Pages 2 through 19 of this presentation were developed by USACE Mobile District staff and presented in poster format at the September 11, 2018, Open House Public Meeting on the Mobile Harbor Draft General Reevaluation Report with Supplemental Environmental Impact Statement. The information contained in the presentation was used to discuss preliminary study results and to answer questions related to the proposed project.

As the study is finalized, information cited in this presentation is subject to change.

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MOBILE HARBOR GENERAL REEVALUATION REPORT

WELCOME

OPERATIONS

ENGINEERING

ENVIRONMENTAL

ASPA

Mobile Harbor GRR
Public Meeting Room Layout

TSP and ECONOMICS

COMMENT TABLE

Court Reporter

WELCOME & SIGN-IN

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MOBILE HARBOR GENERAL REEVALUATION REPORT

ALTERNATIVES

U.S.ARMY

SCOPE OF STUDY

- Deepening: 47 to 55 feet Including Turning Basin
- Bend Easing
- Widener: 100 and 150 feet for 5, 10, and 15 mile segments

TENTATIVELY SELECTED PLAN (TSP) SCOPE

- Deepening the existing Bar, Bay and a portion of the River Channels by 5 feet
- Incorporate bend easings in the Bar Channel
- Widen the Bay Channel to 500 feet from the mouth of Mobile Bay northward for 3 nautical miles
- Expand the Choctaw Pass Turning Basin 250 feet to the south

MOBILE HARBOR GENERAL REEVALUATION REPORT
PLAN SELECTION

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U.S.ARMY

Identify Problems

Problem:

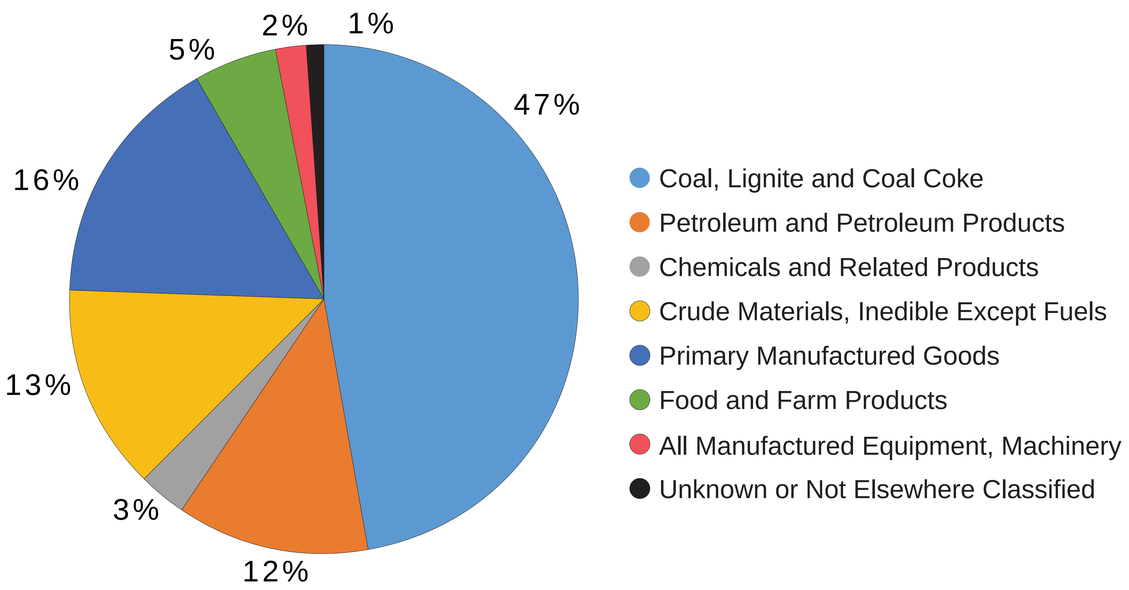
- Vessel traffic increased safety concerns
- Larger vessels experience transit delays due to existing width of channel
- Channel depths limit vessel cargo capacity

Inventory and Forecast Conditions

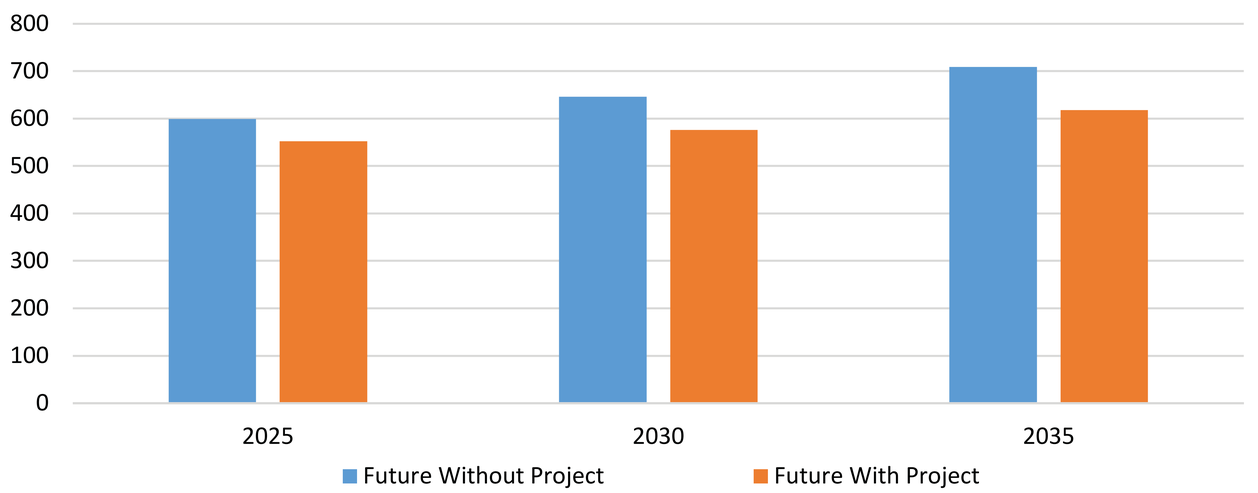
Economic Analysis required data on:

- Historic data calls
- Commodity forecast
- Fleet forecast

Commodity Distribution from 2010 to 2014



Forecast of Deep Draft Vessels



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MOBILE HARBOR GENERAL REEVALUATION REPORT

PLAN SELECTION

U.S.ARMY

Project Economic Benefits Must Exceed Project Costs

Economic Benefits accrue by reducing vessel operating costs as follows:

- Larger, fully loaded vessels are more efficient
- Panama Canal Expansion allows operators to use larger vessels
- Passing area reduces delays due to one-way traffic

Develop and Evaluate Alternative Plans

- Consider Alternative Depths
- Consider Alternative Widths and Lengths
- Consider other Features for Safety Improvements
- Determine Costs and Economic Benefits of Alternatives
- Select Tentative Plan Based on Maximum Net Benefits

Combined Measures Preliminary Project Cost and Net Benefits ($M)
Deepening, 3 Nautical Mile Widener, Bend Easing, Turning Basin

	Alternative (Depth in Ft)			
	47	48	49	50
Cost*	$179.09	$249.53	$315.41	$387.76
Net Benefit	$14.8	$19.6	$24.3	$34.5
Benefit to Cost Ratio	3.0	2.9	2.8	3.0 to 1

**FY18 Price Level, Includes Associated Costs. Costs reported are preliminary.*

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MOBILE HARBOR GENERAL REEVALUATION REPORT

SCHEDULE (48 MONTHS)

U.S.ARMY

COMPLETE

- Identify study objectives
- Define problems & opportunities
- NEPA scoping
- Inventory & forecast
- Formulate alternative plans
- Evaluate alternatives & identify reasonable array

COMPLETE

- Develop the “Future without Project Condition”
- Analyze, evaluate and compare alternatives to identify TSP
- Prepare the Draft Integrated GRR and SEIS
- Vertical team concurrence on tentatively selected plan
- Release Draft Integrated GRR/SEIS report review (Public, Agency, HQ)

- Respond to comments in the SEIS
- Agency consultation activities
- Agency endorsement of recommended plan
- Prepare the Final Integrated GRR and SEIS
- Final integrated report package approved by Division and transmitted to Corps Headquarters

- Headquarters’ prepares Director’s Report
- Final SEIS; Alabama state and Federal agency review
- GRR approval
- Record of Decision signed

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MOBILE HARBOR GENERAL REEVALUATION REPORT

AREAS OF PUBLIC CONCERN

U.S.ARMY

Channel dredging disrupts the sediment transport to Dauphin Island

Modeling results indicate minimal differences in morphologic change in the nearshore areas of Dauphin Island and Pelican Island as a result of the proposed channel modifications.

(See Engineering area for more information)

Placement location of Bar Channel material (particularly during maintenance operations)

Dauphin Island residents and others are concerned that material dredged from the Bar Channel during maintenance will not be placed in an area benefiting the island. This study includes a proposed northwest extension to the SIBUA.

(See Operations area for more information)

Shoreline erosion caused by ship wake

The ship wake analysis indicates a reduction in vessel generated wave energy when comparing the future With and Without-Project conditions.

(See Engineering area for more information)

Placement of new work dredged material within the Relic Shell Mined Area and its impact on fishing and oyster reefs

This study found the Relic Shelled Mined Area to be a suitable placement site based on the results of the hydrodynamic, sediment transport, and water quality modeling.

(See Environmental area for more information)

Environmental impacts caused by channel modifications

The environmental impact analyses indicate minimal impacts of the aquatic resources supported by Mobile Bay and Mobile-Tensaw River Delta areas resulting from predicted changes in water quality. As a result of the minimal nature of the predicted impacts, mitigative measures are not warranted. *(See Environmental area for more information)*

Impacts to Environmental Communities

The proposed project would not have disproportionately high and adverse impacts to any communities, including Environmental Justice communities.

