U.S. Army Corps of Engineers
Charleston District

SECTION 905(b) (WRDA 86) ANALYSIS

CHARLESTON HARBOR NAVIGATION IMPROVEMENT PROJECT

CHARLESTON, SOUTH CAROLINA

July 2010

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1.0 STUDY AUTHORITY

a. This study is authorized by Section 216 of the Flood Control Act of 1970 (Public Law 91-611), which authorizes the review of completed projects.

b. Funds in the amount of $90,000 were allocated in Fiscal Year 2010 to conduct the reconnaissance study to examine the deepening of Charleston Harbor, South Carolina beyond 45 feet (13.7 m).

c. The February 1996 Final Feasibility Report, Charleston Harbor, Charleston, South Carolina served as the basis for the currently authorized Federal Navigation Channel. The project was authorized by Section 27 of the Water Resources and Development Act of 1996 (WRDA 1996):

> *(27) CHARLESTON HARBOR, SOUTH CAROLINA. The project for navigation, Charleston Harbor Deepening and Widening, South Carolina: Report of the Chief of Engineers, dated July 18, 1996, at a total cost of $116,639,000, with an estimated Federal cost of $71,940,000 and an estimated non-Federal cost of $44,699,000.*

WRDA 1996 authorized deepening the entrance channel from 42 feet to the present depth of 47 feet and deepening the inner harbor channel from 40 feet to the present depth of 45 feet.

2.0 STUDY PURPOSE

The purpose of this 905(b) analysis is to determine whether there is a Federal Interest in participating in a cost shared Feasibility Study to investigate modification of the existing Charleston Harbor project in the interest of navigation improvements. The 905(b) analysis is the first activity in the overall reconnaissance phase and is generally 6-12 months in duration. Upon completion, the 905(b) Analysis is submitted to the Corps' South Atlantic Division Headquarters (Atlanta, Georgia) for review and certification of policy compliance. This certification is expected to be accomplished prior to completion of the next activity in the Reconnaissance phase, Project Management Plan (PMP) development.

The purpose of the PMP is to identify tasks in the study process and provide the basis for identifying the tasks needed to be performed during the feasibility study. PMP development will also identify the responsible parties for tasks identified and will provide estimates of the total feasibility study cost and local share. The PMP will be negotiated between the Corps and the non-Federal sponsor to ensure the work required for the feasibility phase is carefully developed and considered. The reconnaissance study ends and the feasibility phase begins when a Feasibility Cost Share Agreement (FCSA) is executed between the Corps and non-Federal sponsor. By law the overall duration of the Reconnaissance Phase shall normally be no more than 12 months and in all cases limited to 18 months.

3.0 LOCATION OF STUDY, NON-FEDERAL SPONSOR AND CONGRESSIONAL DISTRICTS

3.1 Study Area

Charleston Harbor is a natural tidal estuary formed by the confluence of the Cooper, Ashley, and Wando Rivers. The total area of the Harbor, which is located about midway on the South Carolina coastline, is approximately 14 square miles. Charleston Harbor is bordered by the Atlantic Ocean to the east, the city of Charleston to the west, Mount Pleasant and Sullivan's Island to the north and James Island and Morris Island to the south (see Figure 1). The harbor is approximately 140 statute miles southwest of the entrance to Cape Fear River, NC and approximately 75 statute miles northeast of the entrance to Savannah River, GA. The study area is located in Berkeley and Charleston Counties, South Carolina.

3.2 Project Sponsor

The potential non-Federal sponsor for the Feasibility phase of the study is the South Carolina State Ports Authority.

The study area lies within the jurisdiction of these South Carolina Congressional Districts:

1) 1st – Representative Henry E. Brown (R)
2) 6th – Representative James E. Clyburn (D)

Both Congressional Districts are served by Senators Lindsey Graham (R) and Jim DeMint (R).

4.0 EXISTING PROJECT, PRIOR REPORTS AND STUDIES

4.1 Existing Project

The entrance to Charleston Harbor is flanked by a dual weir-jetty system 2900 feet apart. Construction of the rubble mound jetties was completed by the Corps in 1895. The south jetty extends seaward from the northern end of Morris Island and is 19,104 feet in length. The north jetty extends seaward from the southern tip of Sullivan's Island and is 15,443 feet in length. The top elevation of the jetties is approximately 12 feet above mean low water (MLW). The existing Federal navigational project includes a 17-mile long, 47-foot deep, 800-foot wide entrance channel[1] extending from the 47-foot ocean contour to the entrance of the harbor between Sullivans Island and Morris Island. At the entrance to the harbor, the channel transitions to a depth of 45 feet with a varying

[1] The authorized entrance channel includes a 42-foot deep x100-foot wide "strip" on each side of the main 800-foot wide center portion of the channel, resulting in a total channel width of 1000 feet.

Figure 1 - Study Location

width of 500 feet to 900 feet and extends approximately 15½ miles up the Cooper River to the South Carolina State Ports Authority (SCSPA) North Charleston Terminal[2]. An additional 2.3 mile long, 45-foot deep, 400-foot wide channel extends up the Wando River to the SCSPA Wando Welch Terminal. The SCSPA operates 5 terminals in Charleston Harbor (Union Pier Terminal, Columbus Street Terminal, Wando Welch Terminal, Veterans Terminal, and North Charleston Terminal) and has begun construction of a sixth terminal. In addition to SCSPA, there are several other private terminals operating in Charleston Harbor. The mean and spring tidal ranges in the entrance channel are 5.1 feet and 5.9 feet, respectively.

The Charleston Harbor Federal navigation channel also includes Shipyard River. Shipyard River provides an entrance channel 300 feet wide and 45 feet deep from deep water in the Cooper River to a lower turning basin, and then a 200-foot wide by 30-foot deep channel to an upper turning basin. The lower turning basin and upper turning basin are 45 and 30 feet deep, respectively. This channel serves several private terminals. This channel was originally a separate authorization (River and Harbor Act of July 25, 1912), but was incorporated into the overall Charleston Harbor Federal Navigation channel in WRDA 1986. The mean tidal range in Shipyard River is 5.3 feet above mean low water, and the spring tide is 6.1 feet above mean low water.

A small 110-foot wide by 10-foot deep shallow-draft navigation channel also extends through the harbor, behind Crab Bank and up Shem Creek to Mount Pleasant. This channel serves the shrimping and fishing industry. This channel was originally authorized in 1940 by House Document 259, 76th Congress, 1st Session. Additional authorization to modify the channel to its present dimensions was provided in 1960 by House Document 35, 86th Congress, 1st Session.

The Charleston Harbor Federal Navigation channel is able to be maintained in a manner that has minimal adverse impact to shipping. Most of the project is regularly maintained to its full authorized project depth and width. Decisions to not maintain a section of the channel to its full depth and width are driven by budget constraints. Budget constraints have also affected the frequency of dredging (i.e., the time between dredging events has sometimes been lengthened) and decisions on dredging areas with lower shoaling rates (i.e., areas that have experienced lower shoaling rates are occasionally skipped until the next dredging cycle). The areas of the channel that are not maintained to their full depth and width are: the anchorage basin, the Shem Creek channel, and part of the entrance channel. Regular maintenance of the anchorage basin has been discontinued since the closure of the Charleston Naval Base in 1996. The Shem Creek channel is rarely maintained (i.e., 2004 and 1994 were the most recent maintenance dredging events in Shem Creek). The only sections of the entrance channel that are not regularly maintained are the 42-foot deep, 100-foot wide strips on each side of the main 47-foot deep channel.

