

**Review of the Section 905(b) Analysis
Wilmington Harbor Navigation Improvements
New Hanover and Brunswick Counties
North Carolina
April 2011
Prepared by the
US Army Corps of Engineers, Wilmington District.**

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Prepared for Save the Cape, Inc.

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A Review of the Section 905(b) Analysis, Wilmington Harbor Navigation Improvements, New Hanover and Brunswick Counties, North Carolina, dated April 2011, prepared by the US Army Corps of Engineers, Wilmington District

Summary

The Wilmington District of the US Army Corps of Engineers has prepared a preliminary analysis of the benefits, costs and environmental impacts of improvements to the channel in the Cape Fear River to Wilmington, pursuant to the requirements of section 905(b) of the Water Resources Development Act of 1986. That preliminary analysis is required to move forward with a feasibility study under section 905(a) of the act.

The study addresses three alternatives:

1. *Minor Modifications.* Three modifications to the channel in the Cape Fear River:
(A) adjusting the channel alignment at the river mouth near Bald Head Island,
(B) modifying the channel turn at Battery Island, and
(C) expanding the anchorage and turning basin at the Port of Wilmington.
2. *NCIT.* A combination of substantial deepening of the lower reaches of the channel and construction of a channel extension, turning basin and berthing area for the proposed North Carolina International Terminal, a very large marine container terminal planned for Southport near the mouth of the Cape Fear River.
3. *No Action.* Continued maintenance of the existing channel and completion of the current project to deepen the channel to 42 feet.

The *Section 905(b) Analysis* recommends a feasibility study to cover the minor modifications. Such a study would cost approximately \$10 million and take about five years. The State of North Carolina would pay one-half of the cost, but the work would be done by the Wilmington District of the Corps.

There are four major failings of the *Section 905(b) Analysis*:

The proposed solutions are inadequate or impractical. The improvements proposed by the Wilmington District exemplify the serial engineering for which the Corps is often accused—attempting to correct a project that was poorly designed or should not have been done at all by engineering another project.

- The realignment of the channel at Bald Head will only serve to conform the marked channel to the path followed by vessels—it will not reduce shoaling and will not solve or even attenuate the problem of beach erosion.

- There is not enough room in the Cape Fear River for a channel around Battery Island complying with Corps standards for channel turns for the largest vessels now using the river.
- Enlarging the anchorage and turning basin at Wilmington would increase the intervals between maintenance dredging, but at the expense of 37 acres of habitat and the risk of releasing toxic materials into the river.

The economic justification for the project is bogus. The *Section 905(b) Analysis* counts benefits from use of larger container ships than the river can accommodate, loaded to less than capacity, carrying shipments exceeding the capacity of the container terminal at the Port of Wilmington. The benefits counted for the alternative marine terminal at Southport are captured from other ports, which is both bad analysis and a violation of the laws covering the Corps procedures.

The proposed study format is improper. The three improvements identified for further study flow from problems arising from the channel deepening project commenced in 1998 and still in progress. Corps regulations and practice dictate that a general reevaluation report be used for such problems rather than a new feasibility study. A general reevaluation report would reduce the cost to the State of North Carolina.

The study can be reprogrammed to cover the proposed port at Southport. The *Section 905(b) Analysis* is an adaption of an earlier draft done with funds and authority originally provided for the port project at Southport. The analysis from that draft is included in the final report as an alternative. If the study and its funds can be reprogrammed from that project, they can be reprogrammed back. Indeed, the ability to so reprogram the project is the only plausible reason for the use of the feasibility study format instead of a general reevaluation report.

Report Purpose and Project History

Wilmington Harbor “Improvements.”

The Wilmington District of the US Army Corps of Engineers began a project in 1998 to deepen the channel in the Cape Fear River to the port at Wilmington to 42 feet to accommodate the largest ships then able to transit the Panama Canal (such ships are called “Panamax”). At the time, the channel had been maintained at a depth of 38 feet, after a series of projects dating back to the 19th century to deepen the channel from 16 feet. The channel was opened at the new 42-foot depth in early 2004, but certain parts of the project, including environmental mitigation, have not yet been completed. The project remains active and awaits further funding.

Panamax vessels began calling at the port at Wilmington shortly after the channel was opened at the 42-foot depth, but problems emerged in accommodating these ships. On December 7, 2010, Dee Freeman, Secretary of the North Carolina Department of Environment and Natural Resources, sent a letter to the District Engineer of the Wilmington District of the US Army Corps of Engineers stating that the States intends to share the costs of a study of modifications to the channel in the Cape Fear River “to retain existing vessel calls as well as accommodate slightly larger vessels.” The letter identified three projects to be examined closely:

- Modifications to the alignment within the Bald Head portion.
- Modifications to the turn within the Battery Island portion.
- Modifications to the size of the existing turning and anchorage basin at the Port of Wilmington.

No further description of the scope of the study was provided or appears in NCDENR public records. There is not any indication of what is meant by “slightly larger vessels.” No estimate of the cost was provided in the letter of intent. The letter does, however, does specifically exclude participation by the State of North Carolina as “non-Federal sponsor” for the North Carolina International Terminal project, a plan for a very large container terminal downriver at Southport. That project had been put “on hold” by the State Ports Authority after substantial community opposition arose, the Congressman for the District withdrew his support, and the General Assembly inserted language in the budget bill for fiscal year 2011 prohibiting use of State funds for the project. The exclusion in the Secretary’s letter of intent was necessitated by that language.

In April 2011, the Wilmington District of the US Army Corps of Engineers released a report entitled “Section 905(b) Analysis, Wilmington Harbor Navigation Improvements, New Hanover and Brunswick Counties, North Carolina.” That report provides preliminary costs, benefits, and environmental impacts of those three projects, and includes a recommendation to proceed to a full feasibility study of those projects.

The report also includes investigation of two other alternatives:

- *NCIT*. A combination of substantial deepening of the lower reaches of the channel and construction of a channel extension, turning basin and berthing area for the proposed North Carolina International Terminal. This is included despite the exclusion in Secretary Freeman's letter.
- *No Action*. Continued maintenance of the existing channel and completion of the current project to deepen the channel to 42 feet.

The *Section 905(b) Analysis* estimated the cost of the feasibility study at \$5.3 million, of which \$2.5 million would be for the account of the "non-Federal sponsor," the State of North Carolina. That has since been increased to \$10.1 million, with \$4.8 million for the account of the State. The study would be conducted and controlled by the Corps of Engineers.

The cost of the three improvement projects is estimated to be \$41.1 million. The State share would be 35%: \$14.3 million.

Water Resources Project Planning

A "section 905(b) analysis" is part of the first of two steps in planning by the US Army Corps of Engineers for water resources projects—dams, canals, harbor dredging and other navigation improvements and the like—within the responsibility of the Corps. The two steps are specified in section 905 of the Water Resources Development Act of 1986. 33 USC §2282.

The first step is a "reconnaissance study," preliminary in nature, to determine whether the project has enough merit to warrant a full feasibility study. Such studies are fully funded by the Federal government, cost about \$100,000, and take a year or two. 33 USC §2282(b).

The essential element of such a reconnaissance study is the "section 905(b) analysis," which responds to the requirements of section 905(b) of the Water Resources Development Act of 1986. That involves preliminary analysis of the costs and potential benefits to determine whether there is a "Federal interest" in proceeding to the next phase, the feasibility phase.