(See Environmental area for more information)

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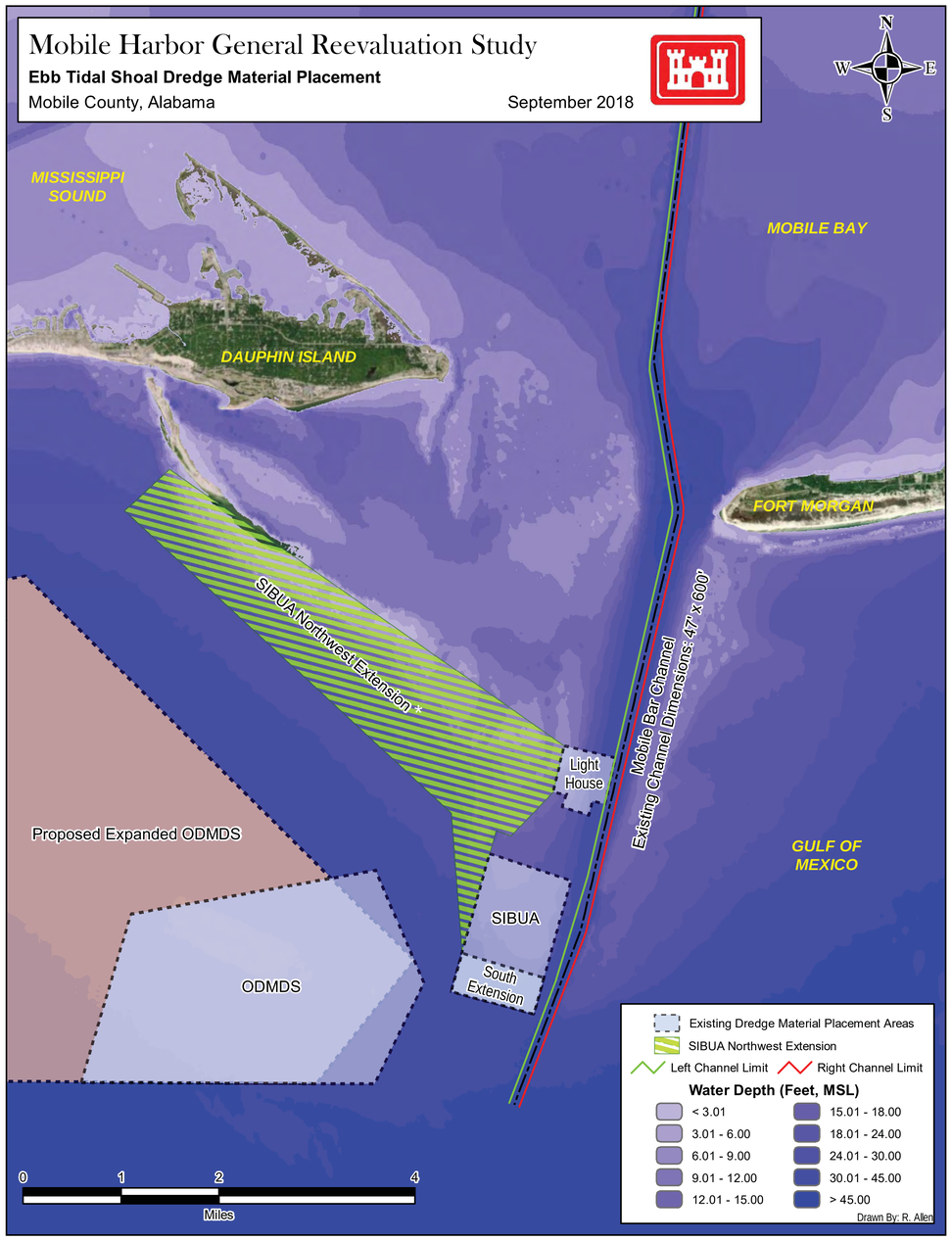
MOBILE HARBOR GENERAL REEVALUATION REPORT

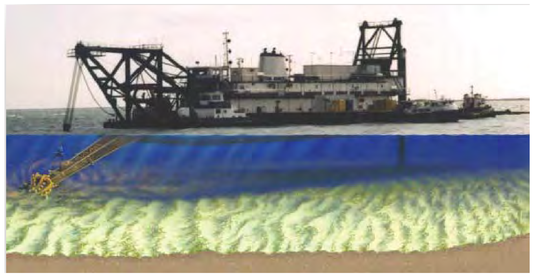
MAINTENANCE DREDGING AND PLACEMENT

U.S.ARMY

Bar Channel

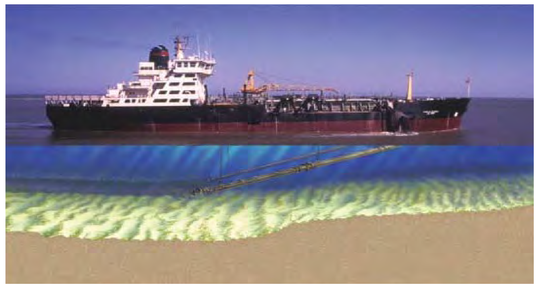


* Proposed extension



Cutterhead/Pipeline Dredge

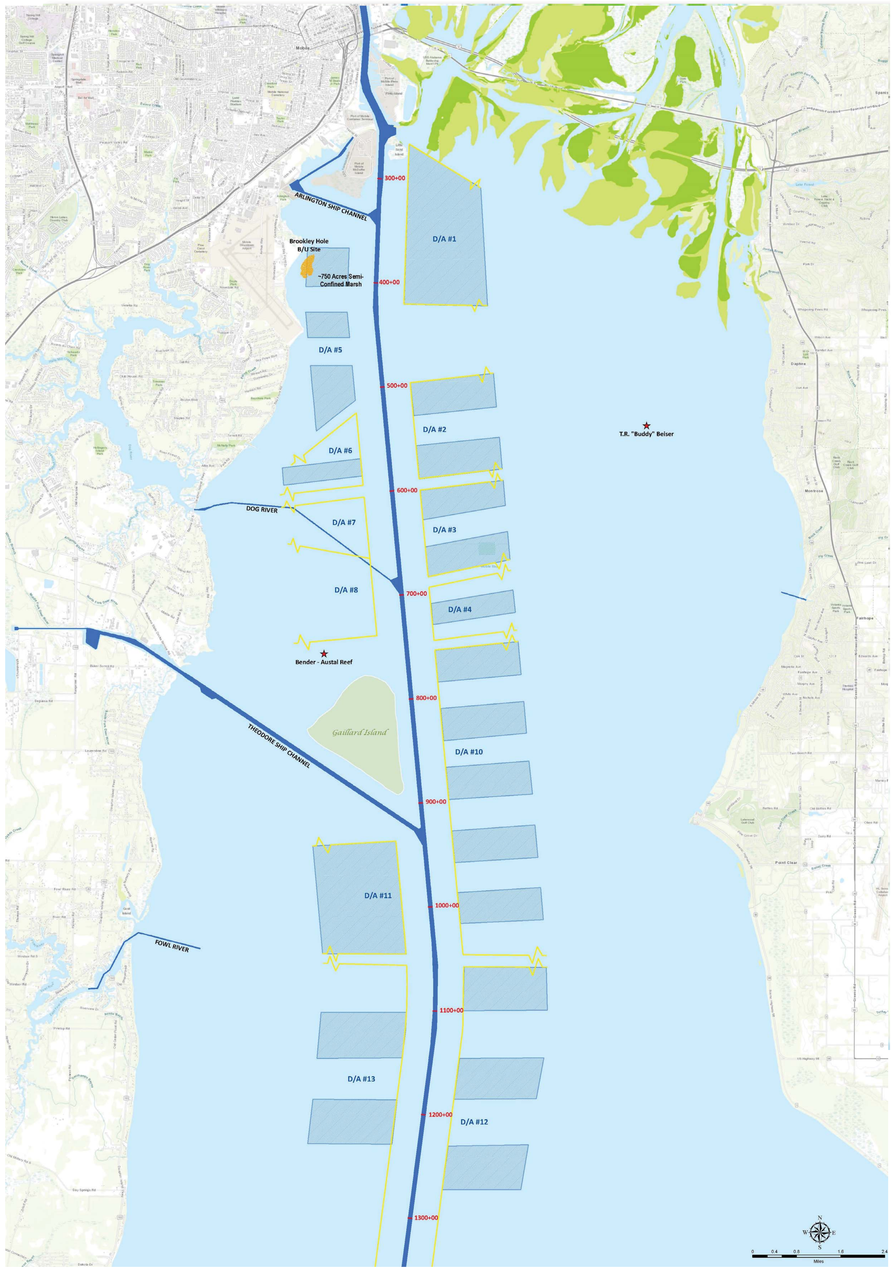
- Used in short to moderate disposal distances
- Best in calm water
- All material types – mud, sand, rock



Hopper Dredge

- Used in deepwater dredging and deepwater disposal areas
- Best dredge for rough seas
- Short or long haul distance
- Sand or mud

Bay Channel



MOBILE HARBOR GENERAL REEVALUATION REPORT
SEDIMENT TRANSPORT MODELING

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U.S.ARMY

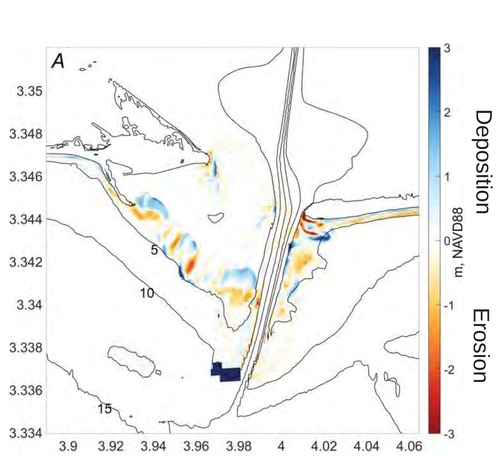
APPROACH

- Applied a suite of numerical modeling tools to determine potential effects of proposed channel modifications on sediment transport in the bay and along the ebb tidal shoal/ nearshore coastal areas
- Project evaluated under single year (2010) and 10-year climatology with a future 0.5 meter rise in sea level

