

the data come in and we can process them.”

The Tier I studies, conducted under Section 203, provide the foundation for the second EIS ordered by Congress.

“Tier I looked at a range of things and then, based on the analyses, narrowed the possible impacts down,” said Plachy. “Now we’re going to focus on those impacts and refine them in greater detail— what we call a funnel effect. We’re not looking at everything all over again, because that was done in Tier I, in most cases.”

It will be a greener Corps focusing on the impacts.

“Under the Corps’ Environmental Operating Principles, if you can generate an environmental benefit, even if it doesn’t directly relate to what you’re doing, you’re encouraged to take that opportunity,” said Plachy. “The premise articulated by Gen. [Robert] Flowers [Chief of Engineers] is that we already have those kinds of authorities under the law— we just need to take advantage of them. One of our goals is to keep these environmental operating principles in mind as we do the work.”

GPA is close to completing the scientific and technical analyses as well as development, refinement and calibration of various tools that will be used to evaluate impacts (see milestones and list of project studies inside). The follow-up analysis of the Floridan aquifer was contracted out to the district. That work began July 2003. Cultural resources investigations, economic analysis, and plan formulation and screening of alternatives are underway.

“We’re spending a lot of time coordinating with the other agencies to come up with methodologies for evaluating impacts beforehand,” said Bill Bailey, the district’s physical scientist. “That’s something we haven’t done before. If we agree on the methodology, everyone should basically agree with the numbers that we get when we apply the tool, then it’s just interpreting how important those numbers are.” That kind of coordination extends to evaluating impacts to the aquifer, fisheries, wetlands and water quality.

One of the tools the district will use to evaluate impacts to wetlands is the hydrodynamic model, a computer-based tool that makes projections of salinity and water levels in the river and creeks. A second tool, which is being developed by the U.S. Geological Survey (USGS), converts those levels to what they will be up in the marshes. A third tool, being developed by ATM (Applied Technology & Management) and USGS, will predict what vegetation will be in a given area if the salinity, river flow, or another variable is changed by “x” amount. That model predicts the end-state— not how long the transition would take.

“One of the things that I think is good in this process is the interagency trust that is developing,” said Bailey. “The Corps and GPA have been relying a lot on USGS— a part of USGS that came out of the Fish and Wildlife Service. It’s saying that those construction agencies are relying a lot on a resource agency that had been against the project. We’re relying on them to do a lot of the impact prediction.”

In terms of quality control and quality assurance, the PDT looks at each product and those that draw conclusions or make projections are reviewed, either by the district’s technical staff, by another district (independent review), by one of the Corps’ technical labs (independent technical review), by technical experts at the cooperating agencies (independent technical review), or by a combination of the above. For example, the Corps’ Waterways Experimental Station performed the independent technical review on the hydrodynamic salinity model developed by ATM, a GPA contractor. The model is one of the tools that will be used to determine impacts to wetlands and fisheries, and so it was also reviewed by technical experts at EPA and USGS.

“That’s above and beyond the Corps’ normal stringent guidelines,” said Plachy. “The integrity here is very strong in the sense that it would be hard to misinterpret the data because of all the different technical reviews we’re getting.”

“What is really important about the SHEP studies is recognition by all parties that a healthy Savannah River ecosystem and the port are both important,” said Prescott Brownell, PDT member representing the National Marine Fisheries Service. “The SHEP studies will provide a framework for long-term maintenance of environmental quality and an economically viable port.”

The total budgeted cost for the studies and evaluations is about \$24 million, with GPA carrying about \$19 million and the district, about \$5 million.

This may be the only project in the Corps not under a feasibility cost-sharing agreement, according to Plachy. Normally, the federal government picks up at least 50-75 percent of the cost. “In this case,” Plachy said, “the local sponsor is paying about 75-80 percent of the cost. The intent is that when this gets to be an implementable project, GPA would be given credit for the costs they’ve incurred to get the project to the construction phase. [The federal share of the project would total \$145 million— the local sponsor’s share, the remaining \$85 million.]