Should the section 905(b) analysis result in a recommendation by the District Engineer to proceed, the Corps would seek a "letter of intent" from a "non-Federal sponsor" expressing a willingness to share the costs of a feasibility study, and then develop a project management plan for a full feasibility study. (In this case, that letter of intent was issued by Secretary Freeman before the recommendation was in hand.) The Corps must also obtain a full cost-sharing agreement for the one-half of the cost of the feasibility study to be provided by the "non-Federal sponsor," in this case the State of North Carolina.

The requirements for a feasibility study are specified in section 905(a) of the Water Resources Development Act of 1986. 33 USC §2282(a) . The feasibility study would be the basis for seeking Congressional authorization and funding for the construction project, and accordingly “shall describe, with reasonable certainty, the economic, environmental, and social benefits and detriments of the recommended plan an alternative plans” Such studies cost many millions of dollars and take the better part of a decade (33 USC 2282(a)).

Costs of a feasibility study would be shared equally between the Federal government and a “non-Federal sponsor.” In the case of channel-dredging projects, the usual non-Federal sponsor would be the port authority or other agency that operates the port facilities that would be served. Although the costs may be shared, the study responsibility is not; the local district of the Corps of Engineers conducts such studies using its own practices and procedures.

A recommendation to go forward with a project, whether at the reconnaissance phase or the feasibility phase, would be based on an estimate and comparison of benefits and costs. A surplus of benefits over costs indicates that the project would contribute to “National economic development” and should proceed. The Corps has not had a system of comparison of projects to determine priority, and there is not any other system of determining national priorities. Until the current Congress condemned “earmarks,” whether a project received Congressional authorization and funding depended on the ability of the relevant Congressional delegation to obtain that authorization and funding.

The system now used involves recommendation of projects by individual districts, followed by recommendation by the division overseeing the district, and then recommendation by headquarters to the Office of Management and Budget for inclusion in the administration budget request. At OMB, projects are compared to projects presented by other agencies. According to the statement of the Assistant Secretary of the Army for Civil Works for the fiscal year 2012 budget, the construction budget “gives priority to the projects with the greatest net economic and environmental returns per dollar invested, as well as those projects that address a significant risk to human safety.” In practice, recommendations and ratification of the recommendation up the line are based on the benefit/cost ratio of the project. At this time, a benefit/cost ratio of at least 3.0 is necessary to make the cut at OMB. But inclusion in the administration budget request does not assure inclusion in the budget adopted by Congress.

The analysis subject of this review results in a recommendation by the Wilmington District of the Corps of Engineers to proceed to the feasibility phase of a study for “limited channel widening, turning basin enlargement, and other modifications at the existing project depth” of the Cape Fear River channel to Wilmington. That recommendation has been approved by the South Atlantic Division of the Corps. The budget for the fiscal year ending September 30, 2012, includes \$500,000 for the feasibility study. The administration budget request for fiscal year 2013 includes another \$250,000.

The Wilmington Harbor Project

The Cape Fear River has been maintained by the Corps of Engineers as a channel to Wilmington and a harbor since the nineteenth century; that channel and harbor have been widened and deepened by the Corps in a series of projects starting with a channel depth of 16 feet. The most recent is the Wilmington Harbor Improvement Project, a project to deepen the channel in the Cape Fear River from 38 to 42 feet, which is now in its 14th year. The project traces its ancestry to authorization in the Water Resources Development Act of 1986. Current plans call for completion in 2014, depending on the availability of funds.

The feasibility study and the environmental impact statement for this project were started in 1992, and completed in 1996. Construction of the project began with authorization and funding in 1998; the channel was opened at the deeper depth in 2004, but many of the environmental mitigation parts of the project remain to be funded and constructed.

The cost of the feasibility study and environmental impact statement are not apparent in the record. The feasibility study estimated the project cost at \$250 million, and on that basis determined that the benefits would exceed costs in a ratio of 1.2 to 1.

The last published estimate by the Wilmington District of the cost to complete the project, in 2009, was \$533 million, of which the State share would be \$174 million. Some elements of the project have since been abandoned. As of June 30, 2011, the end of the 2011 fiscal year, the North Carolina Department of Environment and Natural Resources Water Resources Division, the “non-Federal sponsor” of the project, reported that \$317,548,550 had been spent, with the State covering \$73,995,550 and a local share of another of \$1,345,000. Completion of the project was estimated to cost another \$66,497,000, for a total of \$384,045,550. Part of the State share has been deferred; bringing the State share up to 35%, approximately \$134,416,000, would require an additional State contribution of about \$59 million.

The benefit/cost ratio, originally found to be 1.2 to 1, has not been recalculated to take into account actual benefits and costs experienced since the channel was opened at the deeper depth. It has been recalculated to reflect changes in discount rate for future benefits and costs

When design work commenced, the Wilmington District determined that there would be cost savings from realignment of the channel at the ocean bar, where the river meets the sea between Bald Head Island and Caswell Beach. The realignment involved moving the lower reaches of the channel, beyond the river mouth, to the east to avoid rock formations. An environmental assessment of modifications of the plan was made in 2000, and the modifications were adopted.

In 2005, a general reevaluation report was begun to address environmental mitigation and other issues that had arisen. In 2007, the project team determined that peer review would

not be required, and that decision was approved by the South Atlantic Division. In early 2009, the general reevaluation report process stopped, and has not been resumed. A General Reevaluation Report is the procedure specified in the Corps of Engineers *Planning Guidance Notebook, ER1105-2-100*, for issues that arise in a project not yet complete.

Some elements of the analysis subject of this review were prompted by requests of the North Carolina State Ports Authority for investigation of means of enlarging the anchorage and turning basin at Wilmington to accommodate larger vessels, and to address the problems existing vessels were experiencing navigating a sharp S-curve near the mouth of the river. There is also a problem of beach erosion due to the channel at the river mouth trapping sand moving along the shore, which problem has resulted in a lawsuit by the Village of Bald Head Island. However, the subject analysis does not address the erosion problem directly, only the effects of shoaling of that channel on navigation.

According to Corps of Engineers procedures, those elements would properly be addressed in a General Reevaluation Report. Such a report would be done under the authority of the project, and costs would be shared in the same proportion. In this case, the State would pay 25% of the cost, and another 10% over a 30-year period, instead of the 50% share of a feasibility study.

The North Carolina International Terminal

This project and its *Section 905(b) Analysis* is a reprogramming by the Wilmington District of funds originally authorized for a reconnaissance study for the proposed North Carolina International Terminal (NCIT), a very large new marine container terminal planned to be located at Southport, near the mouth of the Cape Fear River. The terminal would be designed to accommodate new generations of container ships that would be able to pass through the Panama Canal after the opening of new locks in 2014 or 2015. It would require dredging a channel approximately 50 feet deep in areas where the current depth is about one foot.

That project used as authority a 2006 resolution of the U.S. House Committee on Transportation and Infrastructure for review of the 1996 Wilmington Harbor Project report “to determine whether any modifications of the recommendations contained therein are advisable in the interest of navigation improvements and associated water resource development opportunities for Wilmington Harbor, North Carolina.” Using this authority for a study for dredging for a new marine container terminal downriver at Southport seems to be a bit of a stretch, but the project was funded and moved along. The study was begun in June 2009 and a draft “Section 905(b) Analysis” dated February 2010 had been prepared.