[2] The width of the channel varies from 500 feet to almost 900 feet with the wider sections located at channel bends and the narrower sections located at the longer straight-aways. Most sections of the channel have a width of 600 feet.

4.2 Prior Reports and Studies

The River and Harbor Act of 1852 initially authorized navigation improvements to Charleston Harbor. Later, the passage of the River and Harbor Act of 1878 authorized the deepening of a channel through the ocean bar to a depth of 21 feet MLW, as well as the construction of a pair of jetties as a means of stabilizing the new channel. In 1898 and 1904, additional dredging occurred in Charleston Harbor to secure channel depths of 26 and 30 feet deep, respectively. In October 1940, a 35-foot project was authorized, which provided for a channel from the 35-foot ocean contour up the Cooper River to the North Charleston Terminal area.

An October 1974 Interim Feasibility Report, as supplemented by a 1980 Phase I Advanced Engineering and Design Study of Charleston Harbor, recommended that Charleston Harbor and Shipyard River Entrance Channel be modified to provide for construction and maintenance of a 40-foot deep navigational channel 26.97 miles in length from the 42-foot ocean contour to the North Charleston Terminal on the Cooper River; a 38-foot deep channel in Shipyard River and 38-foot depths in both the upper and lower turning basins. A January 1984 report for Charleston Harbor, Wando River Extension recommended: (1) Federal maintenance of the Wando river navigational channel that had been completed by the South Carolina State Ports Authority in 1981 and (2) deepening of the Wando River channel from 35 feet to 40 feet. This project was completed in 1996.

In March 1990 and August 1990, the Senate Committee on Environment and Public Works and the House Committee on Public Works and Transportation, respectively, adopted resolutions that authorized the study of improvements to be made to Charleston Harbor in the interest of navigation with a particular view toward deepening and/or widening. Based on a 1996 Feasibility Study, Congress authorized further deepening of the Federal channel to its present configuration which includes a 47-foot deep entrance channel and a 45-foot deep inner harbor channel.

Construction of the authorized project was initiated in 1998 with the removal of a contraction dike at the southern tip of Daniel Island. Since that time, the entrance channel, the lower harbor (including Wando River), and the upper harbor (including Shipyard River) have been dredged to 45 feet. All of the authorized 1996 changes have been completed with the exception of the Daniel Island Turning Basin, as construction of the turning basin was contingent upon the construction of a new SCSPS six-berth terminal on Daniel Island. Plans to build the terminal on Daniel Island have been canceled, and replaced with plans for a smaller, three-berth terminal across the river at the former Charleston Naval Base. Relocation of the terminal has prompted the Corps to initiate a Post-Authorization Change Report to evaluate relocation of the authorized, but unconstructed, Daniel Island Turning Basin.

5.0 PLAN FORMULATION

An assessment of water and related navigation problems, needs and opportunities is presented in the study area. General discussions are included on existing conditions assessments, expected future conditions, and statement of specific problems and opportunities with emphasis on problems warranting Federal participation in more detailed feasibility studies.

The discussion that follows presents the results of the initial iterations of the planning steps that were conducted during the reconnaissance phase.

5.1 Federal Objectives

The National or Federal objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to National Economic Development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the study area and the rest of the nation.

5.2 Planning Objectives

The objectives of this reconnaissance study are to:

- Investigate and analyze existing vessel size and movement information to determine impacts, if any, caused by the current 45-foot channel depth.
- Investigate and analyze future vessel size and draft projection data over the expected life of the project to forecast additional channel depth requirements up to and including 50 feet.
- Identify on a preliminary basis the environmental and cultural resource impacts and concerns associated with additional channel depth.
- Determine whether or not there is Federal interest in initiating a feasibility study to further deepen Charleston Harbor in order to service an evolving shipping fleet that is using larger vessels.
- Identify the initial feasibility phase scope (early PMP development).
- Identify a non-Federal sponsor and develop and execute a Feasibility Cost Sharing Agreement (FCSA).
- Develop a recommendation to initiate the feasibility phase.

5.3 Problems and Opportunities

This section describes the need for harbor navigation improvement in the context of problems and opportunities that can be addressed through water and related land resource management. Problems and opportunities statements will be framed in terms

of the Federal objective and the specific study planning objectives. Problems and opportunities are defined in a manner that does not preclude the consideration of all potential alternatives to solve the problems and achieve the opportunities.

5.2.1 Problem Identification

The existing authorized navigation project was designed in the early 1990's to accommodate dry bulk, tanker, and container vessels limited to a draft of about 42 feet. While this may be sufficient for Panamax-class vessels and generation 1 Post-Panamax vessels, newer and larger vessels are expected to require drafts that exceed the design of Charleston Harbor.

- This limits opportunities to accommodate these larger class vessels which are a growing percentage of the world fleet, and allow for economies of scale and transportation cost savings.

- Growth trends in container traffic indicate that the Container ports will need to handle more traffic with expected population growth in South Atlantic Region. Traffic will be exacerbated by an expected shift in trade routes from the West Coast to the East Coast with the opening of the Panama Canal Expansion project, scheduled for completion in 2014. Lack of ports available to handle these larger Container vessels would result in inefficiencies in commodity movement as well as safety concerns resulting in increased transportation costs.

Existing Container services are now deploying Post-Panamax vessels that are calling in Charleston Harbor. These vessels are being forced to delay waiting for tidal advantage due to draft restrictions. The recent shift in trade to heavier export cargo is making this condition more pronounced, as deeper draft vessels have increasingly smaller tidal windows in which to operate, for both incoming and outgoing transits.

5.2.2 Opportunities

Since 2000, the total value of international trade has risen by over 40 percent and it is becoming a larger part of our national economy. The combined value of foreign trade (imports and exports) represented 13 percent of GDP in 1990, rising to nearly 22 percent in 2006. If this trend continues, it is projected that the value of U.S. foreign trade will be equivalent to 35 percent of the Nation's GDP in 2020 and 60 percent in 2030. Marine transportation will become even more important to our economy as 95 percent of America's foreign trade is moved by ship. The bottom line: to sustain expected growth, it is estimated the U.S. must expand its overall port capacity by 10 percent annually. This would require port expansion, mainly on the West Coast, Gulf Coast and South Atlantic. That is the equivalent of adding capacity equal to the Port of Oakland every year.[3]

[3] United States Department of Transportation Maritime Administration. "The Maritime Administration and the U.S. Marine Transportation System: A Vision for the 21st Century." November 2007.

The Charleston port district's ranking as a global trading port is consistently in the top ten nationally in container traffic and cargo value. In 2009, the Charleston port district was ranked ninth (out of 200 deep-draft ports) in cargo value[4], and ninth (out of 80 container ports) in container traffic.[5]

Shipping trends in Charleston show adherence to projections for considerable growth in ship size, in all three dimensions, draft, beam, and length. As economies of scale and improved vessel technologies have driven ship sizes larger, the world's port infrastructure must be rapidly expanded in channel depths and widths and terminal capacity to accommodate larger ships. The number of ports able to handle larger vessels around the world is growing, and, most importantly, the Panama Canal is currently expanding lock capacity to handle ships of 25% greater draft (up to 50 ft), 52% greater beam (up to 160 feet), and 30% greater length (up to 1250 feet). Ships have been under construction for several years to be ready for the new canal capacity when the new Panama Canal locks open in 2014.