“It is our responsibility to recommend the plan that has the greatest net economic benefits with the least environmental impact,” explained Gerber. “It is too early to know which alternative will be selected. GPA did conduct a feasibility study and EIS previously and concluded that there were not significant environmental impacts for deepening to 48 feet. However, we are doing extensive modeling for water quality and field investigations (borings, sampling) to gather additional information on the impacts of each alternative up to 48 feet depth for the entire length of the harbor. The best technical expertise available will be reviewing the alternatives, analyses, and environmental impacts. I believe we will have a high level of confidence that the recommendation we submit for the Chief’s report will not have a significant impact on the environment. It is too early to determine if that alternative will be 48 feet.”

The impacts will be evaluated in 2004 and the EIS written the following year. Traditionally, the regulatory agencies “grade” the EIS at the end, but on this project, they are being asked to help write it.



Courtesy GPA
Contractors conduct tidal wetlands studies, which included monitoring vegetation during the early and late growing seasons at 18 established transects or quadrants within the Savannah National Wildlife Refuge. Data collected will be used to predict shifts in species distributions due to salinity changes that may result from harbor deepening.

JULY 2003 • USACE/SAS/PA • LAMBERT/JORDAN

transport business these days,” said Doug Marchand, GPA’s executive director. “If you don’t accommodate the bigger ships, they are going to stop coming.”

The bigger ships weren’t forecast to call at the port of Savannah before 2015.

In 1996, with the big ships “nigh at the door,” GPA took advantage of a little-used section of the 1986 Water Resources Development Act (WRDA) to put harbor deepening on a fast track. Typically, the Army Corps of Engineers conducts both the reconnaissance study (to determine if there is sufficient justification to conduct a feasibility study) and, pending a positive finding, the follow-on feasibility study (to determine the economic justification for the project and to generate an Environmental Impact Statement or EIS). With positive indications from the completed recon study, GPA employed Section 203, which allows “non-federal” project sponsors to start the feasibility study.

“The Section 203 authority established by WRDA 86 was originally designed to lessen the time it takes a project to get from feasibility to construction,” said David Schaller, GPA’s deputy executive director. “The average deepening project in the nation takes between 12 and 15 years. One reason is that the Corps activity is dependent on the federal funding levels provided by the Administration and Congress each year. As the lead on the feasibility effort, we believed we could provide continuous funding to keep the project schedule on track,

hopefully, lessening the time to project completion.” [Congress customarily considers water resources development projects every two years, and it normally takes the Corps 15 to 20 years to complete a project as complex as the Savannah navigation channel.]

GPA began the feasibility study in March 1997 and, 15 months later, submitted the study and EIS directly to the Secretary of the Army. In August 1999, Congress authorized \$230 million to deepen the Savannah Harbor from 42 feet to as much as 48 feet along the 36-mile stretch of the river from its mouth at the Atlantic to the port terminal near downtown Savannah. Authorization qualifies the project for federal cost-share for the feasibility, design and construction phases.

However, Congressional authorization was contingent upon completing a Tier II EIS and an updated economic study. Congress also made a final mitigation plan and an incremental analysis of channel depths (from 42 to 48 feet) subject to the approval of the departments of Commerce and Interior, the Environmental Protection Agency (EPA) and the Secretary of the Army.

GPA created a Stakeholders Evaluation Group (SEG) in January 1999 to oversee the scientific research projects and develop plans for mitigation. Still functioning today, the group consists of private citizens with an interest in the proposed deepening, Georgia and South Carolina state resource agencies,

various federal resource agencies, the cities of Savannah and Tybee Island, local and regional environmental organizations, members of the maritime community, the Savannah Manufacturers Council and GPA.

During the initial studies (Tier I), Savannah District’s role was mainly oversight and advisory.

“As we started going through the list of work that needed to be done, it became increasingly clear that there was more of a role for the Corps,” said Doug Plachy, senior project manager. “The Office of Management and Budget made it very clear to us that it’s our responsibility to conduct the Tier II EIS because this was now a federal navigation project. It was after that, in discussions with the Secretary of the Army’s Office, that we started to formulate the memorandum of understanding (MOU) between us and GPA.” According to Plachy, no other project came out of a non-federal interest doing the feasibility study, so the district was plowing new ground.

The MOU establishes the Corps as the “lead agency,” responsible for ensuring compliance with federal laws and regulations in the preparation of the Tier II EIS, and names GPA, U.S. Fish and Wildlife Service, U.S. National Marine Fisheries Service, and EPA as “cooperating agencies.”