That report was never issued to the public. A copy was provided to the North Carolina Department of Environment and Natural Resources to induce delivery of a letter of intent for sharing of cost for the feasibility study to follow. In the hands of NCDENR, the report became

subject to discovery under the North Carolina Public Records law. A citizens's group did indeed discover and disclose it, revealing the poor quality of the report and the flaws in its conclusions. The essential conclusion, that anticipated benefits exceed estimated costs, was reached by counting benefits captured from other regions. That is not only poor analysis for a study with a national perspective, but also is illegal. Section 904 of the Water Resources Development Act of 1986 prohibits the counting of benefits transferred from other regions. That violation in the draft section 905(b) analysis became the subject of a complaint to the Inspector General of the Corps of Engineers. The Engineer Inspector General did nothing. That complaint is now in the hands of the Inspector General of the Department of Defense.

The February 2010 draft did not result in a final report in that form. Instead, when the proposed North Carolina International Terminal lost favor with the North Carolina General Assembly and the area's Representative to the U.S. House of Representatives, the Wilmington District of the Corps of Engineers revised the section 905(b) analysis to address the three points requested by the North Carolina State Ports Authority and recited in the NCDENR letter of intent issued in December 2010. The original analysis of the dredging for the NCIT was retained as an alternative in the final *Section 905(b) Analysis* for the "Wilmington Harbor Improvements" project issued in April 2011, although the recommendation of the District Engineer excluded the NCIT.

The April 2011 draft *Section 905(b) Analysis* is the subject of this report.

The Section 905(b) Analysis

Report Structure and Organization

The Wilmington District's *Section 905(b) Analysis* follows a template provide by Corps of Engineers headquarters. That template suggests a distressingly superficial review of the proposed project, addressing neither the mandates of section 905(b) of the Water Resources Development Act of 1986 nor the Corps of Engineers own Principles and Guidelines for such studies set out in its *Planning Guidance Notebook* in more than a perfunctory manner. The Wilmington District's *Section 905(b) Analysis* does no better. The Congress, the State of North Carolina the Nation deserve much more from a study costing \$200,000 and recommending a further study costing over \$10 million.

Section 905 of the Water Resources Development Act of 1986 sets out the requirements for a feasibility study as a prerequisite to authority for a water resources project. Such a feasibility study would be comprehensive in scope and thorough in its analysis, and as such, would be expensive (many millions) and time consuming (years). The Congress determined that a study of that magnitude should be undertaken only after a "reconnaissance study"; that requirement is set forth in section 905(b):

(b) Before initiating any feasibility study under subsection (a) of this section after the date of enactment of this Act, the Secretary shall first perform, at Federal expense, a reconnaissance study of the water resources problem in order to identify potential solutions to such problem in sufficient detail to enable the Secretary to determine whether or not planning to develop a project should proceed to the preparation of a feasibility report. Such reconnaissance study shall include a preliminary analysis of the Federal interest, costs, benefits, and environmental impacts of such project, and an estimate of the costs of preparing the feasibility report.

A reconnaissance study has two parts: a "section 905(b) analysis" responding to the above requirement, and a program management plan defining the feasibility study to follow, presuming that the Corps recommends proceeding to that phase.

The Corps regards a finding of "Federal interest" as central to a recommendation to proceed to a feasibility study. The term "Federal interest" is undefined, however. The nearest thing to a working definition is in the Corps' *Planning Guidance Notebook, Engineer Regulation 1105-2-100*, which develops the requirements and the procedures for both the reconnaissance phase and the later feasibility phase of planning studies. The "Federal objective" is therein defined: "The Federal objective of water and related land resources project planning is to contribute to national economic development consistent with protecting the

Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.”

Thus the “Federal interest” is whatever the Corps wants it to be.

The Corps of Engineers *Planning Manual* is a comprehensive guide to the conduct of all Corps studies. It lists six steps to be used in all planning studies to be conducted by the Corps:

- Step 1 - Identifying problems and opportunities
- Step 2 - Inventorying and forecasting conditions
- Step 3 - Formulating alternative plans
- Step 4 - Evaluating alternative plans
- Step 5 - Comparing alternative plans
- Step 6 - Selecting a plan.

The *Planning Guidance Notebook* provides that the reconnaissance phase of a planning program with its section 905(b) analysis would address the same economic and environmental issues as the later, larger feasibility study, but acknowledges that the level of detail and depth of analysis would be more suitable for an expedited review at a much lower cost (\$200,000 rather than several million).

This report reviews how the Wilmington District's *Section 905(b) Analysis* takes those six steps.

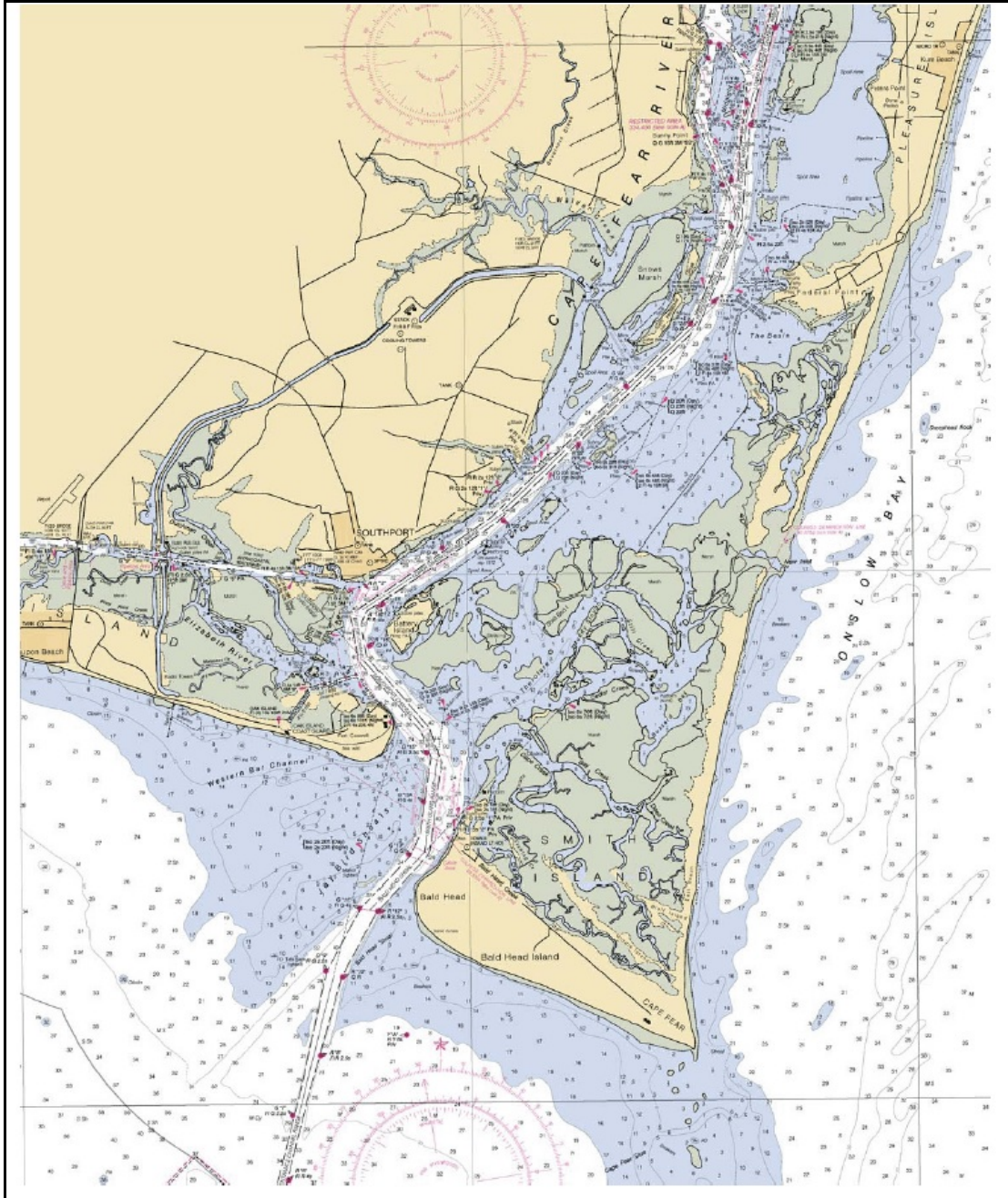
Step 1—Identifying Problems and Opportunities

