REPORT SUMMARY FOR CIVIL WORKS REVIEW BOARD

Sabine-Neches Waterway Channel Improvement Project, Southeast Texas and Southwest Louisiana

Feasibility Scoping Meeting:	16-17 May 2001
Alternative Formulation Briefing:	30 May 2007
AFB Guidance Memorandum:	14 June 2007
Draft Report Guidance Memorandum:	29 March 2010
Division Engineer Transmittal:	12 May 2010
Received at CECW-PC:	12 May 2010
CWRB Briefing:	25 May 2010
30-Day S&A Review Start:	11 June 2010
30-Day S&A Review End:	11 July 2010
FEIS filed with EPA:	18 June 2010

STUDY INFORMATION

Study Authority. This Feasibility Study was conducted in response to the 5 June 1997, Senate resolution from the Committee on Environment and Public Works. The resolution states:

> *The Secretary of the Army shall review previous reports on the Sabine-Neches Waterway published as Senate Document No. 80, 83rd Congress, Second Session; House Document No. 553, 87th Congress, Second Session; and other pertinent reports to determine the feasibility of modifying the channels serving the ports of Beaumont, Port Arthur, and Orange, Texas, in the interest of commercial navigation.*

Study Sponsor. The Sabine-Neches Navigation District (SNND) is the non-Federal Sponsor for the study. The Sponsor was previously known as the Jefferson County Navigation District or the Jefferson County Waterway and Navigation District. In 2007, the SNND name was adopted. SNND fully supports the project, is willing to sponsor project construction and has indicated financial capability to satisfy its obligations for the construction of the Recommended Plan.

Study Purpose and Scope. The purpose of this study was to determine the feasibility of providing navigation improvements to the Sabine-Neches Waterway (SNWW), while maintaining the ecological value coastal and estuarine resources within the project area, consistent with the goals of the study sponsor, SNND, and in response to direction from Congress in the authorizing resolution. This study analyzes the problems and opportunities, and expresses desired outcomes as planning objectives. Alternatives were then developed to address these objectives. These alternatives include a plan of no action and various combinations of structural and nonstructural measures. The economic and environmental impacts of the alternatives were then evaluated to identify the Recommended Plan. The report also presents details on U.S. Army Corps of Engineers (USACE) and non-Federal Sponsor participation

needed to implement the plan. The report concludes with a plan that is recommended for Congressional authorization.

Project Location/Congressional District. The SNWW is a federally constructed deep-draft channel, which serves the Ports of Port Arthur, Beaumont, and Orange, Texas. A map of the area is included in Figure 1. The existing waterway consists of a jettied entrance channel, 42 feet deep and 500 to 800 feet wide, from the Gulf of Mexico; a channel 40 feet deep and 400 feet wide to Beaumont via the Neches River; and a channel 30 feet deep and 200 feet wide to Orange via the Sabine River. The feasibility study investigated navigation modifications up to the Port of Beaumont to improve the efficiency and safety of navigation on the waterway. The Channel to Orange portion of the waterway is not part of this study. Congressional interests/districts include Senators Cornyn and Hutchison (both TX); Senators Landrieu and Vitter (LA); Congressmen Poe (TX-2), Brady (TX-8), Edwards (TX-17), and Boustany (LA-7).

Prior Reports and Existing Water Projects. Federal involvement in navigation improvements along the SNWW began with the River and Harbor Act (RHA) of 1885 to improve the mouth of the Sabine River with additional improvement from the RHA of 1912, which deepened the channel to 9 feet. Major deepening efforts on the SNWW were authorized in 1912 resulting in a channel depth of 25 feet. The channel was authorized for improvement again with the RHA of 1927, 1935, and 1946. Under the RHA 1962, the waterway was authorized to be deepened to its current depth of 40 feet.

On December 11, 1969, the Committee on Public Works House of Representatives adopted a resolution authorizing a review of the SNWW project. The resolution requested review of the report of the Chief of Engineers on the SNWW, published as House Document No. 553, 87th Congress, 2nd Session, and prior reports, with a view to determining whether the existing project should be modified in any way at this time, with particular reference to providing increased depths in the channel and basins. As a result, a feasibility study was initiated and a Draft Feasibility Report was completed in April 1982. The report determined that it was feasible and advisable to deepen and widen the SNWW. The Recommended Plan proposed a channel depth of 52 feet at the Gulf of Mexico entrance channel and a channel 50 feet deep for the Sabine Pass Channel, Port Arthur Canal, Sabine-Neches Canal, and the lower 12 miles of the Neches River Channel. The plan also included widening of the Sabine-Neches Canal, located adjacent to Port Arthur, from 400 feet wide to 500 feet in width to reduce traffic congestion and delays in this reach of the waterway, which also serves as part of the GIWW. The Recommended Plan was not implemented because the Sponsor withdrew their support for the project.

In September 1998, the USACE completed the 905(b) Reconnaissance Report for the SNWW. The reconnaissance concluded that deepening and widening of the SNWW offers sufficient opportunity for navigation improvements with potential benefits outweighing the anticipated project costs.

Federal Interest. The Recommended Plan addresses the problems and opportunities and satisfies the planning objectives of increasing navigational efficiency along the SNWW while maintaining the coastal and estuarine resources within the project area. The National Economic Development (NED) Plan is the 49-foot channel depth which optimized the depth based on