Having been formulated under the 203 legislation and now requiring additional study, the Savannah Harbor Expansion Project (SHEP) was quickly dubbed 203.5. It

was no longer a feasibility study, but it also wasn’t a project ready to be executed, so the district had to develop an MOU with GPA to spell out each agency’s respective roles and responsibilities.

Under standard Corps study procedures, the district decides what needs to be done and does it. On this project, GPA provides the up-front funding for data collection/analysis and development of tools. The Corps identifies work that needs to be done, taking into consideration recommendations from the cooperating agencies. GPA decides how to go about getting the work done. They decide whom to hire; and it’s their project managers who are “in the weeds” overseeing the work. Some of that work has been contracted out to the district.

“GPA-funded work is being done by people other than those responsible for the scope and review of the General Reevaluation Report (GRR)/Tier II EIS,” said Savannah District Commander Col. Roger A. Gerber. “We have been careful to maintain a distinction between the two pieces of the work. I am confident that we are acting independently in determining the alternatives and the scope of the studies. Our actions to date support that, to include our public scoping meeting and the HQUSACE (Corps headquarters) level feasibility review conference.”

In its role as lead agency, the district is responsible for the scope and independent oversight of the GRR/Tier II EIS, which

includes the economic analysis and impact evaluation— work funded 100 percent by federal dollars.

“Many of the processes and procedures used on this project are reflective of the Corps’ Project Management Business Process and Environmental Operating Principles,” said Gerber. “The project delivery team (PDT), led by a single project manager, Doug Plachy, has membership from the non-federal sponsor and other federal agencies, as well as vertical members from the Corps’ South Atlantic Division (SAD) and HQUSACE. This team meets weekly and has been very successful in resolving issues. The issues that cannot be resolved by the PDT are taken up at senior management quarterly meetings between Mr. Schaller and myself and, when necessary, with senior staff at HQUSACE and ASA (CW) (Office of the Assistant Secretary of the Army for Civil Works). This is a model for other complicated, controversial projects.”

The vertical component allows the PDT to get immediate answers and guidance from division and headquarters without having to staff memos and wait for decisions or, in the worst-case scenario, be told that they made wrong decisions and have to backtrack or redo some work.

“The vertical team concept serves as a lessons-learned platform for other projects and ventures,” said SAD biologist and vertical team member Daniel Small, pointing out that it reduces process-

ing time and costs, allows all involved to have a stake in the process, and instills confidence among the team members.

Plachy and his counterpart, Larry Keegan of Lockwood Greene Engineers, GPA’s project manager, work side by side and basically agree on steps to be taken.

“The team-building sessions [between GPA and the Corps] provided the foundation upon which the PDT is based,” said Keegan. “We have a solid group of professionals bringing their talents and expertise to bear on the complexities of the project.”

Initially framed as a study to deepen the harbor, the project has now become a study to reduce costs associated with ships having to wait for high tide to enter the channel.

“That’s where I think this project may have gotten off to a bad start initially,” said Plachy. “When GPA originally did the 203 study, they were trying to do a study to deepen the harbor. But there are a lot of ways to address the ship delay problem other than just deepening the harbor. That is an alternative, so what we’re doing here is taking a step back and saying, okay, we have this problem: The longer a ship sits out there, the more costs are generated. If we can reduce those costs, the consumer benefits, and that’s where the federal interest comes into play.”

The objective, Plachy said, is to identify all the problems and evaluate alternatives that address those problems. The ultimate goal is to determine how best to maximize the benefit to the consumer, so any solution to the problem must potentially generate more in benefits than it costs to implement.

“The answer isn’t, we’ll just put the terminal closer to the ocean because that would lessen the environmental impacts,” said Plachy. “It may not be feasible or cost-effective to do that. We have to wait until

Continued on back page

FAST TRACK

THE PROJECT TEAM



US Army Corps of Engineers
Savannah District

The federal agency responsible, under its Civil Works mission, for maintaining and improving the nation’s navigation channels; lead agency in the preparation of the Environmental Impact Statement (EIS) for the Savannah Harbor Expansion Project (SHEP).



Georgia Ports Authority
developing, maintaining and operating ocean and inland river ports within the state.

Instrumentality of the state of Georgia and a public corporation existing for the express purpose of reaching the desired levels of environmental quality.