Problems

The Section 905(b) Analysis, in section 5.1.1, identifies three problems, corresponding to the items listed in Secretary Freeman's December 2010 letter of intent:

1. Shoaling of the navigation channel at the river mouth at Bald Head Island, causing vessels to use the western side of the channel, which makes execution of the turn immediately following the shoaled portion “problematic ... under typical wind and tide conditions.”
2. The channel turn at Battery Island “is problematic for certain vessels under specific wind and tide conditions.” The vessels in question are three Panamax vessels commonly calling at the port at Wilmington. Certain conditions “could influence safe maneuvering” of those vessels.

3. The anchorage and turning basin at Wilmington is not adequate “to properly accommodate” some of the larger container ships calling at Wilmington.



The Lower Cape Fear River

The Wilmington District also identified as “Potential Water Resource Development Problems” the inability of the existing channel and turning basin to accommodate post-Panamax vessels which may have “a desire to call at Wilmington Harbor in the future” and the inability of the existing 42-foot deep channel “to efficiently accommodate deeper ship drafts.”

However, the Wilmington District failed to address a very serious problem with the existing channel, the interruption of the littoral drift of sand across the river mouth as the sand is captured by the channel, creating the shoaling problem. Beaches normally lose sand due to natural forces, and that sand is carried east by north by the longshore current. However, the same current would bring sand from beaches to the west and south and deposit it, replacing the lost sand. A natural inlet would permit passage of the sand across the inlet, so the process of sand migration would span the inlet. But a dredged navigation channel creates a “sediment sink,” capturing the sand and preventing bypassing the inlet. Thus the dredged channel fills—the shoaling problem—and the downstream beach at Bald Head erodes.

This problem had been recognized in 2000 during the engineering for the deepening to 42 feet, and was addressed by a plan of maintenance dredging which would restore the sand to the beaches from whence it came. But that plan depends on regular appropriations for maintenance dredging, about \$12 million per year, and that has not been forthcoming in recent years.

Causes of the Problems

The Corps of Engineers Planning Manual points out “An important aspect of problem definition is describing its cause. If the underlying causes of a problem are not identified, the solutions can end up being superficial and unsuccessful” The Wilmington District’s report does not identify here the causes of the problems, which, alas, are of their own creation in the project to deepen the channel to 42 feet. Greater detail on the nature of the problems are provided in later sections of the Wilmington District’s *Section 905(b) Analysis*.

The discussion of the problem with the channel turn at Battery Island fails to mention:

- (a) that the turn does not comply with the Corps engineering manual or international standards for channel turns and cannot be brought into compliance within the confines of the river,
- (b) that the issue was recognized in the original feasibility study for the deepening to 42 feet,
- (c) that the Corps conducted a ship simulation study in 1999 that demonstrated that the design vessel for the project, a Panamax vessel 960 feet long, could not navigate the turn without leaving the marked channel, and
- (d) that the Wilmington District went ahead with the project anyway.

The discussion of the problem with the anchorage and turning vessel fails to mention:

- (a) that the existing turning basin is already as large as the river is wide,
-)b) that at 1200 feet, the width of the basin is only 1.24 times the length of the 965-foot design vessel,
-)c) that the recommended width of a turning basin is 1.5 times vessel length, and
- (d) that the limitations on turning maneuvers are due to the inevitable shoaling at the edges of the basin which can only be addressed by frequent maintenance.

All of these factors were apparent during the feasibility study for the last channel deepening, yet the Wilmington District went ahead with the project anyway.

As for the third problem area, the shoaling of the channel at the ocean bar at Bald Head, that was anticipated when the channel alignment was determined in 2000, but the solution at the time was adoption of a “sand management plan” to regularly dredge the channels and restore the dredged materials to the beaches. That solution was doomed to failure, because the source of the necessary funds was not established. Maintenance dredging depends on the largess of Congress each and every time.

As for the “Potential Water Resource Development Problem” of a “desire to call at Wilmington Harbor in the future” on the part of deeper draft vessels, this is unsupported speculation insufficient to justify spending scarce study funds. There is no showing of demand, no showing of insufficient capacity at other nearby deepwater ports.

Opportunities

The Wilmington District’s discussion of “opportunities” (section 5.1.2) is no more than a restatement of the problems together with indications of the results if only those problems could be solved. But an “opportunity” is some favorable circumstance or condition that suggests that the problem can be solved, and the Wilmington District does not identify any such opportunity. If there were any such opportunities in the configuration of the Cape Fear River, they would have been known in 1998 and the problems would not have been created in the first place.

The Cape Fear River is not any wider than it was in 1998 and ships have not become shorter. Some incremental changes in the channel configuration may be helpful, but the channel turn at Battery Island cannot be brought into compliance with safe practice, a turning basin meeting recommended practice for larger ships or even the ships presently calling cannot be fit between the banks of the river at Wilmington , and the navigation channel at the ocean bar will

always be subject to shoaling and capture of sand from beaches so long as it is deeper than the natural inlet. The listing of problems by the Wilmington District in its *Section 905(b) Analysis* is a catalog of problems with navigating the Cape Fear River that cannot be solved by further dredging.

The Wilmington District, clinging to the prospect of a grand project to study a new, 48 or 50-foot deep channel for the North Carolina International Terminal (NCIT) at Southport, includes in its report this statement: “If economically justified and environmentally acceptable, there is opportunity to deepen the Wilmington Harbor navigation channel to accommodate larger vessels.”

It is not necessary to embark on a \$10 million study to find out there is no such opportunity. Congress adopted section 905(b) of the Water Resources Development Act of 1986 and provided \$200,000 in Federal funds to make that determination. One need only look at the previous studies to determine that deepening the channel in the Cape Fear River beyond its present depth and widening the channel to accommodate larger ships presents these problems:

- Investigation of the geology underlying the Cape Fear River by CH2M Hill, Inc., for the State Ports Authority showed that rock would be encountered at the depths contemplated for the NCIT in several parts of the existing channel and in the new access channel needed for the proposed terminal. Removal of rock is substantially more expensive than removal of softer materials.
- The Castle Hayne aquifer underlies the Cape Fear River. Test wells on subsurface topographical maps of the United States Geologic Survey show the depth of that aquifer at 43 feet at the site of the proposed container terminal. Dredging in that area to accommodate post-Panamax vessels would penetrate the aquifer over a large area.
- The continental shelf at the mouth of the Cape Fear River falls off only gradually. Reaching water deep enough for the vessel drafts contemplated by the project requires extending the channel eight to ten miles, depending on the depth selected .
- The existing channel has turns in the vicinity of Southport (Lower Swash, Battery Island Channel, and Southport Channel) that do not conform to the Corps of Engineers design parameters set forth in Engineer Manual 1110-2-1613. Ship simulation tests conducted in 1999 show that Panamax vessels, with overall length of 960 feet and beam of 106 feet, cannot navigate the turns without leaving the marked channel. Experience with such vessels demonstrates that those turns are a major problem limiting access to the Cape Fear River, and an impetus for the subject study. CH2M Hill, Inc., TEC, Inc., PF Richardson Associates and Moffatt & Nichol, in studies for the State Ports Authority, have concluded that turns conforming to the manual for larger vessels cannot be fit between the banks of the river in this area.

