- There is a Federal interest in enhancing the water quality and restoring fish and wildlife habitats which existed in the cutoff bends of the Lower Savannah River and surrounding wetlands before they were cut off by the Federal Navigation Project.
- There appear to be feasible alternatives to restore the environment.
- The reconnaissance phase cost \$125,000. It is estimated that the feasibility phase will cost \$785,000 and will be cost shared by the local sponsor. The City of Savannah will act as the official sponsor for this project and will provide some in-kind services as well as cash contributions. However, most of the in-kind services will be done by Georgia Dept. of Natural Resources.

## RECOMMENDATIONS

Based on the findings of the reconnaissance study, it is recommended that a feasibility study for environmental restoration of the Lower Savannah River Basin be conducted under the existing study authority.

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