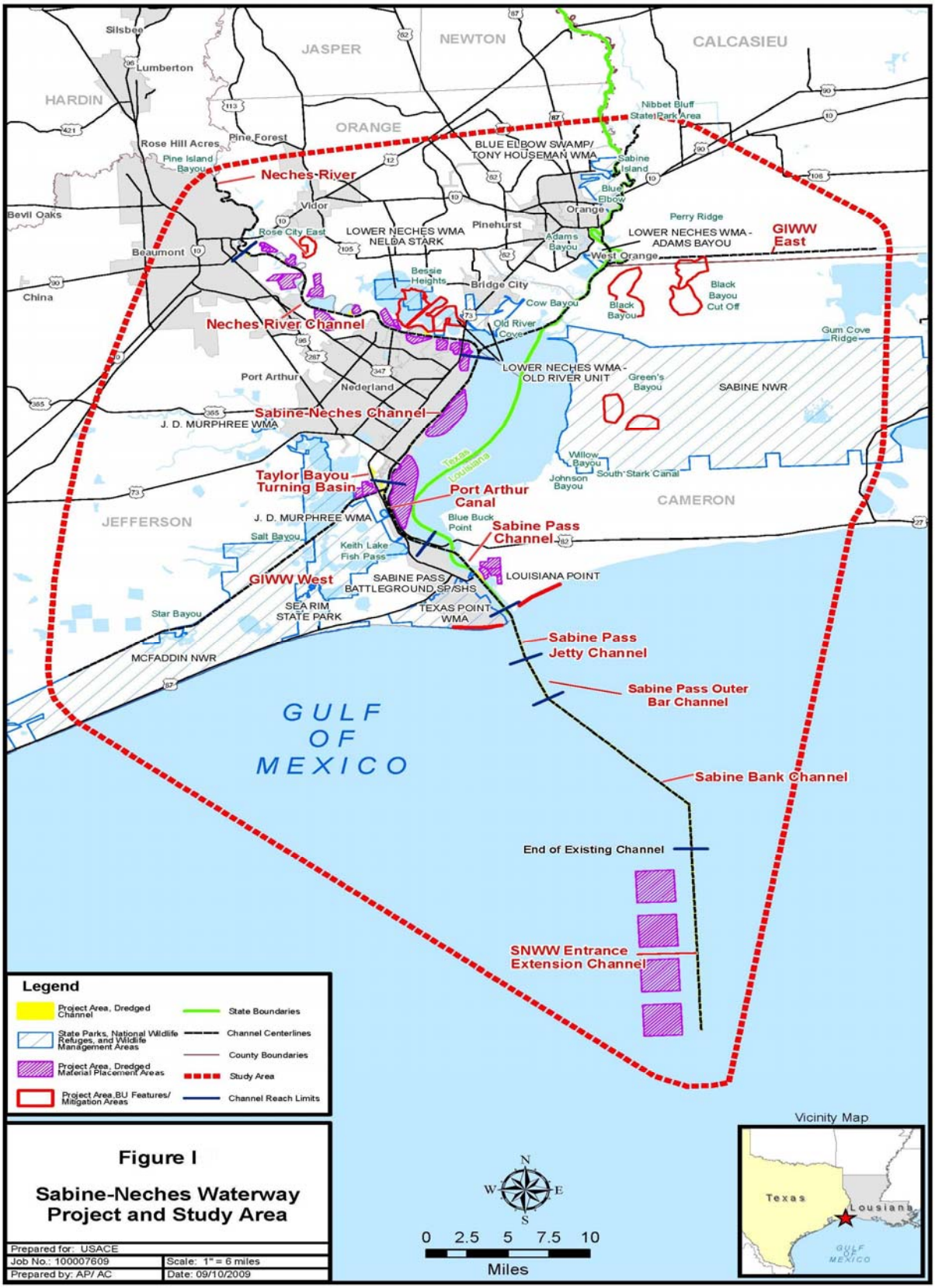
JASPER
NEWTON
CALCASIEU
HARDIN
ORANGE
CAMERON
JEFFERSON
Silsbee
Lumberton
Rose Hill Acres
Pine Forest
Pine Island Bayou
Bevil Oaks
Beaumont
China
Vidor
Orange
Pinehurst
Bridge City
West Orange
Nibbet Bluff State Park Area
Sabine Island
Blue Elbow
Perry Ridge
Adams Bayou
Cow Bayou
Black Bayou
Black Bayou Cut Off
Gum Cove Ridge
Old River Cove
Bessie Heights
Rose City East
Port Arthur
Nederland
Green's Bayou
Willow Bayou
Johnson Bayou
South Stark Canal
Blue Buck Point
Keith Lake
Fish Pass
Salt Bayou
Star Bayou
Texas
Louisiana
BLUE ELBOW SWAMP/ TONY HOUSEMAN WMA
LOWER NECHES WMA NELDA STARK
LOWER NECHES WMA - ADAMS BAYOU
LOWER NECHES WMA - OLD RIVER UNIT
SABINE NWR
J. D. MURPHREE WMA
SABINE PASS BATTLEGROUND SP/SHS
SEA RIM STATE PARK
TEXAS POINT WMA
LOUISIANA POINT
MCFADDIN NWR
Neches-River
Neches River Channel
Sabine-Neches Channel
Taylor Bayou Turning Basin
Port Arthur Canal
Sabine Pass Channel
GIWW West
GIWW East
Sabine Pass Jetty Channel
Sabine Pass Outer Bar Channel
Sabine Bank Channel
End of Existing Channel
SNWW Entrance Extension Channel
GULF OF MEXICO
Legend
Project Area, Dredged Channel
State Parks, National Wildlife Refuges, and Wildlife Management Areas
Project Area, Dredged Material Placement Areas
Project Area BU Features/ Mitigation Areas
State Boundaries
Channel Centerlines
County Boundaries
Study Area
Channel Reach Limits
Figure I
Sabine-Neches Waterway Project and Study Area
Prepared for: USACE
Job No.: 100007609
Scale: 1" = 6 miles
Prepared by: AP/ AC
Date: 09/10/2009
N
W
E
S
0 2.5 5 7.5 10
Miles
Vicinity Map
Texas
Louisiana
GULF OF MEXICO

FIGURE 1

maximization of net economic benefits. The Recommended Plan, the 48-foot channel improvement, is the locally preferred plan (LPP), preferred by the Sponsor, which is less in scope than the NED plan. Federal interest is clearly demonstrated by the positive benefit-to-cost ratio (BCR) of 1.3 for the channel improvements. The total project cost is about $1,072,000,000. All pertinent cost and benefit information can be found in Tables 3 and 4.

