

A WATERSHED PROTECTION PROJECT: THE SAVANNAH RIVER

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INTRODUCTION

At the United States Environmental Protection Agency (EPA), the emphasis of water quality protection programs is shifting towards an integrated, holistic management approach in order to cohesively address the many diverse environmental threats to a watershed. The approach, the Watershed Protection Approach (WPA), is currently being applied in the Savannah River basin to reap environmental benefits and to test the principles of this approach on a major river system in the Southeast. The Savannah River Basin Watershed Project is designed to reduce environmental and human health risk through improved water quality and resource protection. This presentation illustrates the approach being applied to the Savannah River Basin watershed and the technical tools used to address environmental issues in the study area.

BACKGROUND

Surface water quality in the United States has improved considerably over the last twenty years. However, many waterbodies do not meet their designated uses because of the combined affects of point source discharges, non-point source pollution (urban and agricultural run-off), storm-water, and combined sewer overflows. These sources of pollution continue to effect the quality of our Nation's waters.

EPA is incorporating a holistic approach toward watershed protection. EPA's Watershed Protection Approach is a way of focusing and integrating current water protection efforts and exploring innovative methods to achieve maximum effect. The goal of the program is to maintain and improve the health and integrity of aquatic ecosystems using comprehensive approaches. It is built on three main principles: 1) identification of the primary threats to human and ecosystem health within the watershed; 2) involvement of the people, or stakeholders, most likely to be concerned or most able to take action; and 3) the development and implementation of corrective actions in a comprehensive, integrated manner.

The WPA is not a new EPA program but, rather, a process to coordinate existing programs in a flexible manner to address the many and diverse watershed threats. (U.S. EPA, 1991)

DISCUSSION

The objective of the Savannah River Basin Watershed Project is to reduce ecological and human health risk within the study area by ensuring that the Savannah River and Harbor meet or exceed their designated uses under the Federal Clean Water Act and State Water Quality Standards. Federal, State, and local agencies, private industry, and the general public have a role in accomplishing this objective, however EPA and the Georgia and South Carolina water quality agencies are lead project participants.

Study Area

The study area for the Savannah River Basin Watershed Project is defined as the entire Savannah River basin, from the headwaters in North Carolina and Georgia to the Atlantic Ocean. (Figure 1) This study area was selected by EPA-Region IV as a WPA project because it met the following factors: the importance of the watershed as a natural resource; the high public use of the watershed for recreation, municipal, and industrial purposes; the many known environmental impacts to the watershed; the susceptibility of the watershed to additional degradation; the opportunity for a high degree of involvement and coordination with many Federal, State and local agencies; and the likelihood of success due to a high level of interest in protection of the watershed.

The Savannah River is one of the major river systems of the southeast and is a vital natural resource for the area. The entire basin encompasses a total area greater than 10,000 square miles including portions of North Carolina, South Carolina, and Georgia. The Savannah River is formed at Hartwell Reservoir by the Seneca and Tugaloo Rivers and flows southeast to the Atlantic Ocean at the port city of Savannah, Georgia.

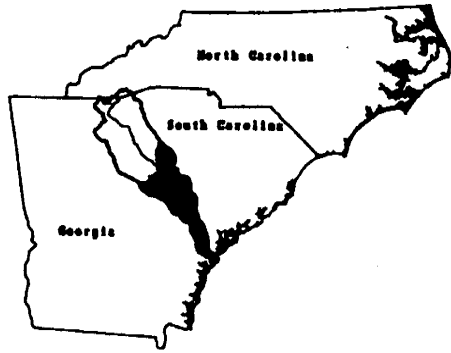


Figure 1. Study Area for Savannah River Watershed Project.

Above the junction of the Seneca and Tugaloo Rivers, the headwater streams of the Seneca River are the Keowee River and Twelve Mile Creek. The Tugaloo River is formed by the confluence of the Tallulah and Chattooga Rivers. These headwater streams originate in the Blue Ridge Mountains of North Carolina and Georgia (U.S. Department of the Army, 1991).

Ecosystem types within the study area include forests, agricultural systems, bottomland hardwoods, tidal freshwater and marine marshes, free-flowing streams, and the near-coastal waters of Georgia and South Carolina. The area lies within the Piedmont and the Coastal Plain physiographic regions.