The federal agency responsible for researching and setting national standards for a variety of environmental programs. Where national standards are not met, EPA can issue sanctions and take other steps to reach the desired levels of environmental quality.



The federal agency charged with conserving, protecting, and enhancing fish and wildlife and their habitats in the U.S.



National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service, is charged with rebuilding and maintaining sustainable fisheries, promoting recovery of protected species, and protecting and maintaining the health of coastal marine habitats.

INDUSTRY TREND

FULLY 90 PERCENT OF ALL INTERNATIONAL TRADE IS CARRIED BY SEA, AND ROUGHLY 70 PERCENT OF GENERAL CARGO IS CARRIED BY CONTAINER SHIPS. THE BIGGER THE SHIP, THE LOWER THE TRANSPORTATION COST PER CONTAINER, AND THAT TRANSLATES TO LOWER PRICES ON THESE PRODUCTS FOR THE CONSUMER.

In the 1960s and ’70s the big ships plying the world’s seas maxed out at 2,500 TEUs (or 20-foot equivalent units). The late 1980s heralded the first of the “mega” (or Post Panamax) container ships. Identified by their beam (more than 106 feet wide— too wide to fit through the Panama Canal), these ships carry more than 4,800 TEUs. Today, however, “mega” applies only to vessels with a capacity in excess of 7,000 TEUs. These fifth generation carriers are humongous— almost a quarter mile long and as wide as a 14-story building! What’s more, many industry experts believe that the practicable upper limit of container ship size might not be capped until the 10,000 to 12,000 TEU level is reached.

So what’s the problem? These bigger vessels are operationally constrained when they come to Savannah because they cannot carry full loads at all tides. The channel’s mean low-tide depth is 42 feet, and ships are required to have at least four feet of clearance between their hulls and the riverbed in order to ply a shipping lane safely. More than half of the container vessels calling on Savannah have a maximum capacity deep-draft greater than 38 feet, according to Georgia Ports Authority (GPA) officials. As a result, these vessels must wait for the tide to come in or must be “light-loaded” to avoid getting stuck. It’s a predicament many U.S. ports face, particularly ports on the East Coast.

Savannah’s navigation channel was dredged from 18 to 24 feet deep in 1896, to 38 feet in 1945, and to its current mean low depth of 42 feet in 1994 (for about \$33 million), each time to accommodate the bigger ships. About 71 percent of the traffic that called on GPA in fiscal year 2003 were container ships, and these vessels are load- and time-sensitive: Carriers lose money when their ships haul smaller loads or have to be anchored at sea waiting for high tide.

If you don’t deepen the channel, you can’t effectively handle the economies of scale that are necessary to be in the

*Most tractor-trailer rigs haul 40-foot-long units, or two TEUs.

PROBLEM

VERTICAL TEAM

NEW FOCUS



AT STAKE

What's at stake? The viability of the port of Savannah, a chance to become the "megaport hub" in the Southeast region,* loss of substantial revenue for the state, the city and surrounding communities, and the loss of thousands of jobs. Only by accommodating the new generation of deep-draft (or mega) container ships—currently those that can transport more than 7,000 TEUs—can the port remain competitive, say Georgia Ports Authority officials. Today the trend is for big companies to band together in loose consortiums to ship their cargo on one large vessel instead of several smaller container ships. "If just one of the consortiums were to go elsewhere, the port of Savannah could lose a significant percent of its business in one stroke," said David Schaller, GPA's deputy executive director. That would have domino-like repercussions, since the Savannah port directly or indirectly supports about 80,100 jobs, is responsible for \$1.8 billion in wages, generates billions of dollars in revenue, and accounts for \$585 million in state and local taxes annually. However, if the deepening project is constructed, GPA estimates that every \$1 spent on the project will result in \$3 in economic benefits to the Savannah area; and that every additional 1 million tons of container cargo would result in 4,000 jobs.

*Charleston, the nearest competitor port, is in the construction phase of a project to widen and deepen its harbor.