The SNWW serves the Ports of Port Arthur, Beaumont, and Orange. Channel improvements are needed to support the SNWW's critically important role in the Nation's economy. In 2007, the SNWW ranked first in the nation in crude oil imports, importing 56.2 million tons. In 2006, the SNWW (Ports of Beaumont, Port Arthur and Orange) was ranked 4th in the nation for domestic and total tonnage.

The existing SNWW navigation channel system is congested. The existing 40-foot project depth was designed to efficiently and safely accommodate much smaller vessels than are being used today. The current channel was completed in the late 1960s and, at that time, crude oil tankers averaging 40,000 deadweight tons (DWT) with loaded drafts of 36 feet were common. Vessels over 90,000 DWT are now used routinely for crude oil imports to both Beaumont and Port Arthur. With the current channel depth, there are draft restrictions on large vessels currently utilizing the channel. A majority of the tonnage carried on the SNWW is in deep-draft vessels, and the vast majority of the deep-draft traffic is comprised of crude oil and petrochemical products. However, Liquefied Natural Gas (LNG), grain, and aggregate products, such as iron ore, steel slab, limestone, sand, and gravel are also carried in draft constrained deep-draft vessels. In addition to larger vessels, the amount of vessel traffic on the SNWW has also increased. Also, three LNG terminals have been constructed or are proposed along the SNWW. LNG is expected to play an increasingly important role in the natural gas industry and global energy markets in the next several years and in the long-term future.

STUDY OBJECTIVES

Problems and Opportunities. The SNWW continues to play a significant role in the growth and economic development of the Golden Triangle area of Port Arthur, Beaumont, and Orange, Texas. As growth and economic development of the study area continues, the increasing use of the SNWW intensifies the need for more efficient movement of commodities, particularly crude petroleum, by vessels traveling the waterway. The amount of the vessel traffic along the waterway also increases concerns for the safety of the users, local communities and businesses all along the waterway. With the current channel dimensions, the tonnage is not being moved as efficiently due to the size restrictions of the larger tankers utilizing the channel. These tankers are either limited by the current channel depth of 40 feet or by the physical and safety limitations of the channel. The water resources problems addressed by this project are the navigational and safety issues that have developed on the SNWW because of the growth in the area. Existing water resource problems and needs in the study area were identified through coordination with Federal, state, and local agencies; area residents; waterway users; and the USACE and SNND.

Planning Objectives. The investigation of the problems and opportunities in the study area led to the establishment of the following planning objectives:

• Improve the navigational efficiency along the SNWW waterway; and
• Maintain the ecological value of coastal and estuarine resources within the project area.

The optimal plan for Federal participation must be consistent with the Corps-NED perspective as set forth in the Principles and Guidelines and must also account for Other Social Effects, be acceptable from the perspective of Environmental Quality, and be in concert with the Chief of Engineers' Environmental Operating Principles. Plans developed for analysis must be formulated to be complete, effective, efficient, and acceptable, and to reasonably maximize net benefits over the 50-year period of analysis from 2019 to 2069.

Planning Constraints. Planning constraints are restrictions that limit the planning process and the available scope of solutions to the identified problems, or that limit consideration of opportunities. Planning constraints are either institutional (laws, policies, and regulations governing Federal water resource project development), physical (sites available for port improvements), economic (limits on sponsor financing), environmental (habitat, endangered species), or sociological (cultural resources, strong local opposition). The following constraints apply to this feasibility study:

• The study process and plans developed must comply with Federal and state laws and policies;
• Fish and wildlife habitat affected by a project plan should be minimized as much as possible and preserved, if possible;
• Alternative plans that resolve problems in one area should not create or amplify problems in other areas; and
• If a plan with lesser benefits is preferred by the sponsor due to financial constraints, guidance allows for a categorical exemption to be granted and this lesser plan to be selected as the Recommended Plan.

ALTERNATIVES

Plan Formulation Rationale. The planning framework requires a systematic preparation and evaluation of alternative ways of addressing the project problems, needs, concerns, and opportunities while considering environmental factors. The criteria and planning objectives previously identified form the basis for plan formulation, alternative screening, and ultimately identification of the Recommended Plan. Planning for Federal water resources projects constructed by the USACE, as well as other agencies, is based on the Principles and Guidelines adopted by the Water Resources Council. The Economic and Environmental Principles for Water and Related Land Resources Implementation Studies have been utilized to facilitate evaluation and display of the effects of alternative plans.

An initial set of alternative plans was developed to improve navigation efficiency while maintaining the ecological value of coastal and estuarine resources within the project area. These plans were screened and further refined, resulting in the development of detailed plans. All plans were examined and compared considering the Federal criteria of completeness, efficiency, effectiveness, acceptability, and constructability, as well as for their potential to impact the environment. Plans were optimized to select the Recommended Plan of improvement.

Management Measures and Alternative Plans. Structural and nonstructural measures were examined to address the navigation problems and opportunities of the study area. The following is a list of the alternatives considered:

Future Without-Project Condition (No-Action Alternative) - The No-Action Alternative or Future Without-Project Condition, assumes that no project would be implemented by the Federal Government or by local interests to improve the navigational efficiency and safety of the waterway. This No-Action Alternative forms the basis against which all other alternative plans are measured. This alternative would retain the existing 40-foot-deep SNWW navigation channel with its various widths along the waterway. The current dimensions would continue to limit the efficient movement of commodities by vessels traveling the waterway. The No-Action Alternative would continue disposal activities for maintenance material from the 40-foot project while forecasting disposal facility needs for all material that would be generated by maintenance dredging of the existing 40-foot project over a 50-year period of analysis. Increases in tidal exchange, velocities and water surface elevations would be expected with a "most likely" relative sea-level rise of 1.1 feet.

Nonstructural Alternatives
- Alternate mode of commodity transport,
- Vessel traffic service, and
- Modification of existing pilot rules on the waterway.