Although the study area is predominantly rural, expanding urban centers are found on the Savannah River in Augusta and Savannah, Georgia. The City of Savannah serves as a major port for commercial and military goods for the southeast. The Savannah estuary is a multi-function ecosystem, including a 40-foot deep dredged harbor, a significant fishery resource, and a fish and wildlife sanctuary. The Savannah River Site, a Department of Energy nuclear production facility, is located within the watershed in South Carolina, and the Savannah National Wildlife Refuge, under the jurisdiction of the U.S. Fish and Wildlife Service, is situated on the South Carolina side of the river, near the City of Savannah (U.S. EPA, undated).

Water Quality

Many water quality-related studies of the Savannah River and Harbor have been conducted, beginning in the

1950's when Strom Thurmond Dam was constructed (then known as Clark's Hill Dam). EPA and other Federal agencies, in conjunction with the States of Georgia and South Carolina, have been actively involved in water quality issues in the Savannah River. In recent years, the State water quality agencies and EPA have invested considerable resources in monitoring, modeling, and evaluating watershed problems.

While little is known about the non-point source contribution to impaired water quality of the Savannah River, much is known about point source impacts and habitat degradation. These impacts include: low dissolved oxygen in the river and estuary; salinity impacts in the estuary; physical modifications to the estuary from dredging and other hydrologic modification activities; toxics and nutrient point source loadings; and fishery (striped bass fishery and endangered shortnose sturgeon) impacts due to poor water quality and habitat degradation. Additional data collection and investigation to further define these and other impacts are components of this project.

Strategy

A Watershed Management Strategy will be used to guide watershed evaluation and restoration activities implemented by EPA, the State water quality agencies, and others. This strategy will identify tools available for further evaluation of watershed impairments and for assessment of the success of restoration activities. The strategy will present and discuss restoration options for attaining the project objective.

Many technical tools will be utilized throughout the assessment and implementation aspects of this project. A QUAL2E model is being calibrated for the Savannah River to determine wasteload allocations and predict biological oxygen demand and nutrient transport to the harbor. (U.S. EPA, 1987) The resultant data will be combined with harbor data to develop a Savannah Harbor water quality model for load allocation development. A watershed screening model of the river has been applied to the Savannah River to provide estimates of sediment and nutrient transport. (U.S. EPA, 1992) The results of these modeling efforts will allow for the development of pollutant loading allocations, or Total Maximum Daily Loads, for the Savannah River and Harbor and the development of marine dissolved oxygen criteria for the Harbor.

EPA and the States of Georgia and South Carolina will seek to maximize the effectiveness of future monitoring efforts to yield statistically accurate and representative estimates of the quality and ecological health of surface water in the basin. To accomplish this, concepts and methods of the Environmental Monitoring and Assessment Program (EMAP) of EPA will be merged with State monitoring strategies for evaluation. (U.S. EPA, 1990) EMAP has its primary focus to characterize the condition of ecological resources, i.e., surface water, and establish a baseline from which change can be confidently docu-

mented. Over time, trends in improvement or degradation of the resource resulting from management policies can be assessed in accurate terms. Via this monitoring strategy, risk-based decision making can establish priorities for the protection and enhancement of ecological resources.

A Geographical Information System (GIS) will be used to manage and assess environmental data pertaining to the project. This system will graphically display point source and monitoring station locations and locations of other potential sources of pollution, as well as ambient water quality data and other environmental indicator monitoring data. A land use/land cover classification system will be incorporated into this system to provide increased ability to assess actual and potential threats to the environment. This tool will also provide the ability to determine the success of restoration activities.

CONCLUSION

The Savannah River Basin Watershed Project is an opportunity to utilize comprehensive, integrated management techniques in addressing diverse environmental impacts to a watershed. Using several technical tools, a Watershed Management Strategy will be implemented by EPA and the Georgia and South Carolina water quality agencies to assess the impacts to the Savannah River basin and to develop restoration activities for risk-based, high priority threats to the environment. This project will demonstrate the application of the WPA principles in a major river system and illustrate risk reduction through holistic watershed management.

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