AT POTENTIAL RISK

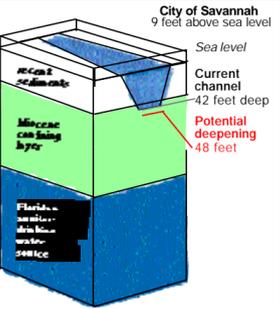
Just across the river, about 300 yards from the Georgia Ports Authority's Garden City Terminal, lies the sprawling 28,168-acre Savannah National Wildlife Refuge, one of the most important wildlife preserves on the East Coast, and perhaps the environment at greatest risk if the harbor-deepening project goes forward. The U.S. Fish and Wildlife Service manages the refuge and contends that deepening the harbor will allow salt water to creep farther up the channel, creating more troubles for the plants and animals that depend on the freshwater marsh for survival. Previous alterations have pushed salt water up the river more than 13 miles, according to Sam Drake, who was manager of the refuge from January 1995 until his retirement January 2001. The city of Savannah's water intake plant is located in the refuge and depends on fresh river water to provide drinking-quality water to nearly 40 industrial customers, who use it for both drinking and industrial processes. If the facility has to be moved farther away to stay in compliance with safe drinking water guidelines, the city's operation and maintenance costs would increase. "If you double the length required to pump water from point A to point B, pumping costs go way up," said Harry Jue, the city's water and sewer director. "That can have an impact on our customers." When the salinity of water increases, so do chloride levels, and industries are worried that an increase in the chloride levels in the river water would increase their production costs. Chlorides are binary compounds of chlorine. Just a few of them per unit of water can cause all kinds of problems in industrial equipment. Industries are also concerned that the dissolved oxygen levels in the river water could decrease with deepening, making it more difficult for them to get permits to discharge waste water into the river.

THE CSS GEORGIA. The most celebrated navigation hazard on the Georgia coast lies in the path of the deepening project. The Confederate ironclad couldn't even navigate the Savannah River, but its presence deterred any Union naval attack. It was scuttled in 1864; its exact location (600 feet from Old Fort Jackson) was pinpointed in 1968 when it was hit by a dredge; and in 1987 it was added to the National Register of Historic Places.

SAVANNAH NATIONAL WILDLIFE REFUGE. When the refuge was founded in 1927 it contained 6,000 acres of tidal freshwater marsh. By 1997, those marshlands had declined to 2,800 acres, due to the cumulative effects of alterations to the harbor. Refuge officials say the previously proposed deepening to 50 feet would have further reduced the freshwater marsh to 1,600 acres. "A lot of times, man's best science is not good enough to predict what is actually going to happen when you deepen the river," said former refuge manager Sam Drake. "Our past experience is that they have drastically underestimated the impacts that have occurred." The refuge is one of the most important wildlife preserves on the East Coast, especially for migrating birds. Its 28,168 acres of freshwater marshes, bottomland hardwoods, tidal rivers and creeks support 276 bird species, 943 plant species, alligators, waterfowl, and freshwater fish, including the endangered short nose sturgeon. The striped bass fishery has perked up but has not yet fully rebounded from increased salinity in the refuge due to the operation of a tide gate from 1977 to 1991.

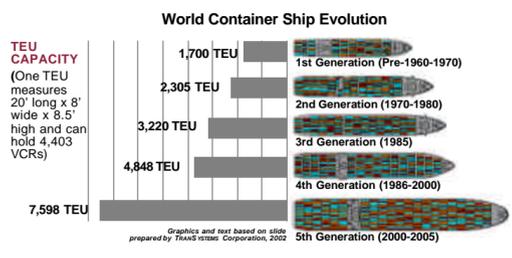


THE FLORIDAN AQUIFER. It's the source of drinking water for coastal Georgia and has already seen some salt water intrusion due to heavy usage. Current thinking is that the project would not impact the Floridan aquifer; but science does not yet fully understand all the complexities of the aquifer and layers of rock or the effect of digging into ancient river channels, some of which cut into the Miocene confining layer that caps the Floridan aquifer.



TYBEE ISLAND BEACH, GA. The concern is that more of the sand that naturally migrates toward the coast will not reach Tybee, Wassaw, and Ossabaw islands but will drop into the deeper trench created by deepening the harbor six feet. Many fear that greater beach erosion would necessitate more expensive renourishment projects to help correct the problem.