Structural Alternatives
- Deepening only (43-, 45-, 48-, 50-, 53-, 55-foot depths)
- Widening, only, along the entire channel (widths varying from 500 to 700 feet) from Sabine Pass to the Port of Beaumont
- Deepening and widening (combinations of six depths and various widths for entire channel length)
- Selective widening only (widening only certain reaches of the channel)
- Deepening with selective widening (combination of depths and widening options)
- Expansion of existing and construction of new turning basins (TB) and/or anchorage basins (AB)
- Construction of barge lanes (for passing)

Several screening iterations of alternatives resulted in elimination of nonstructural alternatives and widening only. The nonstructural alternatives did not address the navigational efficiency of the waterway and would not allow the vessels utilizing the channel to load more fully. The potential relaxation of the current transit rules by the pilots was evaluated but screened out as not implementable because the pilots do not support this course of action. Although the widening in combination with the deepening of the channel was economically justified, the widening was not an incrementally justified feature and was eliminated from further evaluation.

Final Array of Alternatives. Based on additional information from the traffic analysis, the revised BCRs, net excess benefits, and the non-Federal Sponsor's lack of support for depths greater than 50 feet, the deepening alternatives were screened to a 5-foot range from 45 to 50 feet

focusing on those depths with the highest net excess benefits. These depths were evaluated in one-foot increments. Selective widening and TBs/ABs were also carried forward for more detailed analysis and formulation with the deepening alternatives. Additionally, the No-Action Alternative was carried forward as the basis of comparison for all of the plans. Table 1 identifies the alternatives evaluated in the final screening phase.

Table 1
Alternatives for Final Screening

Alternative	Depths (feet)	Sections	Width (feet)
Deepening	45, 46, 47, 48, 49, 50	Extension Channel	700
		Sabine Bank Channel	700 (tapers to 800)
		Sabine Pass Outer Bar	800 (existing)
		Sabine Jetty Channel	500 (existing)
		Sabine Pass Channel	500 (existing)
		Port Arthur Canal	500 (existing)
		Taylor Bayou	selective widening
		Sabine-Neches Canal	400 (existing)
		Neches River Channel	400 (existing)
TBs/ABs (Various combinations)	48	Neches River Channel	

Comparison of Alternatives. During detailed evaluation of screened alternatives, the comparison of the alternatives was based upon technical, economic, and environmental factors. Technical studies, used in the screening of alternatives as well as in the final selection of the plan, were conducted by the ERDC and IWR and included the Hydrodynamic/Salinity Modeling Study(HS Model), Ship Simulation Study, Sediment Study and Velocity Analysis, Vessel Effects Study, Gulf Shoreline Desktop Study and Harbor Simulation Model (Widening Analysis). Costs were estimated for all of the alternatives and compared to the project benefits. Included in the costs were dredging, levee construction, utility relocations, pipeline removals, and operations and maintenance (O&M) costs for the 50-year period of analysis. Costs for ecosystem mitigation were estimated using HS Model salinity projections. O&M costs for extending the entrance channel for the deeper depth alternatives were developed to better estimate project costs of each proposed depth. Table 2 presents the economic summary of the final screening of alternatives and includes BCRs and net excess benefits for the 45- to 50-foot plans, including turning basins and anchorages. The 49-foot depth produced the most net excess benefits compared to the cost of the proposed project modifications and therefore, is identified as the NED Plan. The non-Federal Sponsor has indicated a preference for the 48-foot project because of financial constraints. Therefore, this 48-foot project is the LPP and the Recommended Plan.

Table 2
SNWW Economic Summary Data
Cost and Benefits ($1,000s) by Channel Alternative
(50-Year Period of Analysis at 4.375%)
(December 2008 Vessel Costs)

	45	46	47	48	49	50
First Cost of Construction ($)	798,920	889,906	980,891	1,071,877	1,152,079	1,232,280
Total Annual Cost ($)	70,217	77,258	84,299	91,341	96,626	101,911
Average Annual Benefits ($)	83,844	95,856	104,303	115,074	122,875	127,696
Net Excess Benefits ($)	13,627	18,598	20,004	23,733	26,249	25,785
BCR	1.2	1.2	1.2	1.3	1.3	1.3

Key Assumptions. Various assumptions key to the formulation and recommendation were used in the analysis of this analysis. Recommendations on channel improvements and depth optimization are predicted on levels of commerce identified through investigation and forecasts of future commerce. Additional key assumptions for this study are:

Future without-project Condition

- Louisiana Coastal Wetlands Planning, Protection and Restoration Act Projects will be in operation at Willow Bayou, Black Bayou, and Perry Ridge for remainder of project life,
- The most likely rate of relative sea level rise (RSLR) is estimated to be 1.1 feet in the study area by year 2069 with the full potential range of RSLR estimated to be from 0.3 to 2.8 feet over period of analysis,
- Future freshwater inflows assumed for HS modeling are slightly higher on Neches River than existing inflows and about the same as existing inflows on the Sabine River, and
- Changes in land loss rates are driven by the interaction of salinity and submergence, resulting in a reduction in plant productivity, leading to a decrease in plant growth, plant death, followed by peat collapse and wetland loss with an assumed linear relationship between change in salinity due to RSLR and change in future without project land loss rate.

Future with-project Condition

- RSLR is the same as with the future without-project condition because deepening project causes only negligible increase in water surface elevation,
- Additional land loss would result primarily from the interaction of higher future with-project salinities with RSLR,
- Cost estimate of the Recommended Plan utilized appropriate probabilities of risk,
- Up to five pipeline dredges would be available for use at one time for inshore channel dredging, and mitigation and Beneficial Use (BU) marsh creation. Offshore dredging assumes use of only one hopper dredge at a time, and
- Sufficient funding streams would be available to construct the Recommended Plan over the assumed construction periods and to provide long-term operation and maintenance.