- A straighter channel to the east of Battery Island, proposed by CH2M Hill, Inc., would require extensive dredging through an undisturbed area that was never used for navigation and that is part of the Coastal Barrier Resource System, a Federal reserve.
- The depth and width of the channel at the river mouth has caused substantial problems of beach erosion due to the “sediment” sink” created by the channel, which captures sand normally moving along the shore. A deeper, wider channel would only exacerbate that problem.

When compared with other ports in the region, particularly Hampton Roads with a depth of 50 feet, the Cape Fear River is a poor candidate for further deepening.

In another section of its report (5.6.2), the Wilmington District adds another opportunity that would be provided by “The possible expansion of Wilmington Harbor ... “ for the NCIT—augmenting the military capabilities of the existing ports. But there is no indication that those military capabilities need to be augmented, and the District bases its suggestion on two capabilities that have not been included in the NCIT plans: roll-on, roll-off facilities and the ability to handle special military shipments. The NCIT is designed as an exclusive container port, with automated facilities to suit only that traffic. Roll-on, roll-off facilities are in place at the State Port at Wilmington.

An opportunity that comes to mind but is not mentioned by the Wilmington District is the transfer of deep-draft vessel traffic to other ports. The District does point out that the opening of the larger locks in the Panama Canal in 2014 is expected to cause larger post-Panamax vessels to become a greater percentage of the fleet composition for Asian traffic. But the District does not acknowledge that other ports exist and can accommodate that traffic. Indeed, approximately 80% of North Carolina’s international container traffic moves through other ports anyway. A study delivered to the North Carolina State Ports Authority by Moffatt & Nichol in February 2011 suggested that the container traffic currently carried by the largest Panamax vessels will move to other ports and Wilmington will be left with a “niche” for smaller ships. The State Port at Wilmington is able to retain its Far East container traffic, approximately 70% of the container movements at the port and all of the deep-draft vessel calls, by offering a handling charge about 30% less than the port at Charleston to compensate for the longer highway distance to the ultimate destination from Wilmington compared to Charleston.

Thus the real opportunity would be to allow market forces to redirect deep-draft commerce to other ports and to restore the Cape Fear River to the shallower depth that once served. A thoughtful study would determine the economic consequences and the environmental benefit of exploiting that opportunity instead of fighting it. Indeed, in the Water Resources Development Act of 2007 Congress directed the Corps to focus its attention on restoration projects. The Corps template for section 905(b) analyses identifies ecosystem restoration as a national objective for water resources projects.

Step 2–Inventory and Forecast

In its discussion of the second step in the planning process, the Corps of Engineers *Planning Manual* points out the obvious: “Information is essential to making good decisions.” The Wilmington District does address this requirement, but later in its report (section 5.6), after the formulation of alternatives.

The Wilmington District presents under the heading of “Historic Conditions” (section 5.6.1) selected statistics on the benefits of the recent project to increase the channel depth to 42 feet. The review is far from comprehensive, and neglects to mention that the project cost is currently estimated at \$384 million, that it is not complete, that an additional \$67 million must be spent to complete environmental mitigation and other deferred elements of the project, that the budget for maintenance dredging is \$12.6 million per year, that taking into account the construction cost amortized over 50 years, the annual cost of the project is \$30.85 million, and that in the last year reported by the Corps, 2009, 97 vessels of draft greater than 35 feet called at the port, representing a cost to the taxpayers of \$384,000 per vessel call. This does not take into account the subject proposal to spend another \$10 million for study and \$41.1 million for a project to correct deficiencies in the original project that now restrict the ability of the Panamax design vessels to call at the port.

The presentation of existing conditions and future conditions is focused on the North Carolina International Terminal, the project Secretary Freeman’s letter expressly excluded from the State’s undertaking to participate in a study. Anecdotal evidence is presented that container ships are getting larger and that the post-Panamax vessels cannot be accommodated in the Cape Fear River channel. Those conclusions are undeniable. But there is not any evidence presented that the ports in other States (which now handle 80% of North Carolina’s international commerce) are in any way unable to serve the region’s needs.

The Wilmington Harbor Project was designed in 1996 for a 50-year life, and the planning criteria for solving the problems at hand also include measuring benefits and costs over 50-years. Yet there are not any forecasts in the District’s document. We do not know if the District has used its typical tunnel vision and simply extrapolated past trends for its economic analysis, or has observed the mandate of the Corps *Planning Manual* to take into account factors external to the planning process, factors that cannot be controlled but must be considered.

Here, certainly, is the place to consider the dimensions of the complex matrix that is international maritime commerce. What will happen when the Panama Canal can accommodate larger ships? Will commerce move to ports with deep water, such as Hampton Roads and Charleston, ports that already serve more of North Carolina’s international commerce than Wilmington? What is the place of the port of Wilmington in the larger picture of ports in the Southeast? If we build it will they come? Here we note that the current depth of 42 feet is

only required by two vessels per week, both of which are operated by the same Asian consortium, and that Moffatt & Nichol reported to the State Ports Authority in February 2011 that that vessel string may move to other ports. Indeed, the Moffatt & Nichol report is another catalog of reasons the port of Wilmington and the Cape Fear River are not suitable for any expansion.

Step 3–Formulation of Alternatives

According to the Corps Planning Manual, “Plan formulation is the process of building plans that meet planning objectives and avoid planning constraints.” Accordingly, the Wilmington District has defined its planning objectives and constraints (section 5.3) prior to embarking on formulating alternatives.

That provides insight into the Corps rationale. The planning objectives are economic: improve efficiency, increase national economic development. The constraints are the laws that provide for environmental protection and historic preservation. Thus the environment and history are only considered for compliance for legal minimums and constraints. Strategies for designing a project to enhance the natural or human environment or restore ecosystems are not in the Wilmington District’s repertoire.

The Wilmington District presents three alternatives in section 5.5 of its *Section 905(b) Analysis*:

1. *Minor Modifications* (section 5.5.1). Three modifications to the channel in the Cape Fear River to address the issues specified in Secretary Freeman’s letter of intent:
 - (A) the channel alignment at the river mouth near Bald Head Island,
 - (B) the channel turn at Battery Island, and
 - (C) the size of the anchorage and turning basin at the Port of Wilmington.
2. *NCIT* (5.5.2). A combination of substantial deepening of the lower reaches of the channel and construction of a channel extension, turning basin and berthing area for the proposed North Carolina International Terminal, a very large marine container terminal planned for Southport near the mouth of the Cape Fear River.
3. *No Action* (5.5.3). Continued maintenance of the existing channel and completion of the current project to deepen the channel to 42 feet.

Secretary Freeman’s letter expressing the intent of the State of North Carolina to participate in a feasibility study specifically excluded consideration of the NCIT project. Yet here it is in the Wilmington District’s *Section 905(b) Analysis*. Justification for its inclusion is the Congressional funding for the analysis, originally earmarked for the NCIT and redirected by the Wilmington District.

The Wilmington District does not include the only alternative that would offer any prospect of mitigating the problem at Bald Head Island: restoration of the channel to a shallower depth, such as the 38- foot depth that prevailed from 1969 to 2004.