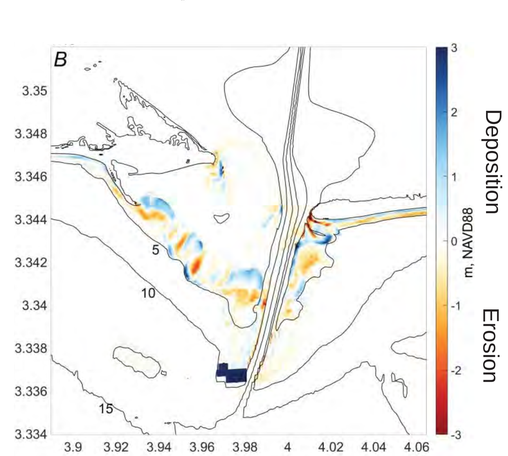
RESULTS

- Expect minimal changes in bed level (seafloor) and sediment transport outside the channel itself
- Some spatial shifting of sand offshore of the Fort Morgan Peninsula is observed; however, patterns of erosion/deposition remain quite similar
- Anticipate increase in channel shoaling rates up to 15 percent

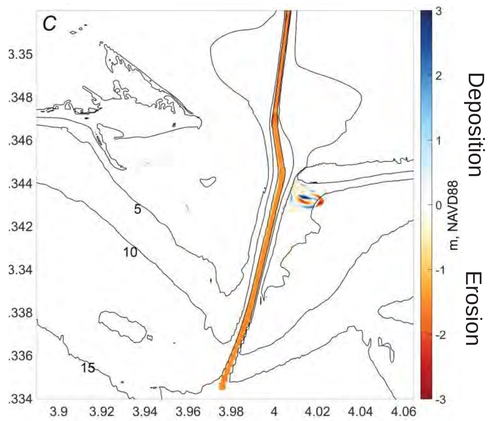
Ebb Tidal Shoal Sediment Transport Modeling (Delft 3D)



Existing Condition 10 Year Simulation
Bed Level Change (+/- Erosion/Deposition, m)



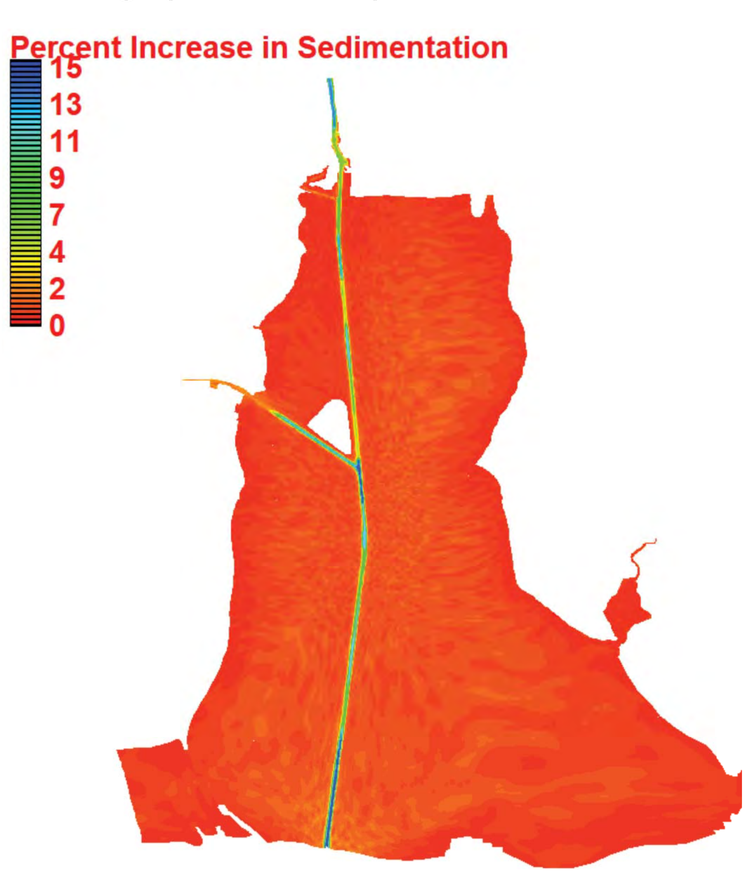
Existing Project Condition 10 Year Simulation
Bed Level Change (+/- Erosion/Deposition, m)



With Project – Existing Condition
Bed Level Change (+/- Erosion/Deposition, m)

Mobile Bay Sediment Transport Modeling (SEDZLG)

With Project - Existing Condition
Percent Increase in Channel Shoaling



With Project - Existing Condition
Percent Change in Shoaling in the Bay

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MOBILE HARBOR GENERAL REEVALUATION REPORT

CHANNEL ANALYSIS AND DESIGN

U.S.ARMY

APPROACH

- Used U.S. Army Corps of Engineers guidance for Hydraulic Design of Deep Draft Navigation Projects and advanced tools to include Automatic Identification System (AIS) mapping and feasibility level ship simulations to evaluate the safety of various channel widths, alignments and depths

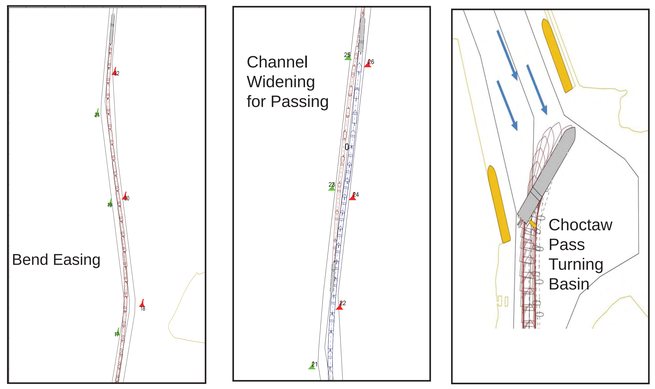
RESULTS

- Bend easings and turning basin extension needed to improve safety
- Channel widening in the lower bay will improve vessel transit efficiencies and provide safe passage of larger beam (width) vessels

MOVING FORWARD

- Further testing to verify the channel widener and optimize the dimension of the turning basin during Preconstruction Engineering and Design (PED)
- Verify the required underkeel clearances for the proposed channel depth using the Channel Analysis Design Evaluation Tool (CADET) during PED

SHIP SIMULATIONS



APPROACH

- Evaluated all existing data to characterize the subsurface conditions and determine the material suitability for various placement options

RESULTS

- Soils in the Bar and Bay Channels are predominately clays and silts with some intermixed sands
- Material in Turning Basin Extension is predominately sand

MOVING FORWARD

- Conduct additional subsurface investigations in strategic areas to obtain soil strength information for channel design and better characterize material suitability for possible beneficial use

Geotechnical Investigations

MOBILE HARBOR GENERAL REEVALUATION REPORT

FIELD DATA COLLECTION AND PROCESSING

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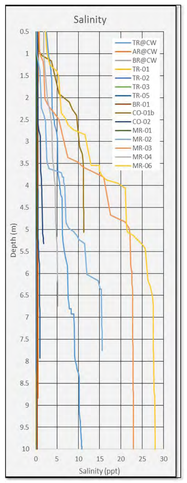
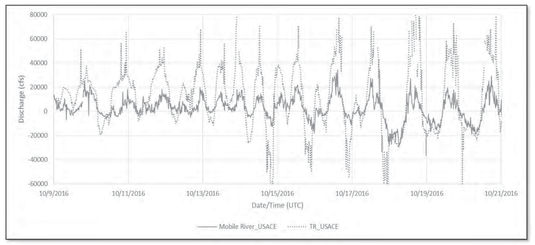
Continuously Operating Data Collection Platforms

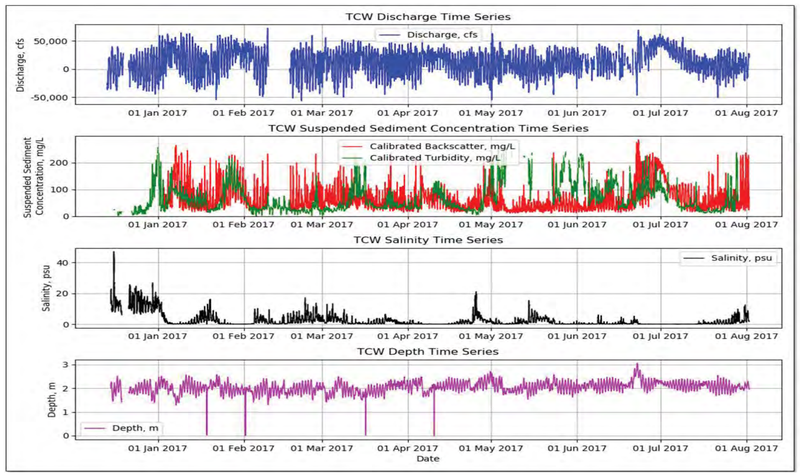
- Hydrodynamic and suspended sediment data were obtained at 6 locations in the Mobile-Tensaw Delta and Mobile Bay
- Data from these efforts were used in development of advanced numerical models for hydrodynamics, water quality, and sediment transport

Data Collection Parameters

- Average Along Stream Velocity
- Water Level (NAVD88)
- Turbidity
- Salinity
- Temperature
- Automatic sampling for Total Suspended Solids