There is opportunity to deepen the navigation channel at Charleston Harbor to accommodate larger container vessels. Particularly important is the great increase in the deployment of those vessels, which is occurring now and expected to increase when the Panama Canal Expansion Project is completed in 2014. These larger vessels, commonly referred to in the shipping industry as the "Super Post-Panamax" vessels, are expected to comprise greater percentages of vessel fleet composition over the next several decades. This transition to larger vessels is expected to occur rapidly and current Panamax vessels are expected to no longer be used in the Asia service by 2024. Additional depth would be required to serve existing users of Charleston Harbor by that time, as the transition from the current Panamax fleet is complete.[6]

5.4 Planning Constraints

The planning constraints identified in this preliminary analysis are as follows:

> Compliance with applicable Executive Orders, Statutes and Regulations including but not limited to: Archeological and Historic Preservation Act; Archeological Resources Protection Act; National Historic Preservation Act; Clean Air Act; Clean Water Act; Coastal Barrier Resources Act; Coastal Zone Management Act; Magnuson-Stevens Fishery Conservation and Management Act; Marine Mammal Protection Act; Marine Protection, Research, and Sanctuaries Act; Endangered Species Act; and National Environmental Policy Act.

[4] U.S. Census Bureau Trade Data Branch report FT920 Tables 1&6
[5] USACE Navigation Data Center U.S. Waterborne Container Traffic by Port/Waterway (2008)
[6] Ralph, Bill. "Some thoughts on what the future holds for the Economy & our Ports," South Atlantic & Caribbean Ports Association Meeting. 6 Nov 2009. <http://aapa.files.cms-plus.com/SeminarPresentations/2009Seminars/09Facilities/09FACENG_Ralph_Bill.pdf>

5.5 Planning Criteria

The following are preliminary criteria for evaluating proposed project alternatives. These criteria will be finalized in the feasibility report.

1) The navigation project must be economically justified with expected benefits exceeding cost over the 50-year project life.
2) The recommended alternative will provide a long term solution that is technically and environmentally feasible.

5.6 Potential Alternatives

The reconnaissance level alternatives analysis does not constitute a complete analysis of the full array of potential alternatives nor does it define a preferred alternative or National Economic Development (NED) plan. Detailed analyses are expected to be conducted in the proposed feasibility phase and would likely involve evaluation of all alternatives to address the problems and opportunities. The array of alternatives that may be examined in the feasibility study would likely include navigational improvements to some or all of the channels in Charleston Harbor, including (1) deepening channel(s) up to 50 feet MLW or more, (2) widening channel(s), (3) adjusting existing channel alignments/bend easing, and (4) widening and/or lengthening turning basins.

5.6.1 Evaluation of Alternatives

During the feasibility phase, Charleston Harbor will be evaluated to identify the extent to which the array of alternatives will be applied to each reach. Problems and opportunities pertinent to each reach will be identified and investigated. A matrix of reach specific alternative plans will be developed and evaluated to produce a recommended plan for improvements to Charleston Harbor. This process will include the appropriate level of engineering, economic, and environmental analyses to identify all possible benefits and impacts associated with the projected navigational improvements.

5.6.2 Deepen the Existing Project

Additional channel depth would allow current and future shippers to more fully utilize larger class vessels and would reduce anticipated future congestion. The current depth of the existing inner harbor channel is 45 feet. The Entrance Channel from the Atlantic Ocean through the jetties is 47 feet deep to allow for wave action. For the purposes of this reconnaissance level study deepening the existing inner harbor to depths of 48 feet and 50 feet was investigated (including 2 additional feet in the Ocean entrance channel). A project depth of 50 feet is often discussed as a way for East Coast US ports to prepare for the expansion of the Panama Canal, expected to open in 2014. A depth of 48 feet, though shallower than the preferred depths documented by the pilots

and SCSPA, may reasonably accommodate the Post Panamax vessel with some tidal delays and/or lightloading. The benefits and costs of these and other alternatives will be fully evaluated in the Feasibility Study, including depths greater than 50 feet.

5.6.3 No Action Alternative

The No Action alternative would involve no action on the part of the Corps of Engineers. The existing navigation channel would remain at its current authorized depth, dimension and location. This alternative will be considered further in the feasibility phase and will also be used as a basis of comparison to all action alternatives considered.

5.7 Project Area Conditions: Existing, Future-with and Future-without Conditions

5.7.1 Project Area Conditions: Historic

The port of Charleston is a major strategic and economic national asset. The Charleston port district's ranking as a global trading port is consistently in the top ten nationally in cargo value and container volume. In 2009, the Charleston district was ranked ninth in cargo value and ninth in container volume. The most important containerized imports, by tonnage, are chemicals, machinery and textiles. More than 2,100 vessels from ports around the world called at the Port of Charleston in 2007. Of these, 74 percent were container ships, 8 percent were tankers, 4 percent were dry-bulk carriers, and 4 percent were general cargo vessels. The major commodities handled at the port included agricultural products, consumer goods, machinery, metals, vehicles, chemicals, and clay products.

The 1996 Feasibility Study projected various future commodity movements to reach the conclusion that Charleston Harbor should be deepened to 45 feet. That study placed greater emphasis on bulk commodities (coal, grain) and liquid bulk (gasoline, fuel oil, chemicals) compared to containerized traffic. In comparing the report projections to the actual commerce through 2008, the liquid bulk movements have been larger than expected, the dry bulk movements have been less than expected, and the container movements were in the first few years greater than expected but more recently were less than projected. A new bulk commodity of iron ore and steel scrap has been brought in as a result of the opening of Nucor Steel plant in the late 1990s, and Charleston Harbor has handled about 1,000,000 tons since 2000.

The historic tonnage retrieved from Waterborne Commerce show an increase in tonnage bulk commodities – gasoline, distillate fuel oil, residual fuel oil, lubricating oil, grains, coal, and iron carbide from 2004 through 2008. In 2005, gasoline receipts at Charleston Harbor totaled 1.6 million tons and have remained relatively stable from 1999 through 2005 with the exception of a significant drop in 2003. In 2005 and 2006, an average of about 26 million short tons of waterborne commerce were moved through the harbor, although this had decreased to about 21 million in 2008 as a result of the recession. The primary exports are chemicals, paper, and wood pulp. Petroleum

products, coal, chemicals, cement, bauxite, non-ferrous metal products, and primary iron and steel products are the major commodities for Charleston Harbor. Increases in tonnage are attributable especially to expected increases in tonnage in petroleum, break-bulk, and containerized cargo. Decreases in tonnage have been mostly grain and coal related.

Between 1999 and 2005, receipts of distillate fuel oil have increased, exceeding the historical highs in the late 1970's of nearly 700,000 tons. Tonnage increased from 607,000 tons in 1999 to 832,000 tons in 2005. Tonnage dipped in 2002 to 508,000 tons, but reached an all-time high of 906,000 tons in 2004. In the 1996 report, projections of distillate fuel oil tonnage were also based on Department of Energy projections, of 457,000 tons in 2002 and 558,000 tons in 2012, which were largely underestimated in the 1996 Feasibility Study.

Containerized traffic in Charleston Harbor showed significant growth when the 45-foot project was constructed in the late 1990s. Container traffic grew from over 1.2 million TEUs in 1998 to over 1.6 million in 2003. Since 2005, Container traffic has been flat to down. From 2007 to 2009 containerized traffic and break-bulk have experienced a decline. The recent decline in container traffic is likely related to the current global economic conditions. The current economic recession has impacted commerce in many sectors of the economy both nationally and internationally. It should be noted that this trend is a snapshot of activities from 2007 to 2009 and is likely to change when the economy recovers from its recession. Data obtained from Port Container Traffic from December 2008 to December 2009 reveal that other major ports in the US have also experienced a significant decline in container traffic.