Alternative One–Minor Modifications

The minor modifications in the first alternative are these three:

Change in Channel Alignment at the Entrance Channel. The Wilmington District’s proposal to address the first item in Secretary Freeman’s letter of intent is a relocation of the entrance channel at Bald Head Island, which the District observes “has proven susceptible to rapid and persistent shoaling theoretically attributable to a combination of natural forces and impacts from adjacent beach renourishment projects and Federal shoreline disposal projects.” In other words, the remedies for the capture of beach sand by the channel are the cause of that capture. When the sand is restored to the beaches, it finds its way back into the channel.

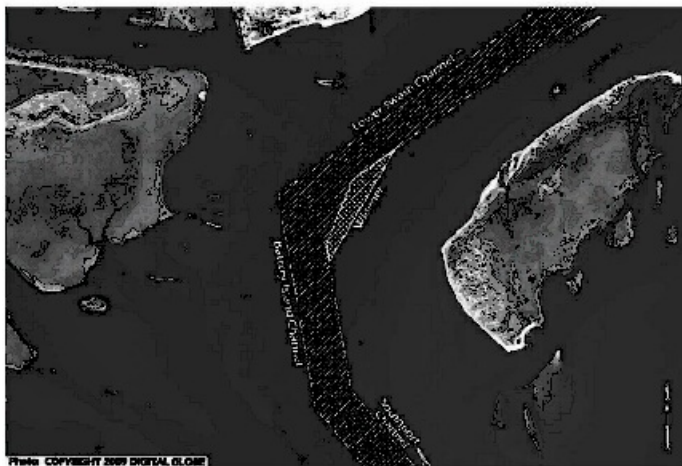
The District’s proposed remedy is relocatiing the channel about a hundred feet to the west, away from the shoreline at Bald Head Island. This, the District’s says, “may potentially allow for reduced future maintenance costs, improved overall reliability, and increased full channel capability.” “[M]ay potentially” is not very promising.

The proposed change in alignment is perplexing, however. The navigation problem cited is shoaling on the east side of the channel, forcing ships to the west side, the “less advantageous side of the channel to safely navigate the bend with Smith Island channel.” That bend is to the west, so ships on the west side of the channel are required to make a sharper turn. But the change in the channel proposed by the Wilmington District is to the west, making the turn even sharper. It appears that the ships would use the east side of the channel to prepare for the turn; the result is that the path of the ships would not change—all that would change is the location of the marked channel.



Modification of the Channel Turn at Battery Island. The alternatives available to the Wilmington District to improve the situation at the channel turn at Battery Island are limited by the shape and size of the Cape Fear River. There is not enough room in the river for a turn conforming to the Corps Engineering Manual or international standards for Panamax vessels; all that can be done is widening the channel at the apex of the most severe turn, the 65-degree turn. This turn immediately follows a 30-degree turn; the river pilots treat it as a single 95-degree turn.

Such a widener is shown in the illustration. The Wilmington District does not provide the effective radius of the resulting turn, or suggest the size vessel that could navigate the turn safely. Here we note that the effective radius of the existing turn at the requisite width is 1280 feet. The design vessel for the channel deepening to 42 feet was 965 feet long. The Corps Engineering Manual recommends a radius of more than ten times vessel length for turns of greater than 50 degrees—9650 feet. International standards call for a radius of at least seven times vessel length—6755 feet.



The widener can be expected to improve the situation somewhat for Panamax vessels, but studies by the State Ports Authority’s consultants, including a simulation study by Moffatt & Nichol, hold out no hope of accommodating larger ships.

The Anchorage and Turning Basin. To address the problem of inadequacy of the anchorage and turning basin for Panamax vessels¹, the Wilmington District proposes moving the basin upriver slightly, where the District believes a basin 1450 long and wide can be opened by encroaching on marsh and marine habitat areas on the west side of the river and a disused section of the State Port on the east side.

¹ The *Section 905(b) Analysis* here recites that the turning basin is being used by “vessels of 950 feet and 965 feet in length, approximately 100 feet longer than the design vessel” for the 1996 study leading to the most recent channel deepening project. That it not true. The design vessel for that study was 965 feet in length. That is confirmed elsewhere in the District’s report.

Alternative Two–The North Carolina International Terminal

The description of the alternative action of pursuing the North Carolina International Terminal is limited to the dredging that would be necessary to connect the terminal site near Southport to the main channel, deepening, widening, and reconfiguring that channel, and extending the channel eight to ten miles out to sea. The description does not include the terminal itself or the landside infrastructure that would be necessary, although the report acknowledges that such things must be considered to determine economic and environmental feasibility of the dredging project.

The District uses as a design vessel for this inquiry a post-Panamax container ship 1100 feet long, 140 feet in beam, with a draft of 47 feet. Channel depths of 48 feet and 50 feet are considered.

The Wilmington District employs the guidance in the Corps Engineer Manual for navigation projects to determine channel dimensions. However, this guidance is abandoned in considering the channel turns at Battery Island and the river mouth. That is not admitted; the reason is that a channel conforming to the manual's standards cannot be fit in the river. Instead, the Wilmington District proposes to use the same non-conforming relationship of turn radius to vessel length that was used in the 1992-1996 feasibility study and has proven so troublesome in service. Panamax vessels can be navigated through the turns only during a three-to-four hour period each day, and even then the maneuver is "extremely complex" and safety is an issue. The District proposes to make the same mistake again, but on a larger scale. CH2M Hill, Inc., TEC, Inc., PF Richardson Associates and Moffatt & Nichol, in studies for the State Ports Authority, all concluded that turns conforming to the manual for larger vessels cannot be fit between the banks of the river in this area. Those studies have not been acknowledged by the District.

Alternative Three–No Action

The "no-action" alternative would continue to use the existing channel without change to its depth, dimensions, or location. There is no discussion of this alternative in the *Section 905(b) Analysis*. The end of this section (5.5.3) is missing, and language from the end of section 5.2 is repeated instead.

The "do-nothing" alternative must be defined. The "standard" definition might be maintenance of the existing channel depth and dimensions. However, in practice that does not happen because the funding for maintenance is not always, or even often, available. A more realistic definition would be based on the history of the channel for the last eight years since being opened at the 42-foot depth specified in the most recent channel deepening project. That history tells us that the channel is not always available at the specified depth because of a dearth of maintenance funds. As of this writing the river pilots have imposed a 36-foot draft limit

because of shoaling at the river mouth, the channel turn at Battery Island is a safety issue, with vessels being pushed to the limits of maneuverability, and the larger vessels can only be turned at Wilmington at favorable tide. .

The Wilmington District did not consider restoration to a shallower depth, perhaps 38 feet, or simply allowing the channel to fill with sediment to that depth. Here we note that the Corps data on vessel calls and drafts show only about 100 vessels per year require the 42-foot depth. An inquiry into the economic effect of loss of those calls, compared to savings in maintenance might be useful. Alas, it would take great bureaucratic courage for the Wilmington District to make this inquiry because the result may be that the last channel deepening project—costing \$384 million—should not have been done at all.

Solutions?

The problems identified by Secretary Freeman’s letter of intent have been reasonably well examined, and undeniably, are significant problems. Solutions, however, are elusive. The alternatives proposed for the shoaling at the river mouth and the difficulty with the channel turn at Battery Island offer little to resolve the problems. The larger anchorage and turning basin proposed for the port at Wilmington does address this issue of insufficient room for existing vessels calling at the port, although it is rather drastic given the number of vessels benefitting from the larger basin, about two per week.

As for the North Carolina International Terminal, that is a solution looking for a problem. There is not any demonstration of need or legitimate commercial purpose for such a facility on the Cape Fear River.