4th Generation Post Panamax vessel
 Length overall: 893 feet
 Beam: 132 feet
 Gross tonnage: 63,900
 Max capacity deep draft: 44.3 feet
 TEU capacity: 4,918



Port Notes

- Savannah is currently the 5th largest U.S. container port and the No. 3 ranked container port on the East Coast after the ports of New York/New Jersey and Charleston, S.C.
- The port's ranking shot to 4th in Dec. '02. In February '03, GPA surpassed the 1 million TEU mark earlier in its fiscal year (FY) than ever before, moving an unprecedented 1,004,535 TEUs through the port for a 33.7 percent increase, or 253,178 more TEUs at the same time last year.
- The port now offers 13 weekly services to the Far East, where goods travel only by water between Savannah and Asia.
- During FY '02, which ended June 30, the port welcomed five new ocean carrier services to an already extensive list of liner services.
- In FY '02, Savannah imported and exported almost the same amount of cargo (46 percent imported/54 percent exported) for an approximate 1:1 ratio. Altogether, GPA moved 10.7 million plus tons of cargo that year.
- GPA's ability to quickly move intermodal freight is greatly improved with its new James D. Mason Intermodal Container Transfer Facility (ICTF). For the first eight months of FY '03, the port moved 40,330 units via rail through the ICTF, a 67 percent spike over the previous year.
- Today, the port serves as a major distribution point to and from a 26 state hinterland in the eastern U.S.
- Savannah services 12 major distribution centers that have facilities at or near the port, including Best Buy, Home Depot, Lowe's, and Wal-Mart.
- In March '03 two Super Post-Panamax Cranes were installed. The largest to ever operate in Georgia, these cranes have hoist speeds almost 50 percent faster than existing cranes in service at the port.