5.7.2 Project Area Conditions: Existing

The existing conditions are defined in this report as the project conditions that exist today (2010) plus any changes that are expected to occur prior to project year one, anticipated in 2020. The Charleston Harbor 45-foot project was designed to serve Panamax Container vessels and similar size container vessels limited to a draft of about 42 feet. When the project was authorized in 1996, Sub Panamax and Panamax vessels made up about 80 percent of the Container capacity in the World Fleet and newbuild vessels. Since then, larger Post Panamax and Super Post Panamax classes of vessels are making up increasing percentages of newbuild vessels and the World Fleet.

The South Atlantic Region is one of the fastest growing parts of the Country. Five South Atlantic States (North Carolina, South Carolina, Georgia, Alabama and Tennessee) and North Florida have been designated as the Piedmont Atlantic MegaRegion. The population of this MegaRegion in 2000 was 34 million people (over 12% of the total U.S. population), and it is expected to grow to over 57 million by 2050.[7]

[7] Georgia Institute of Technology, Center for Quality Growth and Regional Development. *Emerging MegaRegions: Studying the Southeastern United States*, January 2006 (http://smartech.gatech.edu/handle/1853/10694/browse?type=type&order=ASC&rpp=20&value=Technical+Report)

Much of this growth is occurring in a crescent-shaped area of economic activity from Raleigh-Durham, NC to Birmingham, AL and includes Charlotte, NC and Atlanta, GA. This region is growing faster than the surrounding areas and much faster than the US as a whole. The port of Charleston is ideally suited to serve this growing part of the nation.

Over the years, containerized cargo has taken over a large proportion of the worldwide general cargo trade. A 2001 Society of Naval Architects and Marine Engineers (SNAME) paper reported that 70% of all cargo was being shipped in containers and projected that by 2010, 90% of general cargo would be containerized.[8,9] As newly-built containerships are introduced into worldwide waterborne trade, it is expected that a growing share of these new ships will be Post-Panamax vessels similar to that of the sixth generation design. These larger ships will be deployed in response to increases in container cargo volume, as well as from pressure to transport goods at a faster rate and with lower slot costs (the cost of shipping a single container).

Both long term and short-term data acquired from the local ship pilots indicates steady increases in the draft and size of ships calling on Charleston. Annual average ship drafts for the largest ships, those with drafts over 38 feet, increased to greater than 40 feet in 2010 (based on partial year data for 2010), as shown on Figure 2.[10]

Monthly data trends show a steady increase in ships' draft and size in the months following the worst of the recession, beginning in July 2009, through February 2010. In this eight month period, ship drafts increased from less than 31 feet to over 33 feet for all piloted ships, and from less than 40 feet to nearly 41 feet for the largest ships, those over 38 feet in draft. Gross tonnage of ships also increased with similar trends for both categories: all ships, and the largest ships over 38 feet draft.[11] As Container traffic grows over the next few years, these ships will be able to handle additional cargo and increase their sailing drafts closer to their design drafts. This draft increase will restrict vessel calls to certain tide conditions, create delay and may cause diversions to more distant ports. These problems would bring inefficiency into the logistics system and increase transportation costs.

New ships built to take advantage of the Panama Canal improvements are already sailing to the U.S. Charleston is one of the U.S. ports capable of handling some of these vessels now, but is restricted by tide. Since February 2010, seven ships have called to the Port of Charleston with more than 8,000 TEU (Twenty-foot Equivalent Units) in capacity. Strategic and economic objectives indicate a compelling need for U.S. ports to be able to accommodate these new larger ships without tide restriction, in channels wide enough to accommodate two-way traffic, so these ships can bring their

[8] Payer, Hans G. *Technological and Economic Implications of Mega-Container Carriers,* SNAME Transactions, Vol. 109, 2001, pp. 101-120.
[9] While this projection appears to not have come true, most likely due to the current worldwide recession, there is still an upward trend in the percentage of cargo that is shipped in containers.
[10] USACE Navigation Data Center Waterborne Commerce of the U.S. CY 2004 -2008 Atlantic Coast
[11] Charleston Branch Pilot Association Data for 2009 and 2010

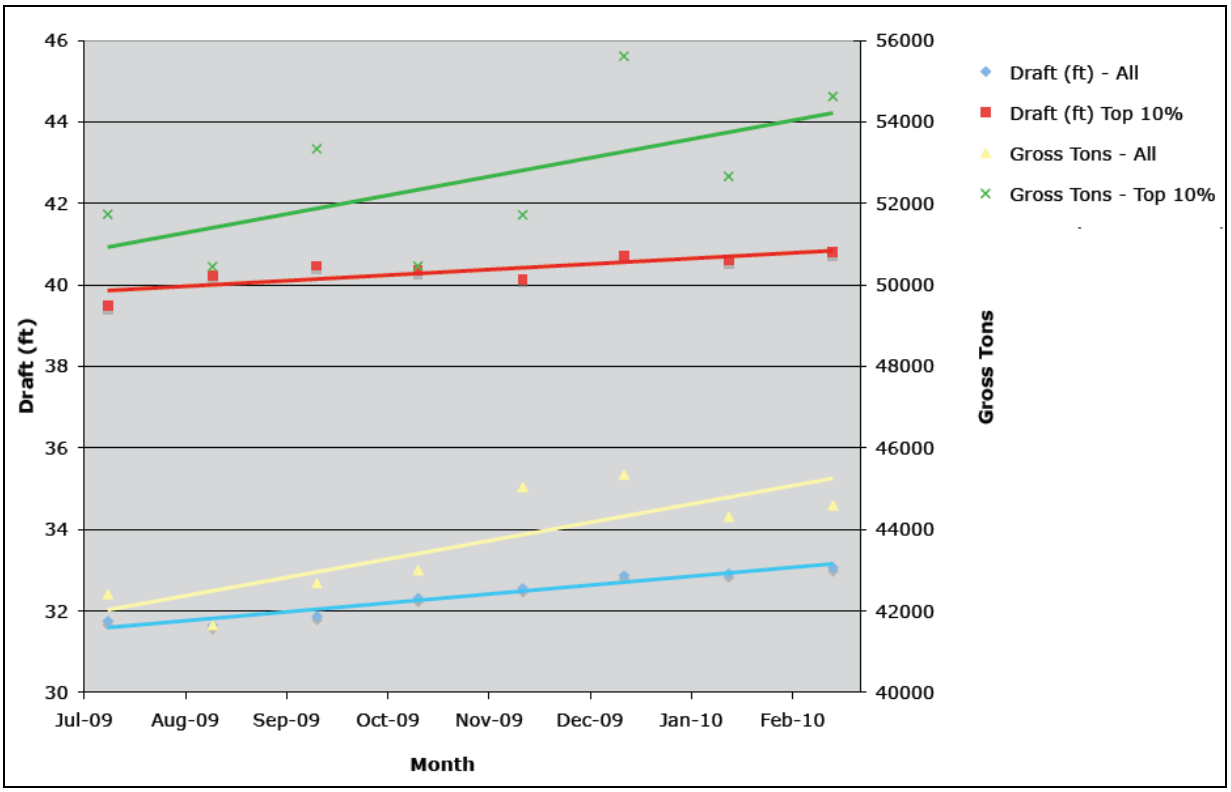


Figure 2 - Piloted Vessels: Monthly Averages – July 2009 thru February 2010

full economic efficiencies to U.S. ports and businesses trading in global markets and fulfilling global strategic missions. Draft and tide constraints cause light loading and transit delays, resulting in higher transportation costs or diversions to less appropriate ports.