Step 4—Evaluation of Alternatives

Economic effects are at the top of the list in the Planning Manual’s guidance on the evaluation of alternatives. But there are other items for consideration on the list—environmental, historic, social and planning objectives. The Wilmington District’s *Section 905(b) Analysis* treats those topics, but arranged by topic rather than by alternative. This makes obtaining a clear picture of the full effect of any particular alternative something of a challenge.

Alternative One—Minor Channel Modifications.

All three of the minor channel modifications have been lumped into a single alternative for evaluation. The prospect of doing less than all three modifications does not seem to be contemplated by the Wilmington District. Thus the *Section 905(b) Analysis* economic analysis

(section 5.7.1) does not present the cost of each modification—only the total for all three. Likewise, the benefits are grouped.

In a benefit/cost analysis, positive and negative monetary effects would be examined, quantified, and then compared with costs. The Corps does the comparison using average annual costs, rather than totals. Future costs and benefits are discounted to present value using a rate determined by headquarters, based on the yield on long-term Treasury bonds. A fifty-year lifetime is used for navigation improvements.

Average annual costs shown in the report are \$1,950,000 for interest and amortization of the \$41.1 million project cost, and \$500,000 for increased maintenance—a total of \$2,450,000 per year.

The benefits of the minor modifications would seem to be the savings in maintenance costs by spreading out maintenance visits. There are also delays that should be prevented, an expense to the shipping lines. Both are measurable. There may also be an actuarial benefit in avoiding risks of grounding, particularly at the channel turn at Battery Island. However, those have not been counted as benefits. Instead, the Wilmington District followed its usual recipe of determining the increase in National economic development that would result from permitting larger and more efficient ships to call at the port.

The Wilmington District has available comparative cost information for various size vessels. So going into the usual conceptual tunnel, the District postulated that the modifications would permit first-generation post-Panamax vessels (size not specified) to call at Wilmington if light-loaded to less than design draft to permit navigation of the Cape Fear River at the 42-foot depth. As if that would happen. Build it and they will come. If they can. The minor modifications are intended to solve problems with navigation by the existing Panamax vessels, not larger ships. Larger ships could not navigate the turns, and even if they could, could be accommodated at the newly-planned turning basin only with difficulty.

Using cost information from a selection of trade routes, the District determined that use of those larger, post-Panamax vessels light-loaded would save an average of \$16.80 for each twenty-foot equivalent unit (TEU) of containers. There are no further calculations displayed. Then in the table of benefits and costs, the figure of \$9,750,000 for the present worth of average annual benefits is presented.

We are left to reverse engineer that figure. To achieve annual benefits of \$9,750,000 at average savings of \$16.80 per TEU, annual container movements of 580,000 TEU would be required in those light-loaded post-Panamax vessels. In that same section of the report, the capacity of the container terminal at the Port of Wilmington is shown as approximately 300,000 TEU. So the \$9,750,000 figure for benefits is not only unlikely, it is impossible.

The rationale for this chicanery is the approval process. In order to put the project in the administration's budget request, a benefit/cost ratio of at least 3.0 is necessary. Annual benefits of \$9,750,000 produce a ratio of 4.0, comfortably over the threshold. Although this is patently bogus, there does not seem to be review of the calculations at any level. It raises the suspicion that all projects presented for inclusion in the budget have been similarly cooked, and that the Wilmington District is simply playing the game as others do, and no one is blowing the whistle.

Environmental effects are not quantified for inclusion in the benefit/cost analysis, except to the extent that mitigation measures are included in the project cost.

The anticipated environmental effects are presented in a table in another section of the report (section 5.8). Again, the effects of the individual modifications are not shown separately, but the three are grouped under navigation improvements. These have been identified for the three minor modifications:

- Channel deepening and widening would involve removal of rock, with adverse effects on groundwater. The report does not mention that the groundwater is the Castle Hayne aquifer, which underlies the Cape Fear River, and is an important fresh water supply for Brunswick County.
- Widening and deepening of the channel would increase salt water intrusion upstream and in tidal inlets.
- Construction and maintenance would cause turbidity and increase solids suspended in the river. Construction, maintenance and operations would increase noise and air pollution.
- The east bank of the Cape Fear River into which the proposed new anchorage and turning basin would be cut is contaminated with pentachlorophenol, creosote and dioxins.
- Dredging for the enlarged anchorage and turning basin would take 37 acres of tidal marsh and marine habitat, of which 28 acres are designated as primary nursery.
- The current problem of erosion at Battery Island, an important rookery for white ibis and other shore birds, would be exacerbated.
- Important underwater archeological sites would be affected, directly or indirectly. The report does not mention that one of the sites is the *CSS North Carolina*, one of two ironclads built in Wilmington, which has already been damaged by dredging.

All of these issues are treated by the Wilmington District as items for further study rather than negative aspects for consideration in the decision to go forward.

Public views were neither solicited nor reported for the channel modifications.

Alternative Two–North Carolina International Terminal

The economic analysis of the North Carolina International terminal takes a step from millions of dollars to billions. The Wilmington District estimates the construction cost of the channel for that project at \$1.2 billion for a 50-foot depth, \$1.04 billion for 48-feet. The average annual cost (at an unspecified rate) would be \$61.5 million for the 50-foot channel, \$54 million for a 48-foot deep channel.

These estimates exclude the terminal itself and the landside infrastructure, without which the dredging would serve no purpose and produce no benefits. The Wilmington District presumes that those facilities would be self-liquidating, although that has never happened and the State Port at Wilmington, a much smaller facility, requires regular infusions of State funds for capital projects.² The District does admit that the construction of the facility is speculative. We note that TEC/PF Richardson, consultants to the State Ports Authority, estimated the cost of those facilities at \$3.2 billion, for a total project cost of \$4.4 billion.

Manufacturing benefits to exceed the estimated costs requires some ingenuity, but the Wilmington District is up to the task, coming up with \$162 million in average annual benefits. The District determined that the use of larger vessels for the trade routes served would save \$84.60 per TEU. Implicit in the calculation is the assumption that all of such savings would be passed through to shippers and would not be retained by the foreign-flag ship owners.

Annual benefits of \$162 million at \$84.60 per TEU would require average annual movements in the more efficient vessels of 1.9 million TEU. Elsewhere in the report (section 5.6.3), the Wilmington District reports that current annual throughput at the State Port of Wilmington is 267,750 TEUs. This indicates market demand—it is not constrained by capacity.

The Wilmington District gets from 267,750 TEUs to 1.9 million by “capturing market share” of East Coast containerized freight volume. The benefit estimate is based on growth from the current market share of about 1.4% at Wilmington to 6.75% in 2030. There are three problems with that:

² The Wilmington District cites a Moffatt & Nichol report delivered to the State Ports Authority in February 2010 for the proposition that projected revenues are sufficient to fund construction of the terminal and provide a return on investment. That report does not do that at all. It is limited to revenues for the existing ports at Wilmington and Morehead City, to support an offering of bonds at that time.

- It is preposterous. The NCIT has the same market as the container terminal at Wilmington, which is defined by geography, location of population centers, and infrastructure. The State port at Wilmington has obtained its market share by offering the lowest rates in the East and providing the good service possible at a port that is operating well below capacity. The current market share has prevailed for decades.
- It is bad analysis. “Capturing” benefits from other ports does nothing for the National economic development that is supposed to drive Corps economic analyses. It simply moves the benefits around.
- It is illegal. Counting benefits transferred from other regions is prohibited by section 904 of the Water Resources Development Act of 1986.