Recommended Plan. The Recommended Plan calls for a 48-foot-deep channel from Sabine Pass Channel to the Port of Beaumont on the Neches River Channel with no additional widening,

widening and deepening of Taylor Bayou TBs and channels to 48 feet, and improvements to several TBs and ABs on the Neches River Channel. The Recommended Plan would increase the existing channel depth by 8 feet, increasing the inland portion from 40 to 48 feet and increasing the existing offshore portions from 42 to 50 feet (plus overdepth and advance maintenance as needed). Two feet of overdepth and two feet of advance maintenance are included for the entire channel length. In high shoaling areas, additional advance maintenance is required in order to maintain current maintenance dredging cycles along the waterway. The Recommended Plan would result in an estimated 98 million cubic yards (mcy) of new work and 650 mcy of maintenance material over the 50-period of analysis. The annual maintenance dredging quantities in the SNWW would increase from an average of 8.1 mcy for the current 40-foot project to 13.0 mcy for the proposed 48-foot project. The total length of the SNWW with the proposed channel modifications would be approximately 77 miles. No modifications to the existing Sabine Pass Jetties are required by the proposed project. The Recommended Plan also includes the least-cost Neches River and Gulf Shore BU features as General Navigation Features of the Dredged Material Management Plan (DMMP). The Neches River BU Feature restores 2,852 acres of emergent marsh, improves 871 acres of open water habitat, and nourishes 1,234 acres of existing marsh in three large degraded marsh areas (Rose City East, Bessie Heights East, and Old River Cove) along the navigation channel. The Gulf Shore BU Feature periodically nourishes three miles of shoreline in Texas and three miles of shoreline in Louisiana beside the Sabine Pass Channel.

All practicable means to avoid or minimize adverse environmental effects have been incorporated into the Recommended Plan, and a compensatory mitigation plan has been included to address all unavoidable impacts in Louisiana. All impacts in Texas and some impacts in Louisiana will be offset by environmental benefits of the DMMP BU Features. The Mitigation Plan will compensate for the Recommended Plan impacts with marsh restoration in five degraded Willow and Black Bayou marshes. The mitigation measures will restore 2,783 acres of emergent marsh in existing open water areas within the marsh, improve 957 acres of shallow water habitat by creating shallower, smaller ponds and channels within the restored marsh, and nourish 4,355 acres of existing marsh located in and around the marsh restoration zone. Monitoring and contingency plans for these mitigation measures and the BU Features are included in the Recommended Plan.

Systems/Watershed Context. The SNWW is a system of navigation channels that have been superimposed upon the Sabine-Neches estuary in Texas and Louisiana. The estuary includes Sabine Lake, tidal portions of the Sabine and Neches rivers, and a number of tidally influenced bayous and shallow coastal lakes. The major rivers within the study area are the Sabine and Neches rivers, and smaller streams such as Taylor, Adam, Cow, and Little Cypress bayous on the Texas side. Major bayous flowing into Sabine Lake from Louisiana include Lighthouse, Johnsons, Madame Johnsons, Willow, Three, and Black bayous. The only connection with the Gulf of Mexico is a long narrow pass called Sabine Pass through which all tidal interchange occurs. Sabine Pass is stabilized by jetties that extend 4.1 miles into the Gulf of Mexico.

The feasibility study evaluated navigation and environmental problems and opportunities for the entire estuarine system, which is defined as the study area in all reports. The study area encompasses a 2,000-square-mile area, which contains the smaller area referred to as the “project

area." The project area includes those areas that would be directly affected by construction of the project (i.e. the dredging footprint, existing and proposed PAs, and mitigation areas). The study area includes the following water bodies and adjacent coastal wetlands: Sabine Lake and adjacent marshes in Texas and Louisiana, the Neches River channel up to the new Neches River Saltwater Barrier, the Sabine River channel to the Sabine Island Wildlife Management Area, the GIWW west to Star Bayou, the GIWW east to Gum Cove Ridge, the Gulf shoreline extending to 10 miles either side of Sabine Pass, and 35 miles offshore into the Gulf of Mexico.

Environmental Operating Principles. The Recommended Plan fully supports each of the seven USACE Environmental Operating Principles:

1. Strive to Achieve Environmental Sustainability. Construction designs of BU, restoration, and mitigation sites were developed for a 50-year period of analysis. Development and design of these areas were made to address potential changes over time (e.g., sea-level rise, shoreline erosion, etc.). The BU features and mitigation measures will contribute to the long-term environmental sustainability of the study area.

2. Consider environmental consequences. The direct and indirect effects of the project on the environment were quantified using ecological modeling. Compensatory mitigation is provided in the Recommended Plan for all unavoidable project impacts.

3. Seek Balance and Synergy. Opportunities to beneficially use the large quantities of dredged material that would be generated by this project were thoroughly explored. The needs of the project to find environmentally acceptable placement areas (PAs) were satisfied with the development of BU Features that would contribute to the long-term sustainability of interior wetlands and the coastal zone.

4. Accept Responsibility. Implementation of the Recommended Plan will ensure that the project complies with all Federal and State laws and regulations most notably in the areas of economic justification, environmental impacts, and agency and external peer review. All environmental impacts of the proposed project have been addressed and either offset by beneficially using dredged material or mitigating for impacts.

5. Mitigate Impacts. Project impacts were identified and the type and location of compensatory mitigation measures are presented in the project reports. No mitigation is required in Texas since the benefits of the DMMP more than offset the impacts in that state. Mitigation has been identified to fully compensate project impacts in Louisiana. The recommended mitigation plan results in an excess of overall environmental benefits vs. impacts.

6. Understand the Environment. Some of the most knowledgeable and experienced environmental professionals in Texas and Louisiana participated on the SNWW Interagency Coordination Team (ICT). Their expertise ensured that the broad spectrum of environmental habitats of the study area were adequately understood, impacts accurately identified, and the appropriate amount and type of mitigation was developed.