In February 2010, Mediterranean Shipping Company's MSC Rita, the largest container carrier ever to call at the Port of Charleston, docked at the Wando Welch Terminal. Measuring 1063 feet long and with a breadth of 141 feet, the Rita brings with it a nearly 48-foot draft when fully loaded. That's significant as it implies current demand to use Charleston Harbor by ships that can only use the harbor at high tide when fully loaded.

The shipping industry continues to move toward these colossal vessels in anticipation of the expanded Panama Canal's opening in 2014. The service between the U.S. East Coast and Asia currently deploys 12 Post-Panamax vessels with capacity of 6,050 20-foot equivalent units (TEU). Typically, a vessel with a capacity of 6,000 TEU's draws a draft of 46 feet when fully loaded. According to industry statistics from DREWRY[12],

[12]DREWRY SHIPPING CONSULTANTS, 2001, *Post-Panamax Containerships – The Next Generation*, London

72% of current vessels on order are Post-Panamax (5,000+ TEU) and 55% are over 8,000 TEU, which reflects future vessel fleets. Most of these container ships draw deepest draft and mostly carry break-bulk.

Charleston has the deepest channels on the South Atlantic coast, capable of handling large ships and vessels drawing up to 47 feet of water (limited to a tide window of 2 hours per day). However, as shown in Table 1, to receive 24-hour access in the Port of Charleston, ships have to be drafting 43 feet or less and will be constrained by tide beyond that. Container ships are among the deepest drafting ships calling on Charleston Harbor, and their tight schedule and expensive delays causes them to avoid waiting on tidal advantage. Note that a container ship calling at a greater than 43-foot draft could be delayed on both the inbound and outbound voyage, compounding the problems with tight schedules and valuable cargo.

According to the SCSPA, 495 ships of design draft 43 feet or greater called the Port of Charleston from December 2008 to December 2009. All of the ships with a draft of greater than 43 feet would be constrained by tide if they were fully loaded. Without additional depth Charleston Harbor will continue to impose a constraint on the use of larger vessels. Vessels with deeper draft will be able to take advantage of deeper channel and reduce transportation costs from tidal delays and light loading. The recent shift to heavier export cargo is causing vessels to sail at closer to their design drafts, resulting in tidal delays and light loading that increase transportation costs.

Of the 37,242 commercial ships in the entire world listed by Lloyds Register of sufficient size to require a pilot entering Charleston, 5914 have full load drafts in excess of 43 ft (Charleston's current 24 hour draft limit), and 2494 have full load drafts greater than 48

Table 1 - Tidal Limitations on Port of Charleston Vessel Draft

Hours/Day Available for Inbound or Outbound Transit	Vessel Draft
24	38
24	39
24	40
24	41
24	42
24	43
16	44
12	45
8	46
6	47
2	48

feet (Charleston's current high tide draft limit). Thus, 16% of the world's ocean-going ships are currently restricted either by tide or cargo carriage to trade in Charleston and 7% cannot trade when fully loaded on any stage of tide.

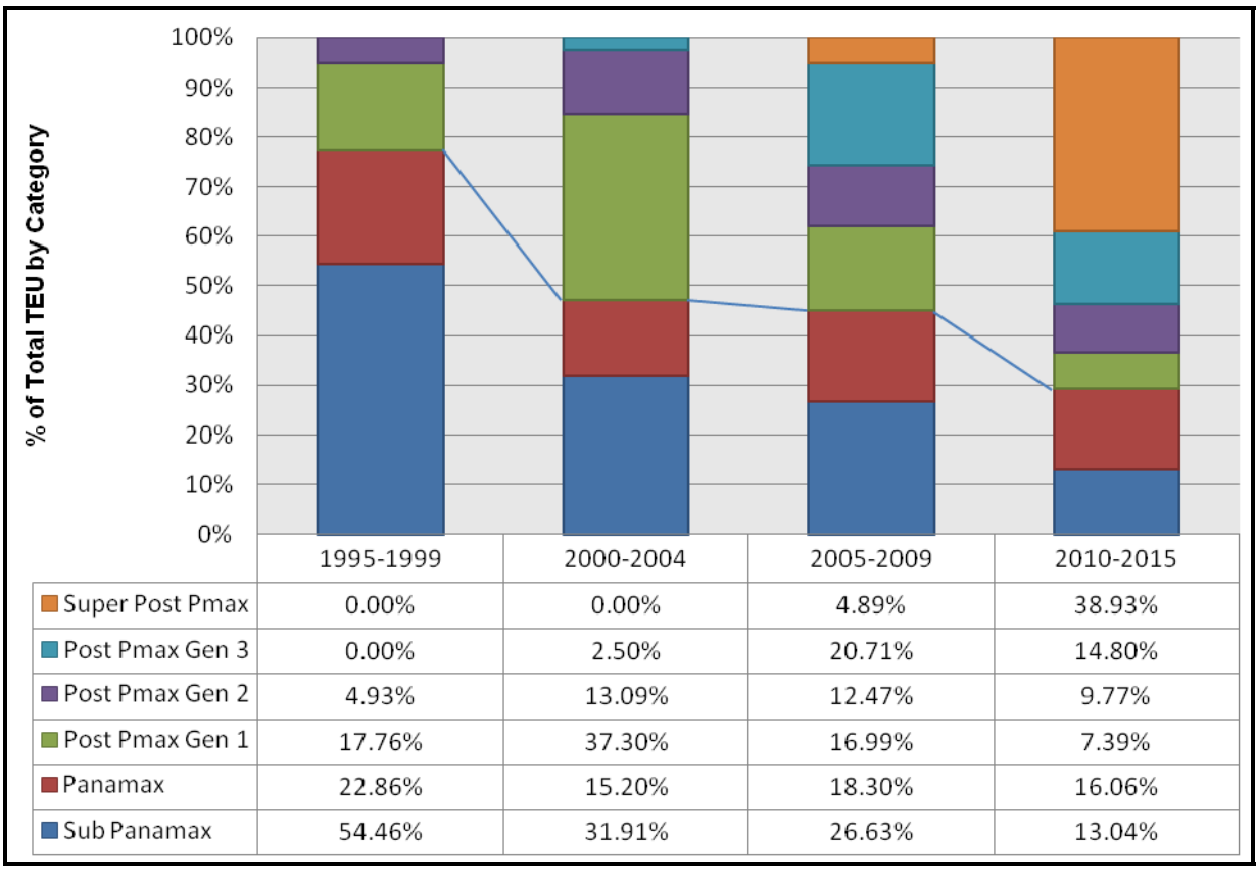
Note that these draft accommodations are available today because the harbor has been completely maintained, including advanced maintenance, from both regular operations and maintenance funding, along with supplemental ARRA funding. When ARRA funding is no longer available, regular O&M funds may not be sufficient to support draft conditions in the table above.