So the benefit calculation is bogus. The Wilmington District is attempting to advance a billion-dollar project with patently phony analysis. Because this issue has been raised with a complaint to the Engineer Inspector General without result, the corruption (and it is nothing less) must extend to headquarters.

The environmental issues for the North Carolina International Terminal project, appearing in the same table in section 5.8 as the issues for the minor modifications, are presented in a more forthright fashion. These have been identified:

- Dredging a new channel to the terminal site would involve removal of rock, with adverse effects on groundwater. The report does not mention that the groundwater is the Castle Hayne aquifer, which underlies the Cape Fear River, and is an important fresh water supply for Brunswick County.
- A wider and deeper channel would increase salt water intrusion upstream and in tidal inlets.
- Construction and maintenance would cause turbidity and increase solids suspended in the river. Construction, maintenance and operations would increase noise and air pollution.
- Dredging would take 657 acres of tidal marsh and marine habitat in the Cape Fear River. Hard bottom habitat would be affected by the channel extension. Several “Essential Habitat Areas” identified by the National Marine Fisheries Service would be affected.
- The terminal facilities and landside infrastructure would have substantial negative impacts on terrestrial resources.
- The enlarged channel would exacerbate problems of erosion at Battery Island, an important rookery for white ibis and other shore birds, and area beaches.

- Important underwater archeological sites would be affected, directly or indirectly. The report does not mention that one of the sites is the *CSS North Carolina*, one of two ironclads built in Wilmington, which has already been damaged by dredging.

The Corps does not quantify these environmental effects, although techniques for so doing are coming into use. All of these negative environmental aspects are assigned a value of zero in the benefits/cost analysis that leads to the finding of a “Federal interest” (except to the extent of the cost of mitigation measures.)

Alternative Three–Do Nothing

The Wilmington District does not mention this alternative in its economic analysis. The do-nothing alternative is included in the table of environmental effects.

Step 5–Comparison of Alternatives

The Wilmington District’s *Section 905(b) Analysis* does not do this at all.

Step 6–Selection of Plan

The plan selected by the Wilmington District is the plan for three minor modifications to the channel. There is not any discussion or rationale—simply a statement in section 7 that there is a “Federal interest” in conducting the study because “transportation savings ... appear to exceed the cost of at least one potential alternative.”

Conclusions

There are four significant problems with the Wilmington District’s *Section 905(b) Analysis* of Wilmington Harbor Navigation Improvements:

The Feasibility of the Proposed Modifications

The three problems identified for study—the shoaling of the channel at Bald Head, the channel turn at Battery Island, and the anchorage and turning basin at Wilmington, are indeed problems that adversely affect the ability of the channel in the Cape Fear River to accommodate the Panamax vessels for which the most recent channel dredging project was designed. The proposed solutions, however, do not appear to be either practical or effective. Adjusting the alignment of the channel at Bald Head would not reduce shoaling—it would just move the

marked channel to reflect more accurately the path of the ships. It would do nothing about the more serious problem, the erosion of the beaches due to the sediment sink created by the channel.

The troublesome turn at Battery Island cannot be modified to bring it into compliance with standards for channel turns within the banks of the Cape Fear River. At best, the hazard to existing vessel traffic can be reduced by widening the turn on the Battery Island side, putting a sensitive ecological asset and historic sites at risk.

Moving and widening the turning basin at Wilmington would serve to extend the maintenance intervals necessary keep the width and depth sufficient for Panamax vessels. However, that is at the expense of 37 acres of habitat and the risk of releasing toxic materials into the river.

Project Justification

The problems identified certainly demand study and resolution. However, the proposed solutions will not produce the benefits claimed—economies of scale from using larger ships. In this respect the report is tainted and does not fulfill the requirements of section 905(b) of the Water Resources Development Act of 1986.

Reprogramming

The *Section 905(b) Analysis* has been effected by reprogramming funds appropriated for a study of the proposed North Carolina International Terminal at Southport under broad authority for study of navigation improvements. The report includes extensive material treating that project as an alternative; it is not rejected in the analysis, simply not included in the recommendation. This raises the prospect of future reprogramming of study resources to the project at Southport should the three improvements to the Cape Fear River channel that are recommended for further study be found impractical or not feasible.

Study Category

The three problem areas identified for the feasibility study all flow from the Wilmington Harbor improvement project studied in 1992-1996, commenced in 1998, and still underway. Corps of Engineers regulations and practice require use of a different format, a general reevaluation report, in cases involving issues covered in a previous study.

A general reevaluation report for that project was begun in 2005 but stopped without explanation in 2009. In a general reevaluation report under an existing project, the share of the

costs to be borne by the State of North Carolina as the “non-Federal sponsor” would be the same as the cost sharing for that project, 35%, substantially less than the share for a new feasibility study, 50%.

Use of the feasibility study format instead of a general reevaluation report would facilitate later redirection of the study back to the Southport terminal project.

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Exhibit A
Outline of Feasibility Study

(prepared by Wilmington District of the US Army Corps of Engineers)

The feasibility report would be expected to analyze whether proposed changes are engineeringly (sic) sound, environmentally acceptable, and economically justified. The following are an example of some of the items that would be studied in greater detail in a feasibility study:

1. Plan Formulation

- a. Alternative channel alignments
- b. Alternative dredging options
- c. Alternative disposal locations
- d. Public involvement and coordination

2. Economics

- a. Vessel characteristics
- b. Expected future commerce
- c. Transportation cost savings
- d. Reduction in vessel delays
- e. Reduction in maintenance costs
- f. Benefit analysis
- g. Comparison of costs and benefits
- h. Selection of the NED Plan

3. Environmental

- a. Environmental assessment
- b. Cultural resources evaluation
- c. Benthic and cultural surveys
- d. Endangered species evaluation
- e. Essential fish habitat
- f. Fish and Wildlife Coordination Act Report
- g. Monitoring and/or mitigation requirements
- h. Public and agency coordination
- i. Consistency Determination with NC Coastal Management Program
- j. Finding of No Significant Impact

4. Geotechnical Investigations
 - a. Evaluation of existing geotechnical data
 - b. Additional subsurface investigations if warranted
 - c. Material characterization
 - d. Top of rock contouring
 - e. Computation of volumes for alternatives
 - f. Evaluation of disposal options
 - g. Preparation of geotechnical documentation

5. Coastal Engineering
 - a. Channel alternative surveys
 - b. Design of channel alternatives
 - c. Alternative shoaling rates
 - d. Sediment transport
 - e. Ship simulation
 - f. Dredged material disposal options

6. Cost Engineering
 - a. Alternative cost estimates
 - b. MCACES costs for Recommended Plan
 - c. Costs risk analysis
 - d. Preparation of cost documentation
 - e. Value engineering study

7. Agency and Technical Review
 - a. Quality Assurance/Quality Control
 - b. Agency Technical Review -Cost Certification
 - c. External Independent Peer Review
 - d. Higher Authority Review

Data generated as part of this study will be posted to the District's navigation home page. Documents will be provided for public review according to a schedule developed in the Project Management Plan. Existing information on hydrodynamic modeling, shoreline monitoring, ship simulation, geotechnical, and other pertinent data will be utilized to the extent possible and updated as required. A combined Feasibility Report and Environmental Assessment or Environmental Impact Statement would be prepared if warranted. The Project Delivery Team will be selected by the Wilmington District, with Agency Technical Review handled by the Deep-Draft Navigation Center of Expertise in South Atlantic Division.