7. **Respect other views.** Scoping meetings and a series of public workshops were held at the outset of the study to obtain a full spectrum of public views regarding potential navigation improvements and beneficial use/ecosystem restoration opportunities. Public and agency comments on the draft project reports were solicited at public meetings and through dissemination of the reports. All comments have been thoroughly reviewed and responses have been provided in the FEIS. Collaboration between the USACE, Sponsor, and ICT members occurred throughout the study process. The interactions were professional and respectful, and always entertaining the opinions and expertise of others.

Independent Technical Review and Agency Technical Review: Agency Technical Review (ATR) for this study has been managed by the Deep Draft Navigation Planning Center of Expertise at the Corps South Atlantic Division, Mobile District (SAM). All concerns of the ATR have been addressed and incorporated into the final report. The completed ATR sign-off of the review of the draft report was provided by SAM on 18 December 2008. The ATR of the final report was certified in May 2010. Additionally, the Corps Center of Expertise for Cost Estimating at the Walla Walla District (NWW) was tasked with technical review of the project cost estimates. NWW forwarded its completed Cost ATR sign-off of the draft report on 19 October 2009. No changes have been made to the cost estimate since that sign-off.

SAM has also managed an Independent External Peer Review (IEPR) of the study documents by experts outside of USACE. The IEPR report was completed and provided to the Galveston District on 5 October 2007. The results of this review has been addressed and incorporated into the final project documents and recommendation. The final certification of the report for IEPR is expected to be provided prior to the Civil Works Review Board meeting.

EXPECTED PROJECT PERFORMANCE

Project Costs. Project first costs are shown in Table 3. Project costs were developed at October 2009 price levels and include post-authorization planning and design costs, the General Navigation Features (GNF) costs including mitigation costs, lands, easements, and rights-of-way, relocations, and O&M. The GNF costs include costs for dredging, PA construction, aids to navigation (e.g., channel markers and protection for MLK Bridge supports and bridge fender replacement). The USACE coordinated with the U.S. Coast Guard (USCG) to develop costs for aids to navigation, and with the Texas Department of Transportation to develop costs for bridge support protection and fender systems. Costs for compensatory fish and wildlife mitigation (including deferred construction costs for one mitigation measure) and potential cultural resource mitigation are also included. Associated Federal and non-Federal costs are the costs of resources directly required for project construction, but for which no project expenditure is made, such as USCG navigation aids, deep-draft utility relocations, pipeline removals, and non-Federal berthing/dock modifications.

Table 3
First Cost Summary
Sabine-Neches Waterway
(All costs in $)
(October 2009 price level; 4.375% interest rate)

Construction Dredging and PAs	$704,977,000
Fish and Wildlife Mitigation	77,491,000
Cultural Resources Mitigation	1,248,000
Lands	4,361,000
Engineering & Design	105,712,000
Construction Management	62,921,000
Deep-Draft Utility Relocations	1,199,000
Pipeline Removals	40,428,000
Aids to Navigation – Bridge Fender Modifications	51,794,000
Aids to Navigation – Channel Markers	1,492,000
Berthing and Dock Modifications	20,254,000
Total Project Cost	$1,071,877,000

Equivalent Annual Costs and Benefits. To determine whether Federal interest in the proposed improvements is warranted, the project has been evaluated for its environmental impacts, social effects, and economic justification. Project benefits were developed based on October 2009 price levels using a project base year of 2019. Economic justification is expressed in terms of a Benefit-Cost analysis. Project costs are discounted to present value and amortized over the project life. They are then compared to average annual economic benefits that would be produced by the project. To be recommended a project must have a BCR of greater than one-to-one. In addition, alternative plans for different channel depths are compared to determine and recommend the plan which has the highest annual net benefits. Net benefits are total annual benefits minus total annual costs. The project was examined incrementally foot-by-foot to determine the channel depth yielding the highest net benefit. The annual costs, annual benefits, and benefit cost analysis for the project are shown in Table 4.

Table 4
Equivalent Annual Benefits and Costs
(All costs in $)
(October 2009 price level; 4.375% interest rate)

Investment Costs	
Total Project Construction Cost	$1,071,877,000
Interest During Construction Costs	119,382,000
Total Investment Cost	$1,191,259,000
Average Annual Costs	
Interest and Amortization of Initial Investment	59,059,000
Deferred Construction (F&W Mitigation)	215,000
Incremental O&M	32,067,000
Total Average Annual Costs	$91,341,000
Average Annual Benefits	115,074,000
Net Annual Benefits	23,733,000
Benefits-Cost Ratio	1.3
Benefits-Cost Ratio (computed at 7%)[1]	0.9

[1]Per Executive Order 12893

Cost Sharing. The GNF costs for deepening between 40 and 45 feet are cost shared at 25 percent non-Federal and 75 percent Federal; costs for deepening below 45 feet are cost shared at 50 percent non-Federal and 50 percent Federal. Fish and wildlife mitigation is considered a GNF and is cost shared in the same manner as other GNF costs. Costs for cultural resources data recovery would be handled in accordance with PL 93-291 (Section 7), e.g., data recovery costs would be 100 percent Federal up to 1 percent of the total amount appropriated for the project. Based upon information available at this time, data recovery costs are not expected to exceed the 1 percent limitation. Non-Federal costs include non-Federal Sponsor, pipeline owner, and berthing/dock owner costs. The non-Federal Sponsor is responsible for 100 percent of Lands, Easements, and Rights-of-Way. Utility relocations required for the Recommended Plan are defined as "deep-draft utility relocations" pursuant to PGL 44 because the SNWW Channel Improvement Project would be authorized at a depth greater than 45 feet. In accordance with Section 101(a) (4) of Water Resources Development Act of 1986, 50 percent of deep-draft utility relocations would be borne by the utility owner and 50 percent would be borne by the non-Federal sponsor. Pipeline removals would be 100 percent owner cost. Owners of berth and dock facilities that would require modification in conjunction with the Recommended Plan would be responsible for 100 percent of those associated costs. The USCG is responsible for 100 percent of the cost for aids to navigation. Cost sharing for the project is shown in Table 5.

