PROPOSED SAVANNAH HARBOR DEEPENING AND POSSIBLE IMPACT ON FLORIDAN AQUIFER

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REFERENCE: Proceedings of the 2001 Georgia Water Resources Conference, held March 26-27, 2001, at the University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, the University of Georgia, Athens, Georgia.

Abstract. The proposed deepening of the Savannah Harbor by the Georgia Ports Authority (GPA) from its current 42 feet below mean sea level (msl) to as much as 48 feet below msl has generated considerable public interest. Possible wide-reaching adverse environmental impacts range from substantial loss of freshwater marshes, incremental capture of additional sand that nourish downdrift beaches, to an increase in the downward movement of saltwater through the upper confining unit and into the Upper Floridan aquifer.

The project has earned a favorable Chief of Engineers report from the U.S. Army Corps of Engineers (USACE). For the project to move forward, it must meet all environmental laws, adequately address potential environmental impacts, and be approved by the Secretary of the Interior, Secretary of Commerce, and Administrator of the Environmental Protection Agency.

The 1999 Water Resources Development Act (WRDA) qualified the project for federal cost sharing for the feasibility, design, and construction phases. Final approval is dependent on completion of a study analyzing the impact on the environment of dredging the river channel to various depths between the present 42 feet up to and including 48 feet.

The bill authorized $230 million to deepen the Savannah Harbor. The federal share of the project would total $145 million; GPA would be responsible for the remaining $85 million. No money has been appropriated for construction of the project and will not be appropriated until it meets all requirements. GPA says it needs the deeper channel to accommodate a new, post Panama Canal generation of vessels that require a deeper draft of about 47 feet. Currently, about 50% of the vessels calling on the port are constrained which means that they must wait for favorable tide conditions to enter the harbor.

The project is under fire from environmental groups, the U.S. Fish and Wildlife Service, and the departments of natural resources of both Georgia and South Carolina because harbor deepening will allow saltwater to creep farther up the river. Such salinity change could harm the freshwater marsh ecosystem of the 27,000-acre Savannah River Wildlife Refuge and damage the breeding grounds of the stripped bass, a popular game fish, and the shortnose sturgeon, an endangered species on both state and federal lists. Local industries are concerned that increased salinity in the river will compromise plant operations that depend on fresh river water. The City of Savannah is concerned that saltwater will impact the intake of its water treatment plant on Abercorn Creek, a tributary of the Savannah River.

All the environmental issues must be addressed before the project can move forward. In October 1998, Congress failed to enact the 1998 Water Resources Development Act (WRDA), which would have authorized the work. The port deepening was on a fast-track path under Section 203 of WRDA, which allowed nonfederal entities such as GPA to start feasibility studies for harbor deepening projects. Creation of a Stakeholder's Evaluation Group (SEG) was part of the language of the initial Environmental Impact Statement that was part of the draft WRDA legislation.

But the legislation did not make it out of committee in 1998 but did so in 1999. WRDA authorized the deepening before completion of a full National Environmental Policy Act (NEPA) review. Such a review mandates a full analysis of environmental impact of all federally funded projects. SEG was formed to insure all environmental impacts were appropriately considered.

GPA's SEG continues to meet regularly on a monthly or occasionally bimonthly (every two months) basis to design scientific studies about various environmental issues surrounding the project. The results of such studies will make up the Tier II Environmental Impact Statement. That document, as well as an economic study, will have to be approved by various agencies before the project can move forward.

SEG is a broad mix of about 50 individual leaders representing local communities, university and research institutes, businesses and industries, environmental groups, state and federal resource agencies, and other

interested affiliated and unaffiliated citizens from both Georgia and South Carolina. SEG has been meeting for the past 2 1/2 years. In April 2001, an about 30-member Aquifer Committee (AC) was formed to establish just how, and to what degree, proposed deepening may impact the Floridan Aquifer. Its determination will make up part of the Tier II Environmental Impact Statement.