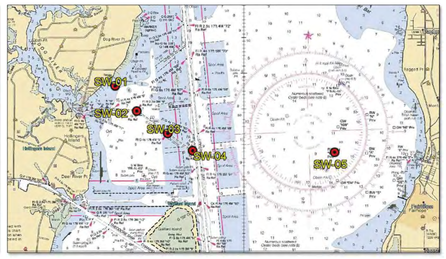


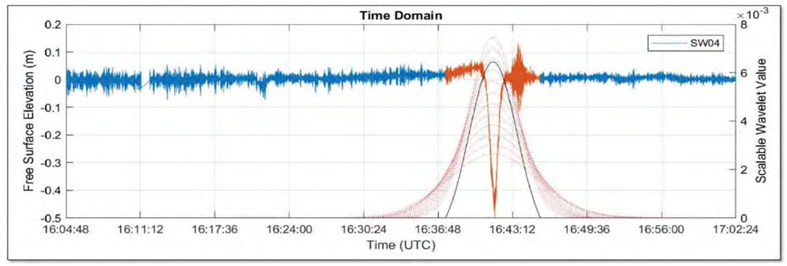


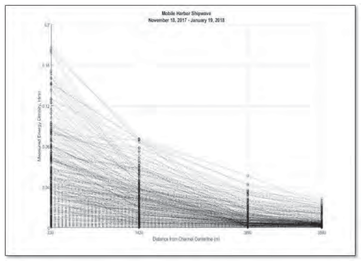


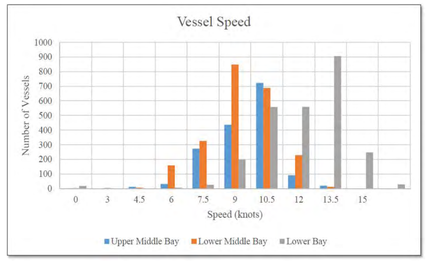
Vessel Generated Wave Energy (VGWE)

- A suite of sensors was deployed in Mobile Bay to obtain VGWE correlated to vessel class, direction, and speed
- Relative difference of VGWE was evaluated using forecasted vessel calls for with and without project conditions at years 2025 and 2035
- No increase in VGWE was determined as a result of the proposed project





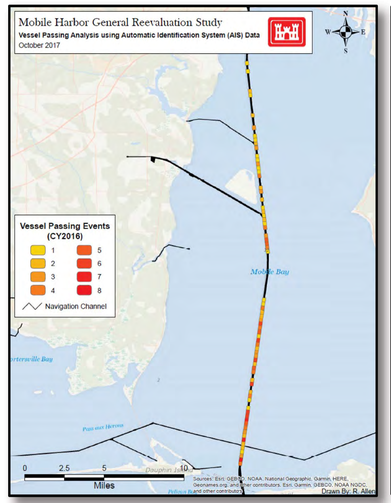


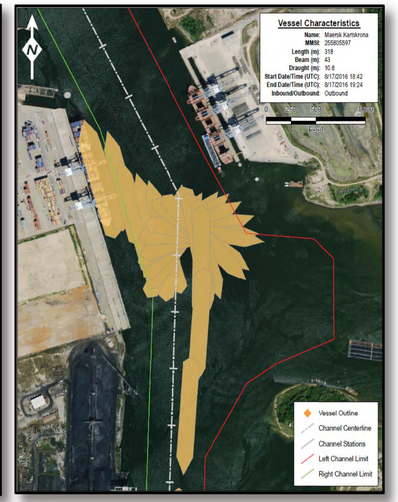


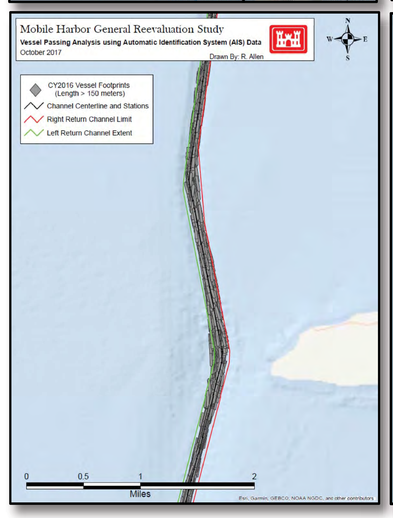
Year/Direction	# of Vessels		VGWE	
	w/o Project	w/ Project	w/o Project	w/ Project
2025 Inbound	1599	1564	18.376	13.153
2025 Outbound	1414	1380	19.337	14.366
2025 Total	**3013**	**2944**	**37.713**	**27.519**
2035 Inbound	1695	1613	21.799	15.425
2035 Outbound	1652	1619	24.850	18.019
2035 Total	**3347**	**3232**	**46.650**	**33.444**

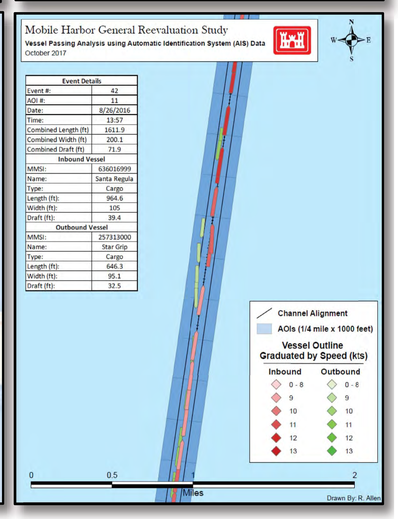
Shipborne Automatic Identification System (AIS)

- Shipborne AIS data was obtained from 2016 to visualize vessel positioning, speed, and heading
- A unique numerical algorithm capable of generating scaled vessel footprints was created
- Results from this process were used to evaluate safety and utilization of the channel with respect to the turning basin, vessel passing and navigating various channel features









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MOBILE HARBOR GENERAL REEVALUATION REPORT

HYDRODYNAMIC AND WATER QUALITY MODELING

U.S.ARMY

APPROACH

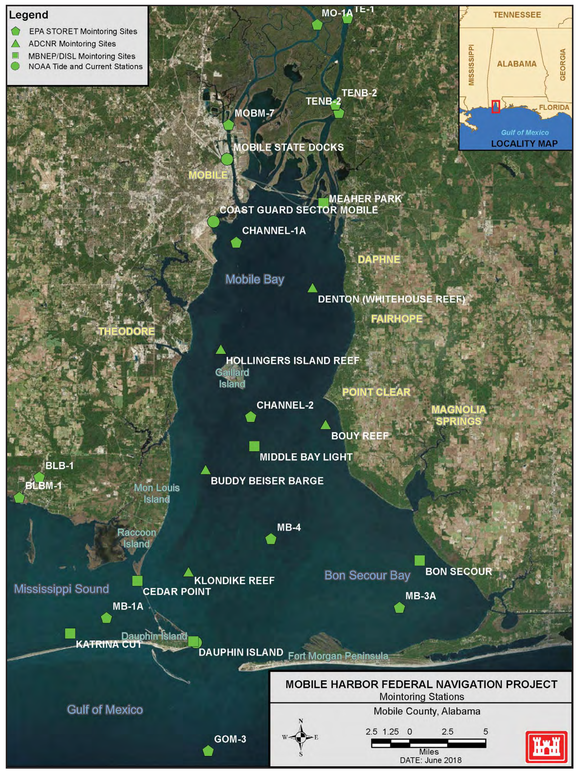
- Characterize the existing hydrodynamic and water quality conditions of the study area and predict changes due to the proposed project using advanced numerical modeling tools
- Project evaluated under single year (2010) conditions and future 0.5 meter rise in sea level

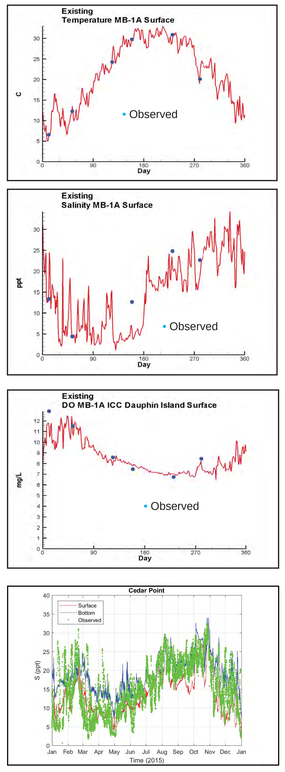
RESULTS

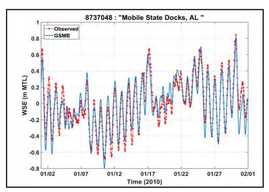
- Anticipate localized and minor differences in flows with the project
- Expect indiscernible changes in the behavior of water quality constituents evaluated

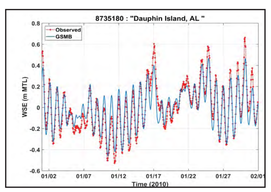
Hydrodynamic and Water Quality

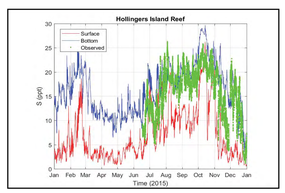
Observed Versus Modeled





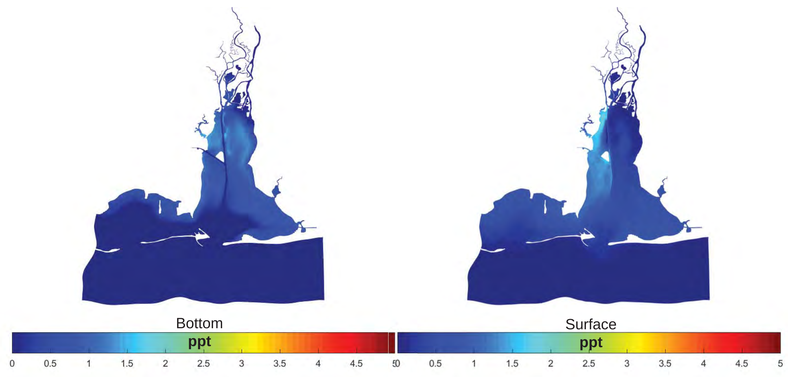




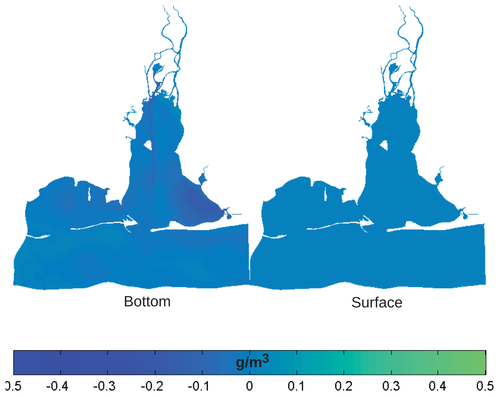


Water Quality Modeling

Fall Salinity Changes (Project-Existing)