Project Implementation. The non-Federal sponsor is the SNND and would supply all necessary items of local cooperation, including the non-Federal shares of design and construction costs, berthing deepening, lands, easements, and rights-of-way, costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized and ensure the performance of all relocations, deep-draft utility relocations, and removals.

Table 5
Sabine-Neches Waterway - Cost Sharing
(All costs in $)
(October 2009 Price Level)

Item	Federal Cost		Non-Federal Cost		Total Cost
Deep-Draft Navigation from 40 to 45 feet					
Construction Contracts	$ 390,306,000	(75)	$130,102,000	(25)	$ 520,408,000
Lands - Federal	$ 558,000	(75)	$ 186,000	(25)	$ 744,000
Bridge Modifications	$ 34,182,750	(75)	$ 11,394,250	(25)	$ 45,577,000
Engineering and Design	$ 62,171,250	(75)	$ 20,723,750	(25)	$ 82,895,000
Construction Management	$ 36,318,750	(75)	$ 12,106,250	(25)	$ 48,425,000
Fish & Wildlife Facilities	$ 41,409,000	(75)	$ 13,803,000	(25)	$ 55,212,000
Cultural Resources	$ 1,248,000	(100)	$ -		$ 1,248,000
Subtotal - Deep-Draft Navigation from 40 to 45 feet	$ 566,193,750		$188,315,250		$ 754,509,000
Deep-Draft Navigation from 45 to 48 feet					
Construction Contracts	$ 92,284,500	(50)	$ 92,284,500	(50)	$ 184,569,000
Bridge Modifications	$ 3,108,500	(50)	$ 3,108,500	(50)	$ 6,217,000
Engineering and Design	$ 11,408,500	(50)	$ 11,408,500	(50)	$ 22,817,000
Construction Management	$ 7,248,000	(50)	$ 7,248,000	(50)	$ 14,496,000
Fish & Wildlife Facilities	$ 11,139,500	(50)	$ 11,139,500	(50)	$ 22,279,000
Subtotal - Deep-Draft Navigation from 45 to 48 feet	$ 125,189,000		$125,189,000		$ 250,378,000
Lands, Easements, Relocations, and Removals					
Lands - 100% Non-Federal	$ -		$ 3,617,000	(100)	$ 3,617,000
Relocation - Deep-Draft Utilities	$ -		$ 599,500	(50)	$ 599,500
Subtotal - Lands, Easements, Relocations, and Removals	$ -		$ 4,216,500		$ 4,216,500
Other Federal					
Navigation Aids	$ 1,492,000	(100)	$ -		$ 1,492,000
Associated Costs					
Relocation - Deep-Draft Utilities	$ -		$ 599,500	(50)	$ 599,500
Removals/Relocations of Pipelines	$ -		$ 40,428,000	(100)	$ 40,428,000
Dredging Berthing Areas and Dock Moods	$ -		$ 20,254,000	(100)	$ 20,254,000
Subtotal - Associated Costs	$ -		$ 61,281,500		$ 61,281,500
Total Project	$ 692,874,750		$317,720,750		$1,010,595,500
Associated Costs			$ 61,281,500		$ 61,281,500
Total with Associated Costs	$ 692,874,750		$379,002,250		$1,071,877,000

Operation and Maintenance. O&M of the completed project would be limited to periodic maintenance dredging of the channels and other dredging features of the project. The Corps would undertake this maintenance with financial participation from SNND for 50 percent of the portion of the cost of maintaining those channels deepened beyond 45 feet. The non-Federal Sponsor and other terminal owners would be responsible for the periodic maintenance of their individual berths. The average annual incremental O&M costs for the project is about $32 million.

Key Social and Environmental Factors. The primary impact of the Recommended Plan will be an indirect impact associated with a small increase in salinity (ranging from 0.3 to 1.8 ppt) and an associated reduction in biological productivity over approximately 182,000 acres of intertidal marsh, and the potential loss of 691 acres of marsh in Louisiana as some marsh converts to open water due to salinity stress. Minor impacts to cypress-tupelo swamp or bottomland hardwood productivity are also projected, but resource agencies considered these impacts to be acceptable since the loss in function is negligible. Other minor and temporary impacts will also occur to water quality and benthic organisms and their Gulf, estuarine, and riverine water-bottom habitats resulting from dredging to construct the navigation improvements, the creation of new offshore Ocean Dredged Material Disposal Sites (ODMDS), the Sabine Lake borrow trench for the Willow Bayou, Louisiana mitigation areas, and marsh restoration in shallow, open-water areas; potential dredging impacts to bottom-feeding and pelagic organisms such as sea turtles; and potential impacts to shoreline birds and their habitat from the placement of maintenance material on the Gulf shoreline.

Consistent with increasing navigational efficiency in an environmentally sustainable manner, the project will be designed, constructed and operated to avoid impacts to threatened and endangered sea turtles, wintering piping plovers and other migratory birds. Hopper dredging during construction and maintenance is likely to adversely affect but is not likely to jeopardize the continued existence of loggerhead, Kemp's ridley, hawksbill, leatherback, or green sea turtles. The Gulf Shore BU Feature is not likely to adversely affect the piping plover or its Critical Habitat and the brown pelican. The DMMP marsh restoration and Louisiana marsh mitigation areas would result in a net increase in migratory bird habitat in the project area. Construction contracts would include instructions to avoid impacts to migratory birds and their nests from construction-related activities. All activity in Louisiana occurring within 2,000 feet of a brown pelican rookery will be restricted to the nonnesting period. In Texas, all activity occurring within 1,000 feet of a rookery will be restricted to the non-nesting season.