One of the trends that are causing Container ships to sail at deeper drafts is the shift in trade from imports to exports. Export containers are generally heavier than imports, weighing 12-14 tons per TEU as compared to 8.5 to 10 tons. Charleston currently has a mix of 54 percent export and 46 percent imports. Historical ship drafts fail to account for the recent shift to exports, and ships are now sailing much deeper. In all of CY 2009, Charleston handled 15 vessel calls (30 transits) having a draft over 43 feet and requiring some amount of tidal advantage. For the first 6 months of 2010, that number has increase to 45 vessel calls (90 transits). And 28 of those 45 vessel calls have been over 44 feet, with the tide limiting channel availability to 12 hours or half a day. This is due to the trend toward greater exports, an economic plus for the Nation and the Region, and a shift to larger, deeper-draft vessels.

5.7.3 Project Area Conditions: Future

The with and without project conditions represent future states beginning in project year one and extending over a 50-year period of analysis. For the purposes of this reconnaissance study, the years 2020 through 2070 will be examined. The purpose of identifying the differences between the with and without project conditions is to note the changes that would be expected to occur in the future as a result of the project compared to the conditions that would occur in the future without the project. As a result of these different conditions, project benefits and project related costs can be identified and quantified. The without project condition is the most likely condition expected to exist over the 50-year period in the absence of the proposed project, including any known changes in the law or public policy. In other words for this project, the without project conditions are those that are expected to occur over time without further channel deepening and/or expansion of the existing harbor facilities.

Figure 3 shows the percentage of total TEU for each ship category for 1995-2015 worldwide. For containerships on order with delivery dates between 2010 and 2015, more than 70 percent of the total orders are on Post Panamax size vessels and almost 40 percent of the total orders are on Super Post Panamax alone (the largest class for which the Panama Canal Expansion project was designed). The average size Containership newbuild has increased from about 2,000 TEU when Charleston Harbor was authorized to 45-feet to about 5,500 TEU for expected deliveries in the next few years. Many of these new vessels will be too large to serve the existing Charleston Harbor, and many other existing South Atlantic ports.



	1995-1999	2000-2004	2005-2009	2010-2015
Super Post Pmax	0.00%	0.00%	4.89%	38.93%
Post Pmax Gen 3	0.00%	2.50%	20.71%	14.80%
Post Pmax Gen 2	4.93%	13.09%	12.47%	9.77%
Post Pmax Gen 1	17.76%	37.30%	16.99%	7.39%
Panamax	22.86%	15.20%	18.30%	16.06%
Sub Panamax	54.46%	31.91%	26.63%	13.04%

Figure 3 - Total TEU by Ship Category

Even more recent information on ships on order show that 75 percent of the capacity is on Post-Panamax vessels. Evergreen Lines, one of the largest carriers in Charleston, has recently ordered 35 vessels with a reported capacity of 9,200 TEUs each.

The State of South Carolina continues to grow rapidly, principally in its Metropolitan areas of Charleston, Columbia, and Greenville-Spartanburg. The state is also growing in jobs and income, thus producing a larger share of the Gross National Product.

Future projections show South Carolina growing from about 4.5 million people today to about 6.1 million in 2050. The Gross State Product for South Carolina has grown about 65 percent in the period from the previous study in 1996 until 2010.

5.7.4 Economic Considerations

The Port of Charleston is one of the most important Container ports in the United States and also serves as one of the most important economic drivers for the State of South Carolina. Today the Port handles between 20 and 26 million tons of cargo, including about 1.5 million TEUs, and is responsible for $45 billion in total economic output and

over 260,000 jobs across its home state. A key component in the Port of Charleston's continued success is its harbor depth. However, its current depth of 45 feet is only able to accommodate the newer deep draft Container ships under the most optimal conditions. Without an increase to the harbor's depth, the deep draft ships that will dominate world trade in a few years will be forced to wait for optimal tides, be light loaded, or call on more distant ports, thereby increasing transportation costs for the nation's businesses and consumers. Should this happen, the efficiency of the port and the opportunities for South Atlantic customers would be degraded.

According to the Charleston Branch Pilots Association, in order to meet trade demands in the next phase of ocean trades currently served by the Port of Charleston, the project depths must support larger vessels than the harbor is currently designed to serve. These newer generation Container ships require a minimum ship draft of 48 feet on any stage of tide, and 52 feet on high tide, to support fully loaded ships exporting to and importing from Asia, Europe, and through other high volume trade routes. To allow for adequate underkeel clearance, project depths are recommended to exceed these ship draft targets by 10% inside the harbor and by 20% in exposed waters. These objectives, which would require deepening Charleston Harbor to 50 feet, would allow 93% of the world's current ship fleet to trade in Charleston fully loaded on any stage of tide, and 95% on high tide, including container ships up through 11,000 TEU. While these draft limits are a great improvement over the port's current capability, even these aggressive deepening objectives would exclude existing 12,000 TEU ships (the design vessel for the Panama Canal Expansion Project) from trading in the port fully loaded. Clearly, a study of increasing the depth of Charleston Harbor beyond 45 feet is urgently needed.

Research on the largest cargo ships calling on Charleston in late 2009 and early 2010 revealed that these ships carry 2600 tons to 3600 tons of cargo for each foot of draft, for typical 6000 TEU ships and 8000 TEU ships respectively[13]. Thus, for each additional foot of channel depth, the largest container ships could each carry 3600 tons of additional cargo on every voyage. This equates to approximately 250 additional twenty-foot containers (TEU)[14] for each additional foot of channel depth on each voyage. In dollar value, taking the total declared value of cargo traded through Charleston in 2008 ($62.4 billion[15]), by the total tons traded through Charleston in 2008 (20.9 million tons[16]), a gross average cargo value of nearly $3000 per ton can be derived. Thus, each additional foot of channel depth affords each 8000 TEU container ship the ability to trade over $10 million more cargo on each voyage for both imports and exports, and each 6000 TEU container ship to trade over $7 million more cargo for every foot of additional channel depth on each voyage.

[13] TEU: 20 foot equivalent shipping container unit; one 40 ft container is two TEU.
[14] Assuming 14 tons per TEU based on industry research
[15] U.S. Census Bureau Trade Data Branch report FT920 Tables 1&6
[16] USACE Navigation Data Center Waterborne Commerce of the U.S. CY 2008 Atlantic Coast

Studies have shown that a 5,000 TEU vessel with a speed of 25 knots will yield a 67% savings compared with a 3,000 TEU vessel with a speed of 21 knots[17] and a fully-loaded 6,000-TEU Post-Panamax vessel will offer a 20% savings compared with a fully-loaded 4,000 TEU Panamax vessel.[18] Furthermore, economic analyses conducted as part of the feasibility and design studies for an 8,000 TEU vessel have shown that the fuel consumption per TEU-mile decreases with an increase in the size of the ship.[19] Therefore, by increasing the speed and size (i.e., capacity) of containerships, shipping firms are able to realize economies of scale, thus realizing cost savings and improving their efficiency.

Due to the nature of economies of scale, only large shipping firms with a big enough demand for their services are able to attain lower unit costs. Therefore, firms within the shipping industry have been moving towards consolidation. Consequently, there has been a growing concentration of container capacity among a declining number of ocean carrier lines. Currently, the top 25 carriers control approximately 70% of the worldwide container carrier capacity. Therefore, additional channel depth would allow current and future shippers to more fully utilize larger class vessels and would reduce transportation costs and help alleviate anticipated future port congestion**.**

5.7.5 Preliminary Analysis of Alternative Plans

The Preliminary economic considerations documented below are a preliminary analysis of potential benefits attributable to the proposed navigation improvement. Detailed analysis would be conducted in the feasibility phase and would involve economic evaluation of all reasonable alternatives to address the problems and opportunities.