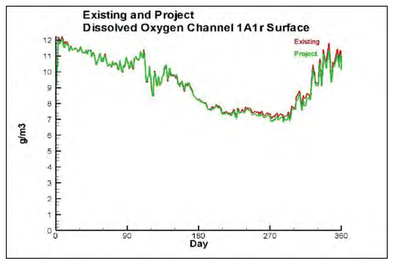


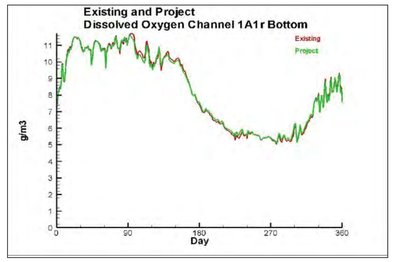
Fall Dissolved Oxygen Changes (Project-Existing)

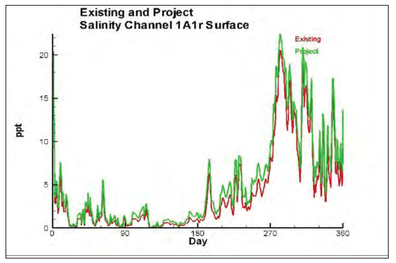


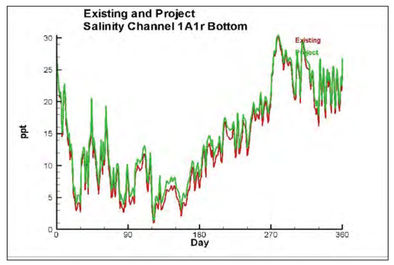
2010 Water Quality Simulations

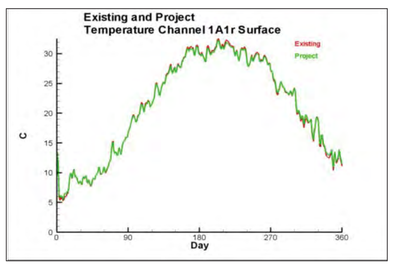
Salinity, Temperature, Dissolved Oxygen

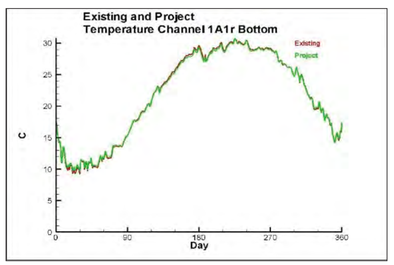












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MOBILE HARBOR GENERAL REEVALUATION REPORT

DREDGE MATERIAL MANAGEMENT

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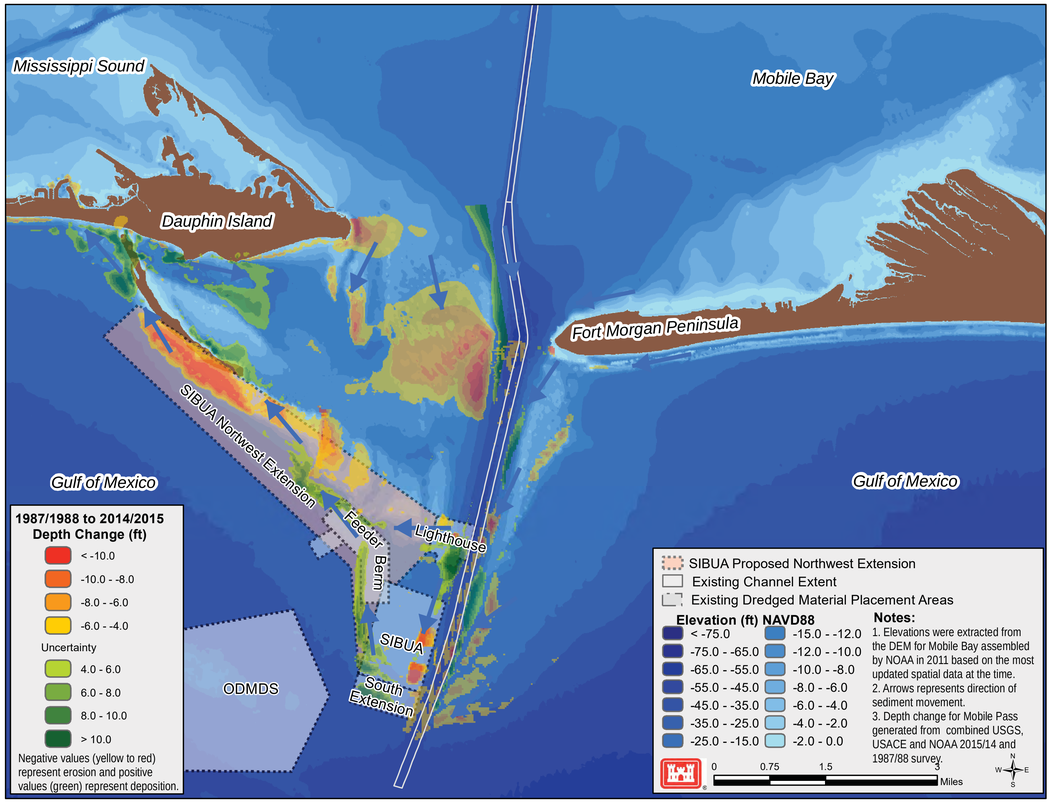
APPROACH

- Evaluated dredged material placement sites using historic dredge records, existing available survey data, and sediment transport modeling to determine if adequate capacity exists to accommodate projected increases in maintenance dredged material associated with implementation of the proposed plan for at least 20 years

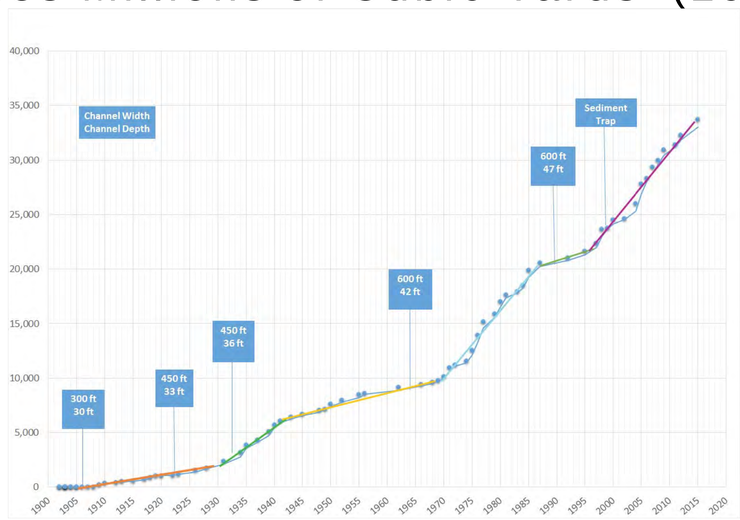
Mobile Pass Bed Level Change 1987/1988 to 2014/2015
(+/- Erosion/Deposition)



RESULTS

- Existing dredge material placement sites along the River and Bay Channels have adequate capacity to accommodate future maintenance dredged material for at least 20 years
- To ensure adequate capacity for future maintenance dredge material from the Bar Channel, the Sand Island Beneficial Use Area (SIBUA) is being expanded to the northwest in the direction of net sediment transport

Bar Channel Cumulative Maintenance Dredge Volumes Millions of Cubic Yards (1904 – 2015)



Sand Island Beneficial Area Site Capacity

	2018 Volume (CY) Below -15' MLLW	2018 Volume (CY) Below -20' MLLW	2018 Volume (CY) Below -25' MLLW
SIBUA	7,487,906	2,202,690	644,437
SIBUA South Extension	4,679,635	2,891,301	1,415,534
SIBUA Lighthouse	1,320,708	682,208	309,517
Total 2018 Capacity	**13,488,249**	**5,776,199**	**2,369,488**
20 Year Net Erosion out of SIBUA (260,000 cy/yr)	5,200,000	5,200,000	5,200,000
20 Year Projected Capacity Needs (624,000 cy/yr + 15% increase)	15,272,000	15,272,000	15,272,000
Remaining Capacity after 20 years	**3,416,249**	**-4,295,801**	**-7,702,512**
SIBUA Northwest Extension	9,294,614	6,241,179	1,014,424
Remaining Capacity after 20 years with Northwest Extension	**12,709,863**	**1,945,378**	**-6,688,270**

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MOBILE HARBOR GENERAL REEVALUATION REPORT
AQUATIC RESOURCES ASSESSMENT

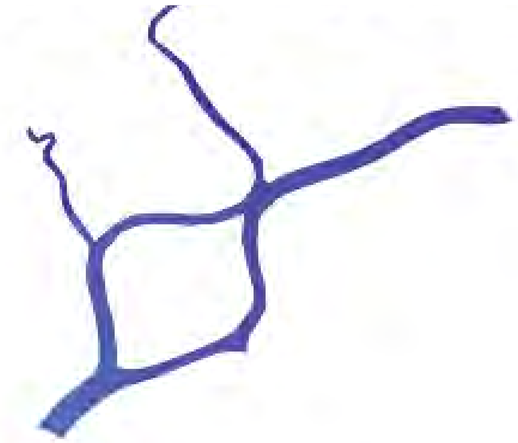
U.S.ARMY

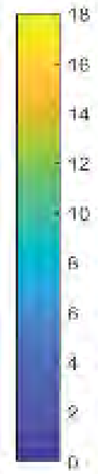
OVERVIEW

- Assessed potential impacts to wetlands, submerged aquatic vegetation, benthic invertebrates, oysters, and fish
- Model outputs compared water quality (salinity, dissolved oxygen) using existing and post-project conditions
- Sea level rise scenario - 0.5 meter intermediate projection per USACE guidance at Dauphin Island