All practicable means to avoid or minimize adverse environmental effects have been incorporated into the Recommended Plan, and a compensatory mitigation plan has been included to address all unavoidable impacts in Louisiana. All impacts in Texas and some impacts in Louisiana will be offset by environmental benefits of the DMMP BU Features. The Mitigation Plan will compensate for the Recommended Plan impacts with marsh restoration that will restore 2,783 acres of emergent marsh in existing open water areas within the marsh, improve 957 acres of shallow water habitat by creating shallower, smaller ponds and channels within the restored marsh, and nourish 4,355 acres of existing marsh located in and around the marsh restoration zone. Monitoring and contingency plans for these mitigation measures and the BU Features are included in the Recommended Plan. Periodic monitoring to determine their success will

continue until the Division Commander determines that the ecological success criteria of the mitigation and DMMP BU features have been met. An interagency coordination team will be consulted annually to determine progress in the planning, construction, and post-construction evaluation of the ecological success of these features.

Stakeholder Perspectives and Differences. SNND fully supports the project, is willing to sponsor project construction and has indicated financial capability to satisfy its obligations for the construction of the Recommended Plan. Because of financial constraints, the sponsor has indicated a preference for the 48-foot project. Therefore, this LPP has been selected as the Recommended Plan.

Public meetings were held in January 2010 in Beaumont, Texas, and Lake Charles, Louisiana with the responses to all public and agency comments presented in the Final Environmental Impact (EIS). The U.S. Fish and Wildlife Service has submitted a Coordination Act Report that affirms the impact assessment and approves the proposed BU and mitigation plans. Since the proposed Willow Bayou mitigation measures are located in the Sabine National Wildlife Refuge (NWR), and the proposed Gulf Shore BU Feature at Texas Point is located in the Texas Point NWR, the USACE is coordinating with the refuges regarding compatibility determinations for the proposed actions. Both refuges have indicated they see no conflict with refuge purposes and expect no issues with obtaining the required clearances. Clean Water Act § 401 water quality certification has been received from the states of Texas and Louisiana. A Final General Conformity Determination has been prepared for the proposed project. Air emissions that would result from construction of the Recommended Plan conform to the State Implementation Plan for the Beaumont-Port Arthur ozone non-attainment area.

The NMFS has concurred that detrimental impacts of the Recommend Plan on Essential Fish Habitat are minor and temporary, and the project would provide indirect benefits leading to an overall net gain in marsh habitat. In order for four new Ocean Disposal Management Disposal Sites to be approved for use, the Environmental Protection Agency (EPA) must publish a final rulemaking in the Federal Register. A Final EIS for the proposed ODMDS and a Final Site Management and Monitoring Plan have been prepared and accepted by EPA for use in this rulemaking at a later date. The Recommended Plan may potentially adversely impact terrestrial and marine historic properties eligible for listing on the National Register of Historic Places. An Historic Properties Programmatic Agreement has been executed among the Texas and Louisiana State Historical Preservation Officers, the project's non-Federal sponsor and USACE that requires the completion of § 106 historic properties investigations and consultation prior to construction. The project has been evaluated for consistency with the Texas and Louisiana coastal management programs, and concluded that the Recommended Plan is fully consistent to the maximum extent practicable with the enforceable policies of both state programs. The Texas Coastal Coordination Council has concurred with the USACE consistency determination. The Louisiana Department of Natural Resources (LDNR) Office of Coastal Management (OCM) found that the SNWW project is conditionally consistent with their state program. Since conditional consistency as proposed by LDNR-OCM is not acceptable, LDNR-OCM has been notified that USACE will proceed with the project.

It is expected that objections to the project will be expressed by the LNDR and Louisiana Department of Wildlife and Fisheries (LDWF). USACE coordination with LDWF has not been able to resolve issues related to the offset of project impacts to Federal lands with benefits from BU features in Texas, LDWF requirements that the Recommended Plan include additional BU features, and royalty, license and further assessment requirements concerning areas in Sabine Lake that would be affected by the borrow trench for marsh mitigation in Louisiana. USACE has proposed that an assessment survey be completed, following the protocol established by the LDWF, during the PED phase. The conditional consistency proposed by LDNR-OCM requires the submission of additional detailed information on topics that include, but are not limited to, storm surge, bar channel deepening, salinity, borrow from Sabine Lake, mitigation plans and adequacy, and pipeline relocation. USACE has conducted extensive technical coordination with LDWF and LDNR regarding these and other issues for nearly 10 years and has successfully resolved numerous concerns, but efforts to obtain concurrence in the Federal consistency determination have been unsuccessful. These objections will be taken into consideration in arriving at the decision.

Environmental Compliance. The project was designed and the study conducted in accord with the requirements of the National Environmental Policy Act. An EIS was prepared for this project. The Draft Feasibility Report and Draft EIS were released for public and agency review for 75 days on 24 December 2009, with Notice of Availability published in the Federal Register on 18 December 2009. The DEIS public review period under the NEPA and State processes closed on 10 March 2010. Public meetings were held in Beaumont, Texas and Lake Charles, Louisiana on 26 and 27 January 2010, respectively. Comments and concerns raised by the reviewers have been addressed and incorporated into the Final Feasibility Report and Final EIS.

At the conclusion of Design Phase investigations and detailed implementation plans, the Federal and State regulatory processes would be completed and the final regulatory approvals obtained for the project. Any significant new information developed in the Design Phase, and changes to the project recommendation, and any construction sequencing or changes in air quality compliance, would be published in additional NEPA documents to solicit public participation.

State and Agency Review. (To be inserted by HQUSACE after the S&A Review ends)

Certification of Peer and Legal Review. Certifications of the technical and legal adequacy of the final feasibility report have been received.

Agency Technical Review final certification was received in 5 May 2010. Independent External Peer Review certification has been received for the 2007 review. The final Independent External Peer Review certification is expected to be received prior to the Civil Works Review Board meeting. Legal review certification was received 6 May 2010.

The Cost Engineering DX reviewed and certified the cost estimate for the Sabine-Neches Waterway Channel Improvement Project in October 2009. Their certification was on the fully funded amount of $1,174,621,000, including $13,249,000 in feasibility study costs. The fully funded amount of $1,161,372,000 reported in the final report does not include these feasibility study costs.

Policy Compliance Review. **(To be inserted by HQUSACE after the S&A Review ends)**