A 1998 USACE study, *Potential Ground-Water Impacts: Savannah Harbor Expansion Feasibility Study*, is considered to be a first step in determining the engineering, environmental, and economic feasibility of the proposed project. The Ground-Water Impact study included geophysical investigations (seismic reflection survey), drilling of core holes, analysis of cores to determine vertical hydraulic conductivity, grain-size distribution and other geotechnical parameters, borehole geophysical logging, installation of observation wells, and a water well survey of wells open to the surficial aquifer and the deeper Miocene sediments.

The study assessed conditions under both leakage through the Miocene confining unit exclusively and leakage partially through a paleochannel and partially through the Miocene confining unit. Both conditions were assessed in the vicinity of the Tybee High where the top of the Upper Floridan aquifer is shallowest. Leakage through the Miocene confining unit was estimated to be about 900 gallons per day per acre and about 1160 gpd/acre through the paleochannel areas. Removal of ten feet of confining unit material through dredging was estimated to increase leakage by about 300 gpd/acre concluding the impact of harbor deepening on the aquifer would be minimal.

Other research on the matter, however, suggests that additional geological and hydrological factors have been overlooked and the potential impact may be more severe. AC, in addressing the question, formed an about 10-member Working Group consisting of principle researchers that include hydrogeologists, geologists, engineers, geochemists, fluid dynamic modelers, groundwater technicians, and other investigators who have carried out primary investigations on the behavior of groundwater in the Upper Floridan aquifer.

One of the first tasks of the Working Group is to try to determine the knowledge gaps and concerns, assessment of current knowledge, and recommendations leading to a Plan of Study. The Working Group will recommend a Plan of Study to the Aquifer Committee who will discuss further the proposed study. When satisfied that all issues have been adequately identified and addressed, AC will then recommend the proposed Plan of Study to SEG. SEG will discuss and when agreement has been reached by consensus will recommend the proposed groundwater Plan of Study to GPA. Final decision to act on and authorize an additional groundwater study rests with GPA.

Individuals currently, but not limited to, comprising the AC Working Group are: John Cox, Applied Technology & Management (ATM) who serves as chair; John Clarke, USGS; William McLemore, GAEPD; Camille Ransom, SCDHEC; Jim Reichard, Georgia Southern University; Cardwell Smith, USACE, and author of the original 1998 USACE groundwater study; Rick Krause, USGS (retired) and currently manager of the Groundwater Resources Program of HydroVision; Jim Henry, Georgia Southern University's Applied Coastal Geology Laboratory; and Jim Landmeyer, USGS.

All information developed by AC and its Working Group is posted on the SEG web page referred to as the Savannah Harbor Expansion Project (SHEP). For example, the literature search posts at this time approximately 30 titles relating to groundwater studies in this area. The SEG web page provides the latest information not only about AC and its Working Group but total progress in SEG. Verbatim minutes of each SEG meeting is posted as well as the comprehensive minutes of AC. Dialogue in AC is both extensive and comprehensive. Navigating through the web page brings the reader to each of SEG's subcommittees.

SHEP home page is: <http://sysconn.com/harbor/> Accessing this address links the reader to each of the nine subcommittees including the Aquifer Committee and Economic Working Group that is addressing the important questions surrounding economic issues of the deepening project. In addition, the home page of GPA is: <http://www.gaports.com/> One also can access SHEP through GPA's home page "Harbor Expansion" link.

Additional web addresses of interest include: www.nwf.org/greeningcorps/top25.html; www.scwf.org.news_current/troubled_waters.htm; http://amrivers.localweb.com/corpsupdate3-7.html; www.taxpayers.net/corpswatch/new.htm; and www.taxpayer.net.corpswatch/LearnMore/index.htm.

LITERATURE CITED

United States Army Corps of Engineers, 1998, Potential Ground-water Impacts: Savannah Harbor Expansion Feasibility Study: Savannah, GA (*variously paged*)