Mean Salinity - July 2010

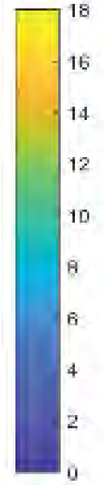
Baseline



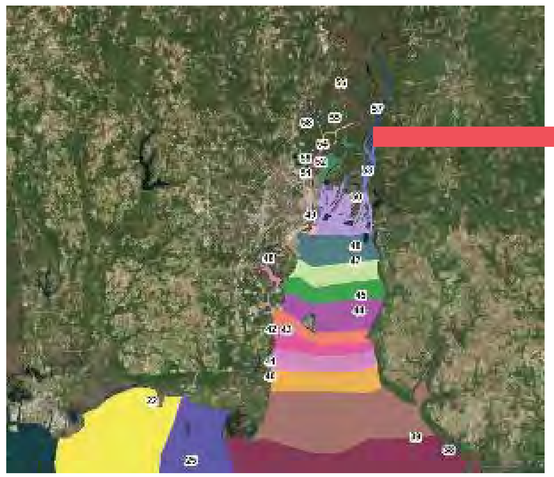


No Measurable Change

With Project



Model grid consists of 30 blocks & 48,000 cells



Example Block

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AQUATIC RESOURCES ASSESSMENT

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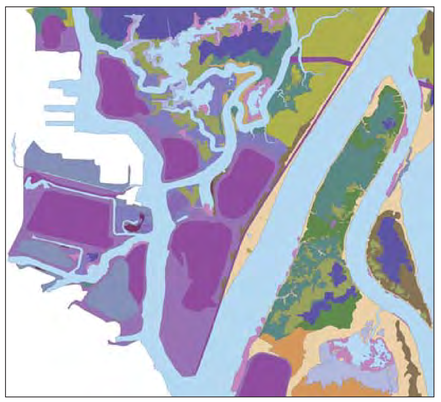
WETLANDS

APPROACH

- Wetland mapping - 77,000 acres mapped; 43 community types; >800 on-site samples
- Assessed for potential exceedance of salinity thresholds

RESULTS

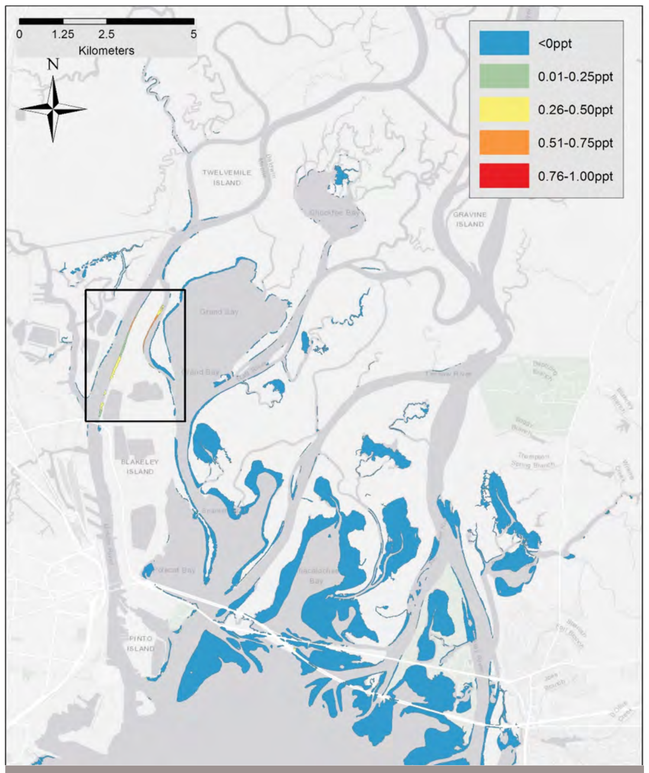
- Negligible impacts - No expected wetland losses as a result of the proposed action
- All vegetation within acceptable environmental tolerance ranges
- All wetlands within ideal growth conditions
- Sea level rise will result in substantial inundation of existing wetlands
- Project impacts remain negligible under 0.5 meter sea level rise scenario



SUBMERGED AQUATIC VEGETATION (SAVs)

APPROACH

- Mobile Bay SAV extent verified (>6,000 acres) across 55 community types
- Salinity tolerances established for each community and adjusted to local conditions



Potential increase in salinity above tolerance thresholds for 4 species

RESULTS

- Minor impacts - No expected loss of SAV habitat as a result of the proposed action
- Sufficient dissolved oxygen present under all scenarios
- Under expected (average) salinity conditions few impacts expected for most species
- Potential stress of Eurasian watermilfoil (invasive species), wild celery, Southern naiad and widgeon grass for short duration
- No major differences seen between baseline and post-project conditions and under 0.5 meter sea level rise scenario

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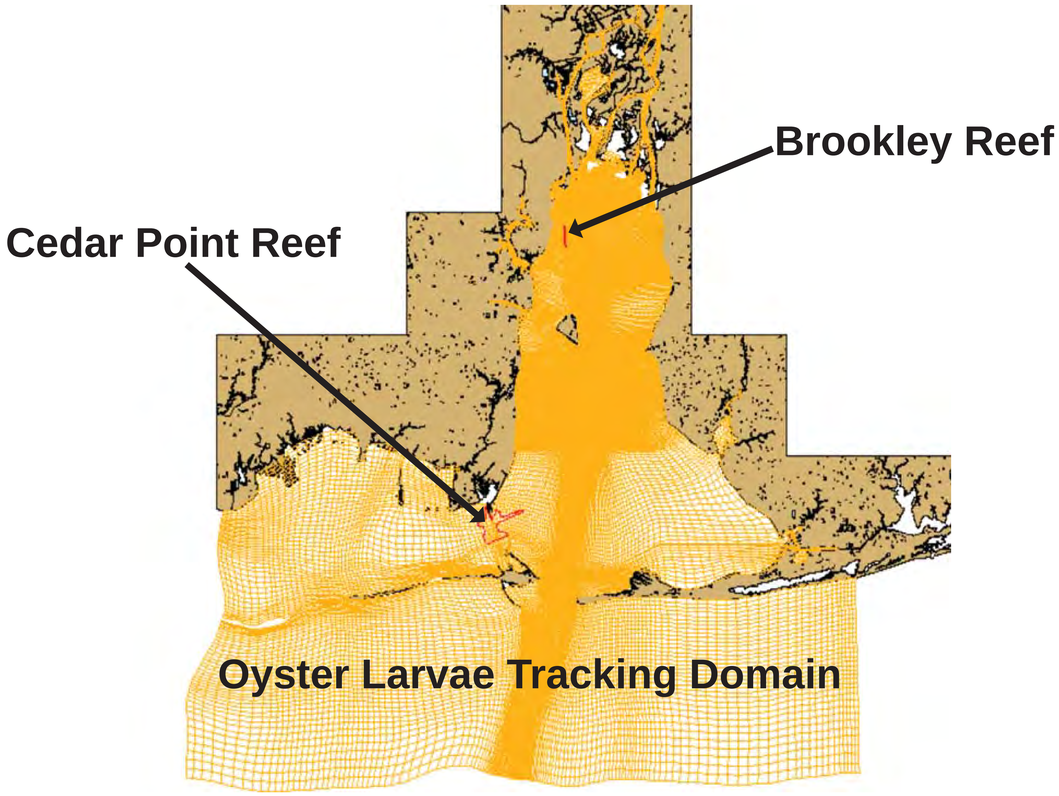
OYSTERS

APPROACH

- 13 adult oyster reefs (>3600 acres) assessed for salinity and Dissolved Oxygen impacts
- Simulated oyster larval movement through integrated hydrodynamic, water quality, and larval tracking models

RESULTS

- Minor impacts - Oyster larvae particle tracking displays 100% survivorship under all scenarios
- Dissolved oxygen levels stay well above minimum oyster tolerances
- Salinity stays within oyster tolerance ranges
- Oyster model predicts no increase in larvae flushing out of Mobile Bay
- Sea-level rise scenario predicts no oyster mortality



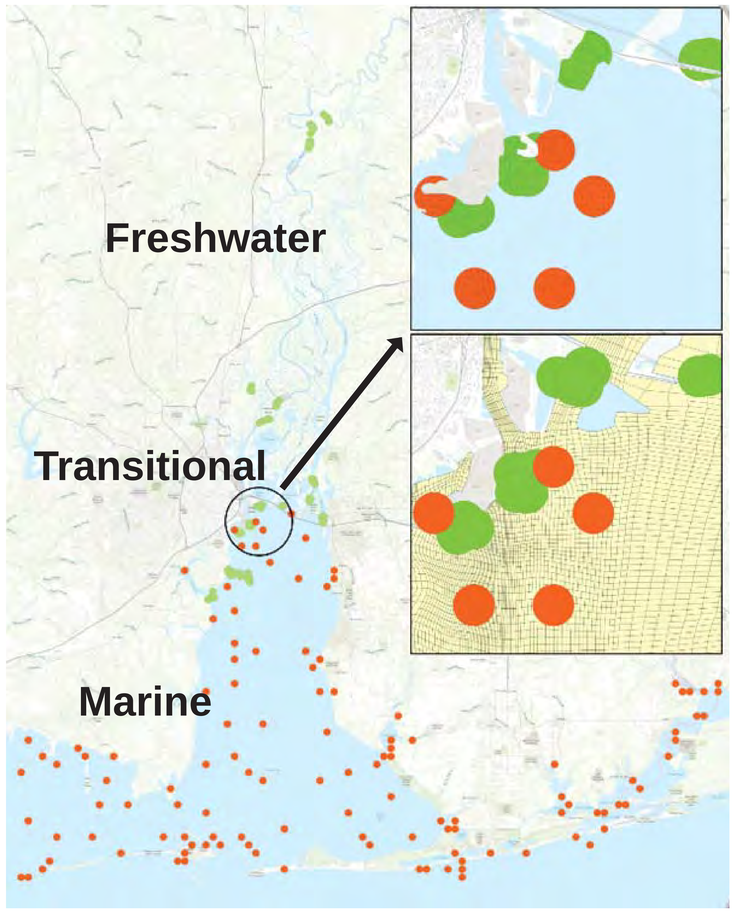
FISH

APPROACH

- Data obtained from AL Marine Resources (2005-2015) and supplemented by USACE
- 98,000 individual fish, 140 species
- Linked salinity and abundance of community members