Savannah Harbor Expansion Project

THE SEARCH FOR ANSWERS

- Chloride Distribution Evaluation.** Determines the potential for increases in salinity intrusion to cause an associated increase in the chloride concentrations at the city's raw water intake.
- Dissolved Oxygen Distribution Evaluation.** Defines the impact on the spatial and temporal concentrations of dissolved oxygen within the primary study area.
- Salinity Distribution.** Refines and updates the 3-dimensional hydrodynamic model to evaluate salinity distribution in study area.
- Marsh Vegetation Surveys.** Updates and expands information on distribution of plant species within the tidal fresh water and brackish marshes of the estuary.
- Marsh Salinity Field Data Collection.** Gathers data to determine relationship between interstitial salinity in marshes and salinity in adjacent river channels.
- Savannah National Wildlife Refuge**
- Freshwater Marsh Studies/ Surveys**
 - Water-level study** determines hydrologic regimes within distinct vegetation association.
 - Topography survey** ties marsh elevations to results of the water-level study to define hydrologic signatures.
 - Sediment Characterization/Mapping** investigates characteristics of sediments that support floating vegetation and the production of hydrogen sulfide gas or methane gas.
 - Spatial Synoptic Analysis** samples a synoptic series of regularly grid-spaced sites to define transition and breakpoint regions representing the spatial boundaries of marsh zones from fresh to sub saline conditions.
 - Transplanting Experiments** provide timelines for vegetation responses as well as indications of ecological community structural changes due to hydrologic alterations.
 - Salinity Spatial Synoptic Sampling** provides information on the temporal dynamics of salinities at specific sites to resolve spatial distribution of salinity across and up and down the flood plain gradient.
 - Tree Gap Analysis** documents the relationship between tree canopy species and the sapling/seedlings in the various regeneration layers.
 - Vegetation Change Analysis** determines changes in vegetation signatures over time.
 - Nekton Study** documents fish and crustacea use of the upper estuary spatially and over time.
 - Migratory Bird Study** documents avian use by fall and spring migrants and selected over-wintering birds.
 - Seed Production Study** monitors key edible seed producing species for seasonal phenological development.
 - Marsh Succession Modeling.** Develops and uses spatial model to predict changes in wetland vegetation distribution caused by salinity and water-level changes associated with harbor deepening.
- Beach Erosion Study.** Determines effects to the local wave and current conditions and any effects on the nearshore and inlet sediment budget.
- Shortnose Sturgeon Distribution Field Study.** Develops a baseline estimate of abundance and behavior and age distribution of juveniles; monitors water quality for evaluating impact of salinity increases and dissolved oxygen decreases on shortnose sturgeon within the lower Savannah River.
- Migration of Juvenile American Shad, Hickory Shad, and Blueback Herring in the Savannah River.** Explores effects of channel depth on downriver migrations of these species.
- Assessment Study of Spawning Sites and Reproductive Status of Striped Bass.** Provides the necessary data to assess the importance of Front River in sustaining the striped bass population.
- Advanced Maintenance Features Study.** Evaluates the advance maintenance features that will be needed for effective and efficient maintenance of a deepened channel.
- Bank Stability Analysis.** Analyzes riverbank and channel bank slope stability to determine potential effects deepening the channel would have on adjacent lands or structures.
- Floridan Aquifer Study.** Evaluates the possible effects of deepening on the Floridan Aquifer.
- Sediment Quality Analysis.** Determines the chemical constituents of the new sediments to be removed and evaluates potential effects of excavating, moving and relocating these sediments.
- Ship Simulation Modeling.** Simulates handling characteristics of ships transiting the river to determine the ability of pilots to safely maneuver the vessels.
- Hydraulic Modeling.** Evaluates the changes in current vectors and flow rates in the Savannah River.
- Sedimentation Changes Evaluation.** Predicts sediment deposition pattern in river; evaluates advance maintenance features; estimates construction costs.
- HTRW Waste Screening.** Evaluates sediments to be removed from within the channel, berth sediments and sediments on the river banks and in bend wideners for the presence of hazardous, toxic, or radioactive wastes.
- Hydrodynamic and Salinity Distribution Evaluation.** Determines relationship between surface water and interstitial salinity; projects temporal and spatial nature of temperature throughout the system; evaluates the changes in salinity concentration.
- Temporal and Spatial Distribution Study of Estuarine-Dependent Species in the Savannah River Estuary.** Documents the spatial, seasonal, and inter-annual use of aquatic habitats by estuarine-dependent species within the Savannah River estuary.
- Disposal Area Capacity Analysis.** Updates evaluation in the Tier I as a result of information developed during Tier II.
- Economic Reevaluation.** Updates the Tier I economic analyses to reflect current conditions.
- CSS Georgia Archival Research.** Surveys and investigates the CSS Georgia for cultural and historical significance.
- CSS Georgia Survey.** Surveys the CSS Georgia site to identify potential project impacts from project alternatives. Develops a mitigation plan if necessary.
- Cultural Resources Survey.** Surveys areas identified in Tier I, Tier II, and by the mitigation plan for cultural or historical resources.
- Cost Benefit Ratio Evaluation and NED Plan Selection.** Determines project alternative with highest net benefit.
- Real Estate Analysis.** Determines real estate requirements to construct project.
- Evaluation of Bank Erosion Changes.** Evaluates possible changes in erosion resulting from the project.
- Dredged Material Beneficial Usage Evaluation.** Determines benefits and costs of depositing channel sediments at various locations. Also considers secondary uses of the deposited sediments.

GRR/TIER II EIS MILESTONES

2003	2004	2005	2006
STUDIES COMPLETED AND TOOLS DEVELOPED by Sept. 30. Another district, one of the Corps' technical labs, or another federal agency or specialist will review studies conducted by Savannah District where projections have been made or conclusions drawn.	IMPACTS DETERMINED. Savannah District's technical staff, with support of GPA contractors, will analyze the data (using numerical models to assess the impacts of deepening the channel to various depths) and present mitigation alternatives. The technical staffs of the cooperating agencies will also analyze data and provide guidance.	EIS PREPARED. Savannah District will work with the cooperating agencies to develop/write the document. Congress has made the final mitigation plan and an incremental analysis of channel depths subject to the approval of the departments of Commerce and Interior, EPA, and the Secretary of the Army. Once the document is written, it is reviewed for technical adequacy and then made available for public comment.	RECORD OF DECISION SIGNED. The EIS makes its way up the USACE chain to headquarters, where it is reviewed from a policy and technical standpoint. [Typically, at this point, other federal agencies would weigh in and "grade the paper," as it were; but on this project they are being asked to help write it.] The Corps' director of Civil Works signs the record of decision.

GOAL

TO INCREASE the capacity of the port by determining the alternative that provides the greatest net economic benefits with the least impact on the environment AND DEVELOP a mitigation plan that addresses unavoidable impacts to critical natural resources.

— Col. Roger A. Gerber, Commander, Savannah District