Benefits for the proposed 50-foot project are based on transportation cost savings for the expected container throughput. These benefits were developed using a cost per mile analysis, utilizing information from Corps of Engineers findings on transportation costs per Twenty Foot Equivalent Units (TEU) using different size vessels.[20] Transporting containers using Panamax ships at typical service draft costs about $30 per TEU per 1,000 miles sailing distance. Using various trip lengths from 4,000 to 11,000 miles (depending on trade route) results in TEU costs from $120 to $330 each way for shipping from Northern Europe, the Far East and South Asia. Shifting those containers to Post-Panamax ships saves about 20 percent or $24 to $66 per TEU. Weights were developed based on analysis of expected number of TEUs transported along trade routes in Charleston Harbor. When the savings are weighted by the number of TEUs on each route, the average savings are about $48 per TEU. Table 2 summarizes the calculation of potential benefits.

[17] I.A.P.H. Trade Affairs Committee on Ship Trends. Biennial Report on Ship Trends – 2001.
[18] Drewry Shipping Consultants.
[19] Kraus et al. “Container Transportation System of the Future”. Final Report. HDW, Kiel (1997).
[20] Moser, David. “Issues in Economics of Container Ship Driven Channel Deepening.” U.S. Army Corps of Engineers Senior Economist Meeting. June 2009.

Table 2: Trade Route Potential Benefits								
Trade Route	One-way Distance (Miles)	Current cost per TEU mile ($)	Current Cost per TEU ($)	Cost per TEU mile Post Panamax ($)	Cost per TEU Post Panamax ($)	Savings per TEU ($)	Weighting by # TEU's	Weighted Savings per TEU ($)
Far East - Panama Canal	11000	0.03	330	0.024	231	66	0.4	26.4
South Asia - Suez Canal	10000	0.03	300	0.024	240	60	0.2	12
Northern Europe	4000	0.03	120	0.024	96	24	0.4	9.6
							Total Savings	**$ 48.0**

Adjusting the total savings ($48.00) for the possibility that up to 25 percent of the container traffic may not benefit from the proposed project yields an average savings of $36.00 per TEU. The EIS prepared by the SCSPA for the proposed Navy Container Terminal projects that Container traffic in Charleston Harbor will grow at a long term rate of 4.28 percent annually. The Corps did a review of that proposed growth rate using information from the Institute of Water Resources and determined that retaining Charleston's share of the US Container trade (about 8 to 9 percent) resulted in even higher growth rates. The EIS used that rate beginning in 2002 through 2025. Current container traffic of about 1.4 million TEUs as a result of the recession is down from a recent average of about 1.5 million TEUs. It is expected that the historic base traffic of 1.5 million TEUs will be reached again in 2012. Using a pre-base year growth rate of 4.28 above gives base year traffic of 2,011,000 TEUs. Using 2.011M TEUs in the base year realizes a savings of about $72,000,000. The savings would grow to $167,000,000 by project year 20. Benefits were projected to be flat after project year 20 due to uncertainties in future growth rates beyond that time. This estimate gives a present worth of annual benefits of $126,000,000. Benefits for the proposed 48-foot project were considered to be proportional by project depth, so were estimated to be sixty percent of the benefits described above. It is estimated that all the Container terminals in Charleston Harbor, with the addition of the Charleston Navy Container Terminal, will have an existing capacity of about 4.4 million TEUs annually.

Costs are based on expected first costs for the assumed channel alignment with the described depth and dimensions. The inner harbor channels would be deepened to 48 or 50 feet, with 2 additional feet in the Outer Entrance Channel through the jetties. These numbers include the estimated costs for dredging, disposal, and project maintenance. Projections in shoaling were used to compute the increased costs of maintenance dredging, which were included to determine Average Annual costs. These costs were then increased to include interest during construction. Interest and

amortization was calculated at the current interest rate of 4 3/8 percent over the 50-year period of analysis. Cost and benefits for the proposed project depths are summarized in Table 3.

These benefits only consider container trade expected in Charleston Harbor during the period of analysis from 2020 through 2050[21]. There are currently indications that both coal export and liquid bulk shipping could also benefit from additional channel depths. These and other categories of beneficiaries will be fully explored during the Feasibility Study.

The costs for associated landside facilities would be provided by the South Carolina State Ports Authority (including berth deepening) and are assumed for this preliminary analysis to be self-liquidating. In other words, the analysis assumes the needed facilities would be paid for by the proceeds expected by their operation. Since most of the Container facilities are completed and the Charleston Navy Container Terminal is expected to be completed before the base year (currently scheduled for 2016), associated costs are not expected to be a very big part of the project costs.

This preliminary analysis contains significant uncertainty in benefit and cost estimation due to lack of availability of information. However, even with a significant reduction of the potential benefits or increase in costs, there is still a Federal interest in further study as the potential benefits would still outweigh the costs. Preliminary studies at other nearby harbors show that Charleston Harbor would probably be the cheapest South Atlantic harbor to deepen to 50 feet.

Table 3: Proposed Project Expected Costs and Benefits

	48' Project	50' Project
First Costs (includes estimated costs for dredging, disposal, and mitigation)	184,000,000	291,000,000
Add Interest During Construction	12,000,000	19,000,000
Financial First Costs	196,000,000	310,000,000
Average Annual Costs		
Interest and Amortization	9,700,000	15,400,000
Increased Operation and Maintenance	3,000,000	4,000,000
Total Average Annual Costs	12,700,000	19,400,000
Present Worth Average Annual Benefits	76,000,000	126,000,000
Net Average Annual Benefits	63,300,000	106,600,000

[21] Harbor is expected to reach its capacity by 2050, after which container traffic flattens.

Charleston is a Strategic port, a critical port to transfer our military forces and equipment overseas. Charleston embarked about fifty percent of the Military Sea Lift support for our ongoing Middle East wars. It plays a significant role in the Department of Energy program to secure and ship nuclear fuels from around the world. And it is home to Ready Reserve Fleet that support military strategic sealift activities overseas.

Charleston already has three Container services that have deployed Post-Panamax ships. In the first half of 2010, forty-five vessels have drafted more than 43 feet and are restricted to move based on favorable tide conditions. Charleston's latest Strategic Plan from the SCSPA projects a container grow rate of 7.3 percent annually from 2010 through 2030. Ship building trends, Suez Canal competitiveness and Panama Canal expansion will cause some portion current West Coast US traffic to shift to the East Coast US. Charleston and other suitable East Coast ports can expect increasing traffic based on a return to historic growth rates for container trade and a shift of traffic based on improving economies of scale. With the return of growth to the Container trade, other lines are looking at post-Panamax ships for the Northern Europe and Asia Suez trade routes. Tidal restrictions will become more severe as deployment of these ships increase, US export cargo grows and world trade increases following the current recession. By the end of 2012, SCSPA expects that seven services will deploy 7,500 TEU or greater ships that will routinely call the US East Coast. The need for deepening is immediate, and opening the Expanded Panama Canal will only make the need even greater.

5.8 Environmental Considerations

The Charleston District has initiated coordination with the South Carolina Department of Natural Resources (SCDNR), the South Carolina Department of Health and Environmental Control (SCDHEC), the South Carolina State Historic Preservation Office (SHPO), the U.S. Fish and Wildlife Service (F&WS), the U.S. Environmental Protection Agency (USEPA), and the National Marine Fisheries Service (NMFS). A scoping meeting will be held at the beginning of the Feasibility Phase to investigate potential concerns regarding the proposed project. All replies received from the state and Federal resource agencies will be discussed at this meeting.