RESULTS

- Minor impacts expected due to salinity for:
  - Freshwater species
  - Freshwater species entering estuary
  - Resident estuary species
  - Marine species entering estuary
  - Marine species



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AQUATIC RESOURCES ASSESSMENT

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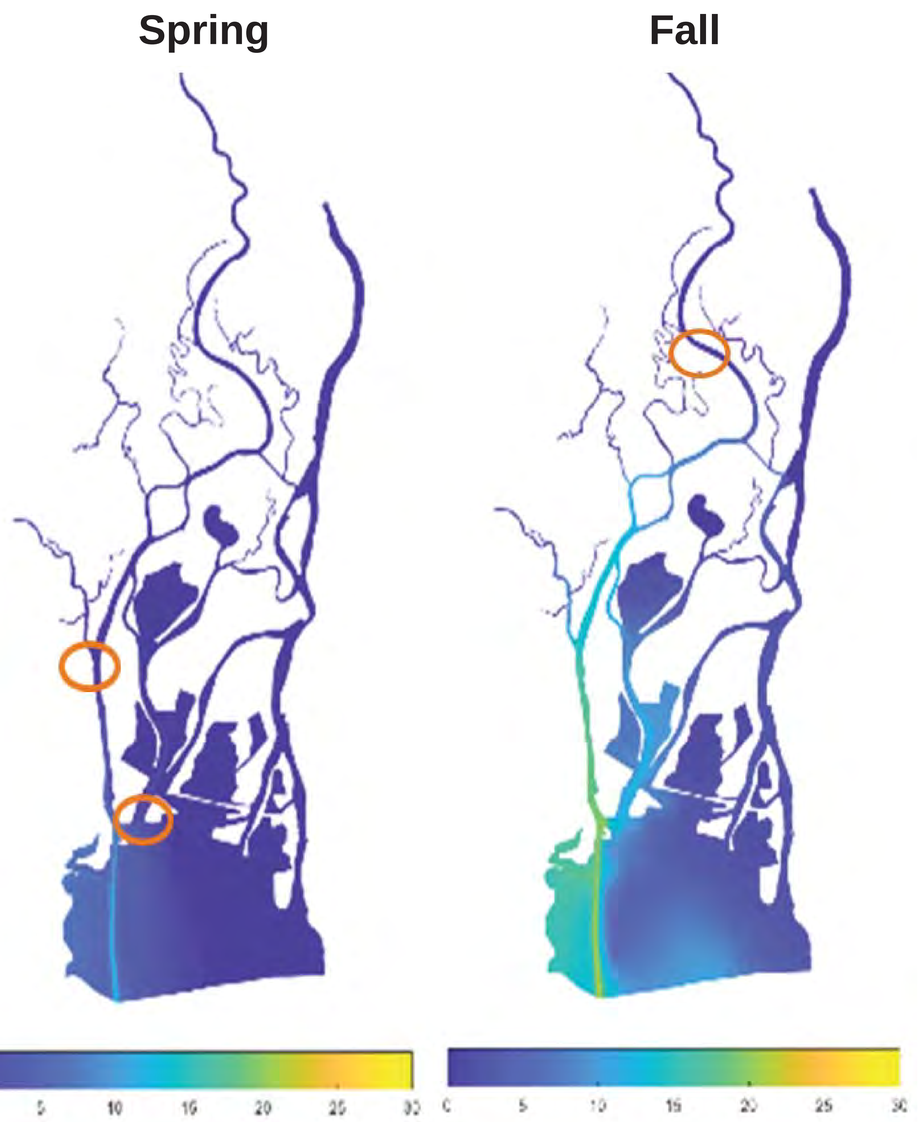
BENTHICS

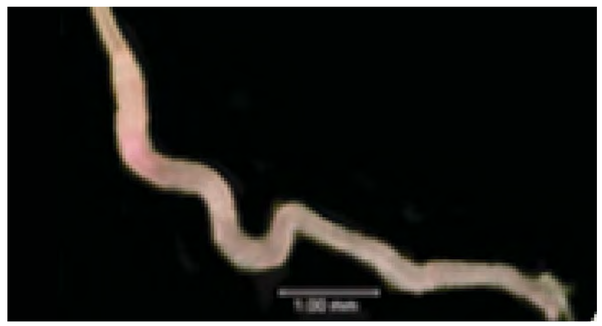
APPROACH

- 240 samples taken in freshwater, transitional, and upper bay habitats
- Locations of changes in invertebrate communities identified



RESULTS

- Minor impacts - Community transitions from saline to freshwater will remain similar to baseline conditions
- Degree of freshwater (river) inputs dictates species transition locations
- Impacts to fish via prey availability appear negligible



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Noise. *Minor impacts* -
The future on-road traffic noise is predicted to increase 3 dBA, but is well below the ALDOT-adopted 15-dBA substantial traffic noise increase that requires noise abatement

Transportation/ Traffic and Hazardous Materials. *Minor impacts* to
Environmental Justice communities. Once the I-10 Bridge is completed, any disproportionate impacts would be mitigated

The projected 25% increase in truck traffic associated with the build-out of the container terminal is not part of this project.

Air Quality. *Minor impacts* -
A deeper and wider channel would result in a decreased total number of vessels resulting in an overall decrease in annual emissions associated with ship traffic

Public Health and Safety. *Minor impacts* with
continued compliance with Federal safety regulations and appropriate safety programs and processes

Coal Dust
With the overall reduction in coal demand and limited storage capacity at the terminal, fewer ships are expected (at larger capacities)

Petroleum Terminals
Air releases associated with petroleum terminals would be regulated through individual terminal air permits

Environmental Justice Concerns
No disproportionally high and adverse impacts to the Environmental Justice communities

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MOBILE HARBOR GENERAL REEVALUATION REPORT

MOBILE DISTRICT CONTACTS

U.S.ARMY

Internet and Social Media

sam.usace.army.mil

facebook.com/**usacemobile**

twitter.com/**usacemobile**

Instagram.com/**usacemobile**

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Mobile, AL 36602

Pages 21 through 23 of this presentation were developed by the Alabama State Port Authority (ASPA), and presented in poster format at the September 11, 2018, Open House Public Meeting on the Mobile Harbor Draft General Reevaluation Report with Supplemental Environmental Impact Statement.

The ASPA is responsible for the content of its presentation.

ALABAMA STATE PORT AUTHORITY
PORT INVESTMENTS DELIVER

FULL SERVICE SEAPORT — 10TH LARGEST IN THE UNITED STATES

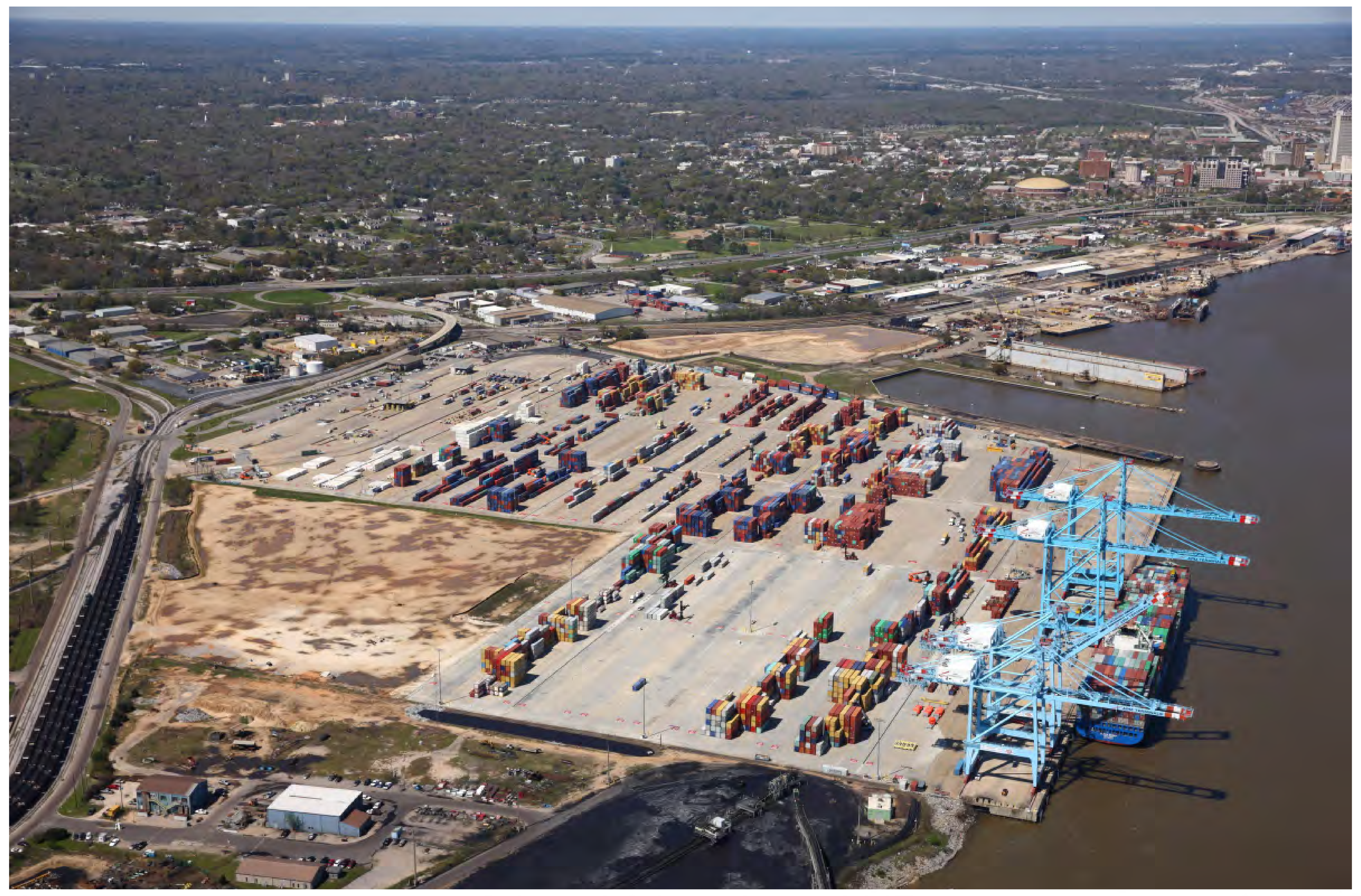
- 58 million+ tons handled port-wide. ASPA terminals represent 25 to 29 million tons annually
- **Over $1 Billion invested in public port infrastructure since 2002**
  - $50 Million Container Terminal Expansion Underway
  - New $60 Million Finished Automobile Terminal 2019/2020

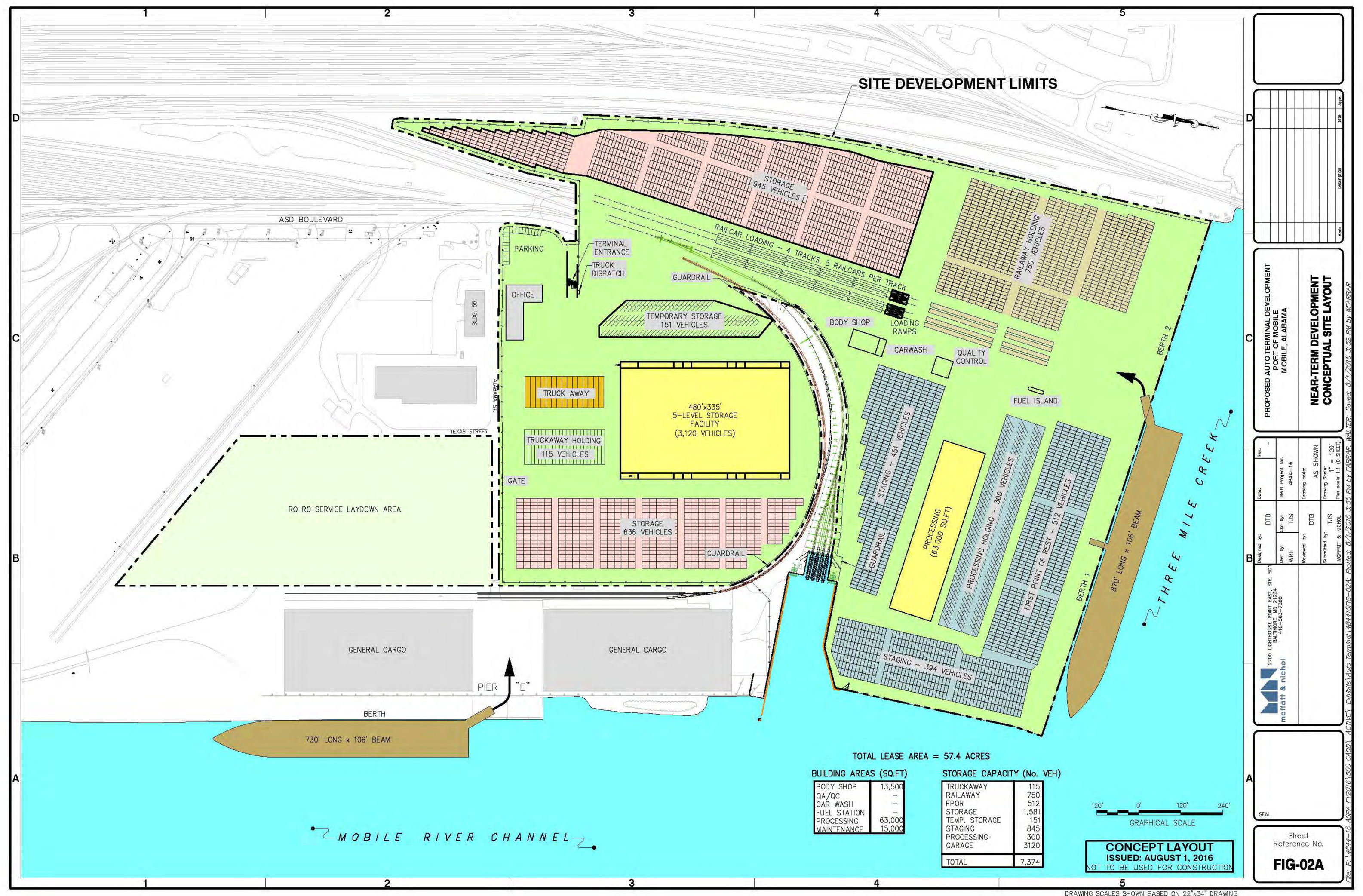
ASPA GROWTH STEADILY CLIMBS

- **Record 2017 20 percent growth in containerized cargo**
- **Port of Mobile ranked No. 2 Steel Port in the U.S. with 16% Growth in 2017**

THE PORT OF MOBILE CONTRIBUTES SIGNIFICANTLY TO THE ECONOMY

- **Alabama State Port Authority Terminals alone generate 134,608 jobs and $22.4 billion in total economic value**
- Private Terminals (Excluding Shipyards) generate 18,670 jobs and $2.7 billion in economic value





ALABAMA STATE PORT AUTHORITY

MOBILE HARBOR DEEPENING & WIDENING DELIVERS

VESSEL SIZE & CHANNEL UTILIZATION EFFICIENCIES

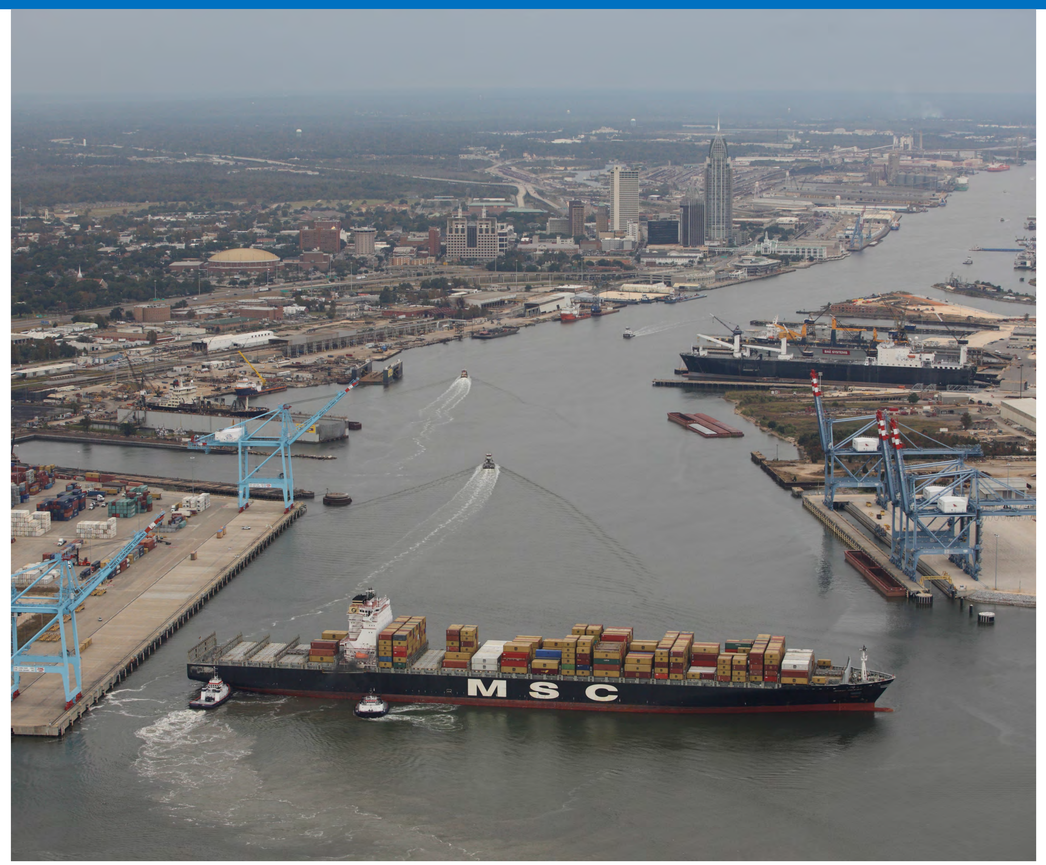
- A deeper and wider channel at Mobile improves shipper efficiency and lowers costs
- At current depths, carriers and shippers are unable to fully utilize available vessel capacity
- Two-thirds of the vessels are restricted by depth and one-way or daylight transit
- 8000+ twenty-foot equivalent unit (TEU) ships provide service into the Port of Mobile. The channel's current 45-foot draft limits full utilization of vessel capacity and reduces the port's slot allocation
- For its three largest carriers, Mobile is the last port of call prior to Miami (soon to be at 50 feet) and Freeport (currently at 52 feet). Mobile's 45-foot draft is a cause to inefficient vessel utilization

NAVIGATION & SAFETY

- Cape / Post-Panamax are restricted to Daylight / one-way channel restrictions
- Bend easing in the lower bay improves navigation safety for larger ships
- Increasing the size of the turning basin improves navigation safety for larger ships
- Channel delays increase vessel and shipper costs
- Higher costs impact U.S. competitiveness and consumer prices

ALABAMA STATE PORT AUTHORITY

DRAFT INTEGRATED GENERAL REEVALUATION REPORT WITH SUPPLEMENTAL ENVIRONMENTAL IMPACT STUDY FINDS



THE ECONOMIC TAKEAWAY

- Deep draft vessels calling the Port of Mobile will increase
- Demand for goods will increase with or without this project
- Most ships calling the Port of Mobile are light-loaded or delayed
- Channel depth limitations and vessel delays increase shipper costs
- **Higher transportation costs impact Alabama and U.S. competitiveness and consumer prices**

COST SUMMARY

- Project Cost $387.8 Million*
  - Federal Share - $244.8 Million*
  - State of Alabama Share - $143.0 Million*

* Costs are based on preliminary assumptions and will be refined for budgetary purposes.