Specific environmental concerns/issues which the Charleston District is currently aware are listed below. These known concerns/issues and any other concerns raised by all stakeholders (i.e., State and Federal environmental resource agencies, the State Port Authority, the shipping industry, non-profit environmental organizations, the general public, etc.) will be fully evaluated during the NEPA process and will be documented in the Environmental Impact Statement that will be prepared to support the Feasibility Study.

- Potential movement of the freshwater/saltwater wedge further up the Cooper River as a result of deepening the channel and the resulting impacts to freshwater intakes. This is a potentially significant issue in the upper Cooper

River and will require modeling to determine if this will be a problem, and will be a factor in determining the proposed new channel depth.

- Potential seepage of saltwater into the freshwater aquifer below the Cooper Marl as a result of deepening the channel. Based on previous studies, this is not believed to be a significant issue.
- Potential effects on threatened and endangered species from both the dredging operations and the larger ships calling on the port. While this will require consultation with F&WS and NMFS, this is not believed to be a significant issue.
- Potential impacts at the Charleston Ocean Dredged Material Disposal Site (ODMDS) as a result of disposal of large quantities of dredged material during the channel deepening/widening operations, and the need for additional testing/monitoring at the ODMDS. This will require coordination with EPA, SCNDR, and SCDHEC, and likely will result in a detailed monitoring program to ensure sensitive resources in the area of the ODMDS are not impacted.
- Potential impacts at confined upland disposal sites as a result of disposal of large quantities of dredged material during the channel deepening/widening operations. This will require coordination with many of the resource agencies and the issuance of a Water Quality Certification by SCDHEC; however, this is not expected to be a significant issue.
- Potential impacts of increased sedimentation within the navigation channel as a result of deepening/widening the channel. This will require modeling to determine the increased sedimentation rates. Increased sedimentation and the associated costs of maintenance dredging will be a factor in determining the proposed new channel depth.
- Potential need for additional testing/monitoring before, during, and after deepening/widening the channel. This will be coordinated with all the resource agencies. Based on the previous deepening project, the only significant monitoring that is expected to be necessary is at the ODMDS.
- Potential impacts to cultural resources from the dredging operations. This will require coordination with SHPO; however, based on previous studies and previous deepening efforts, this is not believed to be a significant issue.
- Potential indirect and/or cumulative impacts as a result of the larger ships calling on the port. The most likely indirect/cumulative impacts resulting from the deepening project are related to increased truck traffic entering and leaving the port terminals. This increased truck traffic may result in traffic congestion and degradation of air quality. These issues are part of the basis for the lawsuit over the Regulatory permit issued to SCSPA for their new terminal; therefore, this is a potentially significant issue.
- Potential effect that sea level rise due to climate change would have on the project. This is not believed to be a significant issue for this project.
- Potential impacts to wetlands and marsh caused by the dredging operations. Since the channel is located near the center of the river, deepening the channel is not expected to have a significant impact on wetlands and marsh.

- Potential impacts to essential fish habitat from the dredging operations. This will require coordination with NMFS; however, since dredging is routinely performed in Charleston Harbor, this is not believed to be a significant issue.
- Potential erosion of an existing bird nesting island (i.e., Crab Bank) in Charleston Harbor resulting from the deeper/wider channel and the larger ships calling on the port. This will require coordination with SCDNR and F&WS, and is a potentially significant issue that will need to be evaluated. Beneficial use of dredged material to protect Crab Bank is a potential solution to this issue.
- Potential opportunities for beneficial use of dredged material for shorebird and/or colonial waterbird habitat creation, marsh creation, or beach nourishment. Charleston District will evaluate all possible beneficial uses of dredged material during the Feasibility Study and will coordinate this evaluation with SCDHEC, SCDNR, F&WS, and NMFS. Attempts to beneficially use dredged material during the previous deepening project were unsuccessful; however, successful projects at other navigation channels have since demonstrated that dredged material can be a resource rather than a "waste product."
- Potential for HTRW or unexploded ordinance in the areas to be dredged. Sediment testing and electro-magnetic surveys will be conducted as part of the Feasibility Study. However, based on previous testing and current maintenance dredging operations (i.e., the channel is dredged every 12 to 18 months), this is not believed to be a significant issue.
- Potential environmental justice issues as a result of the dredging operations or the larger ships calling on the port. Since the deepening/widening project will utilize existing infrastructure (i.e., existing disposal areas will be used for dredged material disposal, the ships will call on existing (or currently under construction) port terminal facilities, and any channel re-alignment is expected to be minor), environmental justice issues are expected to be minimal.

5.8.1 Views of Federal and State Environmental Resource Agencies

F&WS concurred with the above list of concerns/issues. SCDNR also concurred with above list and specifically mentioned dissolved oxygen concerns related to a recently completed TMDL for DO in Charleston Harbor and potential impacts to wildlife utilizing confined upland disposal sites. As of the date of this 905(b) report, none of the other resource agencies had submitted comments.

6.0 FEDERAL INTEREST

Based upon the discussion in this 905(b) report, there is Federal interest in proceeding to the feasibility phase of this study to further analyze and evaluate improvements to Charleston Harbor. Preliminary data suggests that there are additional National Economic Development (NED) benefits associated with Harbor modifications. At this time, the cost associated with these modifications is not quantifiable due to the lack of sufficient information on construction costs.

7.0 PRELIMINARY FINANCIAL ANALYSIS

Based on the SCSPA's 2 June 2010 letter to the Charleston District, the Sponsor is ready, willing, and able to execute the FCSA and provide its share of the funding to support the cost-shared feasibility phase. The estimated cost of the feasibility phase is currently $5 million, cost-shared 50% Federal and 50% Non-Federal.

8.0 SUMMARY OF FEASIBILITY STUDY ASSUMPTIONS

The following assumptions will provide the initial basis for feasibility studies. These assumptions will be added to/revised as needed during future iterations of the planning steps.

- Full analysis of reasonable alternatives will be performed, including the No Action alternative, to optimize potential feasible alternatives in terms of depth and alignment while minimizing environmental effects.
- A detailed economic analysis will be performed in the economic evaluation in order to identify the effect of using neighboring ports.
- An incremental analysis will be performed in selected increments of channel depth to identify the optimum channel depth.
- Public involvement will be achieved through public meetings and/or workshops and interagency work group meetings.
- An Environmental Impact Statement (EIS) will be prepared to document the decision-making process and to analyze the project's effect on human health and the environment.
- The feasibility study and EIS will address alternative methods of disposal of dredged material.
- Modeling studies conducted during the feasibility phase will include hydrodynamic, shoreline erosion, saltwater intrusion, and ship simulation models.
- Consideration of alternatives will be fully coordinated with the USFWS, NMFS, and other appropriate agencies pursuant to environmental statutes.
- The consideration of alternatives in the study will fully comply with the requirements of the Clean Water Act, as amended and the National Environmental Policy Act.
- Appropriate cultural resources investigations will be conducted within the study area to ensure historic areas are not adversely affected by proposed project plans.

9.0 POTENTIAL ISSUES AFFECTING INITIATION OF FEASIBILITY PHASE

Continuation of this study into the cost-shared feasibility phase is contingent upon an executed FCSA, and the receipt of both Federal funding and non-Federal funding.

10.0 RECOMMENDATIONS

I recommend that the Charleston Harbor Deepening Study proceed into the feasibility phase based on the findings developed in this 905(b) reconnaissance report.

JASON A. KIRK, P.E.
LTC, EN
Commanding