Update on the Mobile Harbor General Reevaluation Report

COL James DeLapp
DISTRICT COMMANDER

22 February 2018

US Army Corps of Engineers

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AGENDA

US Army Corps of Engineers

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USACE Overview

- Mission Areas
- Boundaries
- Puerto Rico Update

Mobile Harbor GRR

- Project Overview
- Economic Analysis
- Environmental Analysis
- Engineering Analysis
- Dredged Material Placement
- Summary
- What's next
- Questions

USACE MISSION AREAS

US Army Corps of Engineers

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Military Programs

- Military Construction
- COCOM Support ,Overseas Contingency Opns (OCO)
- Installation, Environmental, Energy and Sustainability

Civil Works

- Navigation, Hydropower
- Flood Control, Coast Protect
- Water Supply, Regulatory
- Recreation, Disaster Response
- Environmental Restoration

Homeland Security

- Critical Infrastructure
- Anti-terrorism Plans
- Intelligence
- Facility Security Partnerships
- Emergency Operations

International & Interagency Support

- Federal
- State
- Local
- International
- Foreign Military Sales

USACE Has a Globally Diverse Mission Set Driven by Diverse Customers in Support of the DoD and the Nation

Research & Development

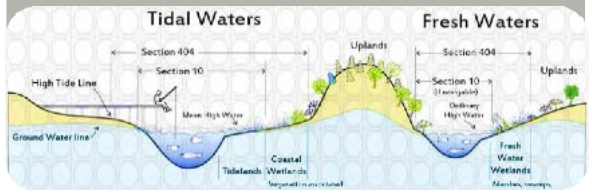
- Warfighter
- Installations & Energy
- Environment ,Water Resources

Real Estate

- Acquire, Manage and Dispose
- DoD Recruiting Facilities
- Contingency Operations

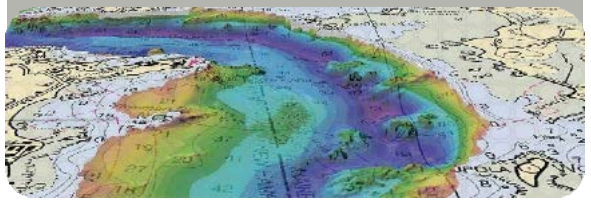
Regulatory

- Regulate Waters of the U.S.
- Section 404 & 10 Programs
- Nationwide Permits



Geospatial Support

- Common Operating Picture
- Support to Civil Works/Military
- Support to Emergency Ops



US ARMY CORPS OF ENGINEERS
DIVISION BOUNDARIES

US Army Corps of Engineers

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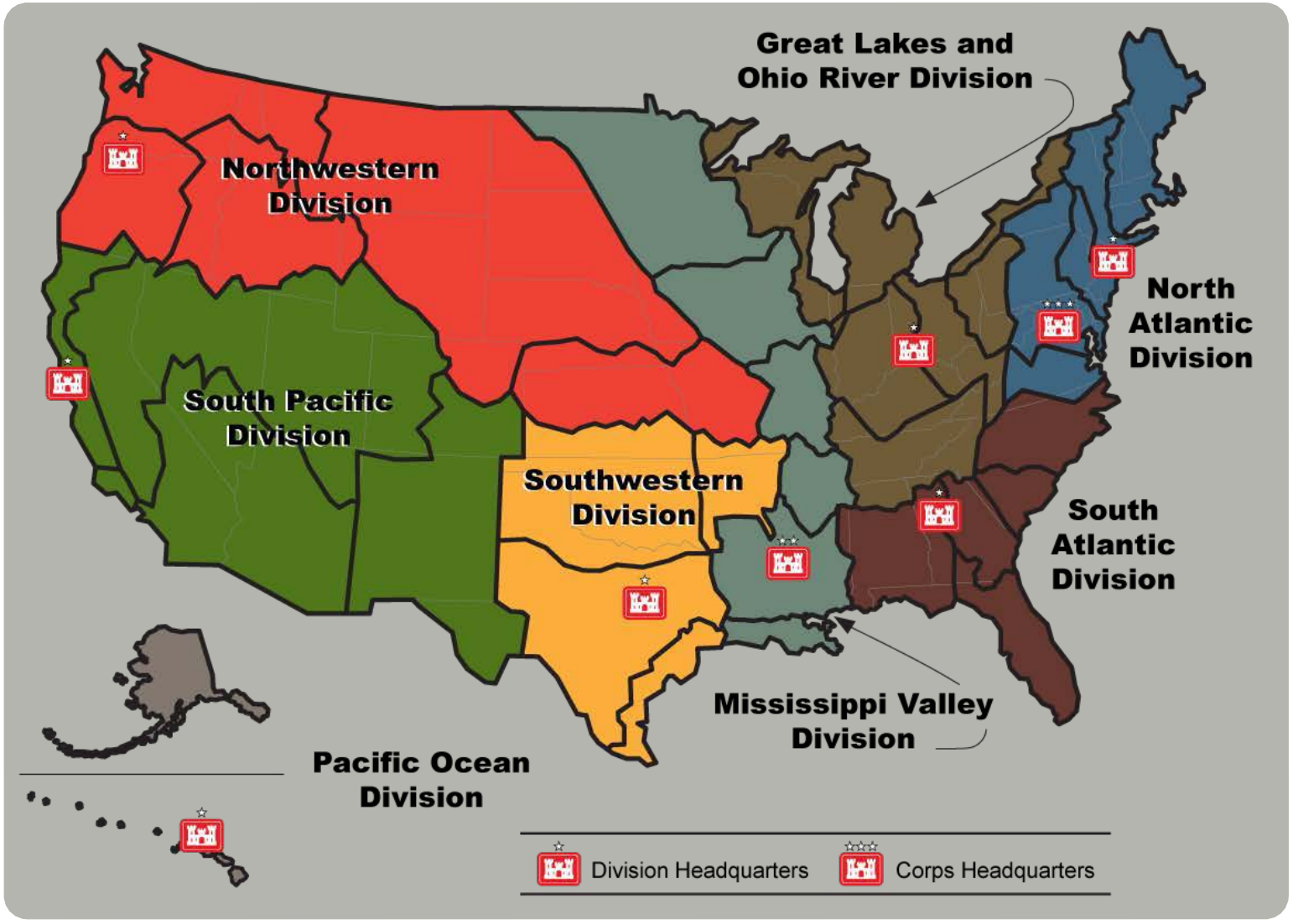

Lieutenant General
Todd Semonite

Commanding General and Chief of Engineers
Headquarters, U.S. Army Corps of Engineers

HQ, USACE Facts:

U.S. Army Corps of Engineers (USACE) employs approximately 35,000 Civilian Employees and 700 Military personnel with a presence in more than 30 countries and providing reach-back technical and construction expertise to more than 100 counties worldwide.

USACE owns and operates 694 dams; maintains 12,000 miles of waterways, 239 locks and 926 Coastal, Great Lakes and inland channels and harbors. About 1.4 trillion of U.S. trade moves through the ports and waterways that we manage.

USACE is the Nation's largest provider of outdoor recreation operating 2,380 recreation areas. Our projects host about 370 million visitors who spend some $16 billion yearly; supporting an estimated 270,000 jobs.

USACE is the largest owner and operator of hydroelectric power plants in the U.S., providing 3% of the total national electric capacity, producing approximately 83.7 billion kilowatt-hours of electricity in its 75 hydropower plants. The electricity generated nearly $4 billion in gross revenue.

SOUTH ATLANTIC DIVISION
DISTRICT BOUNDARIES

US Army Corps of Engineers

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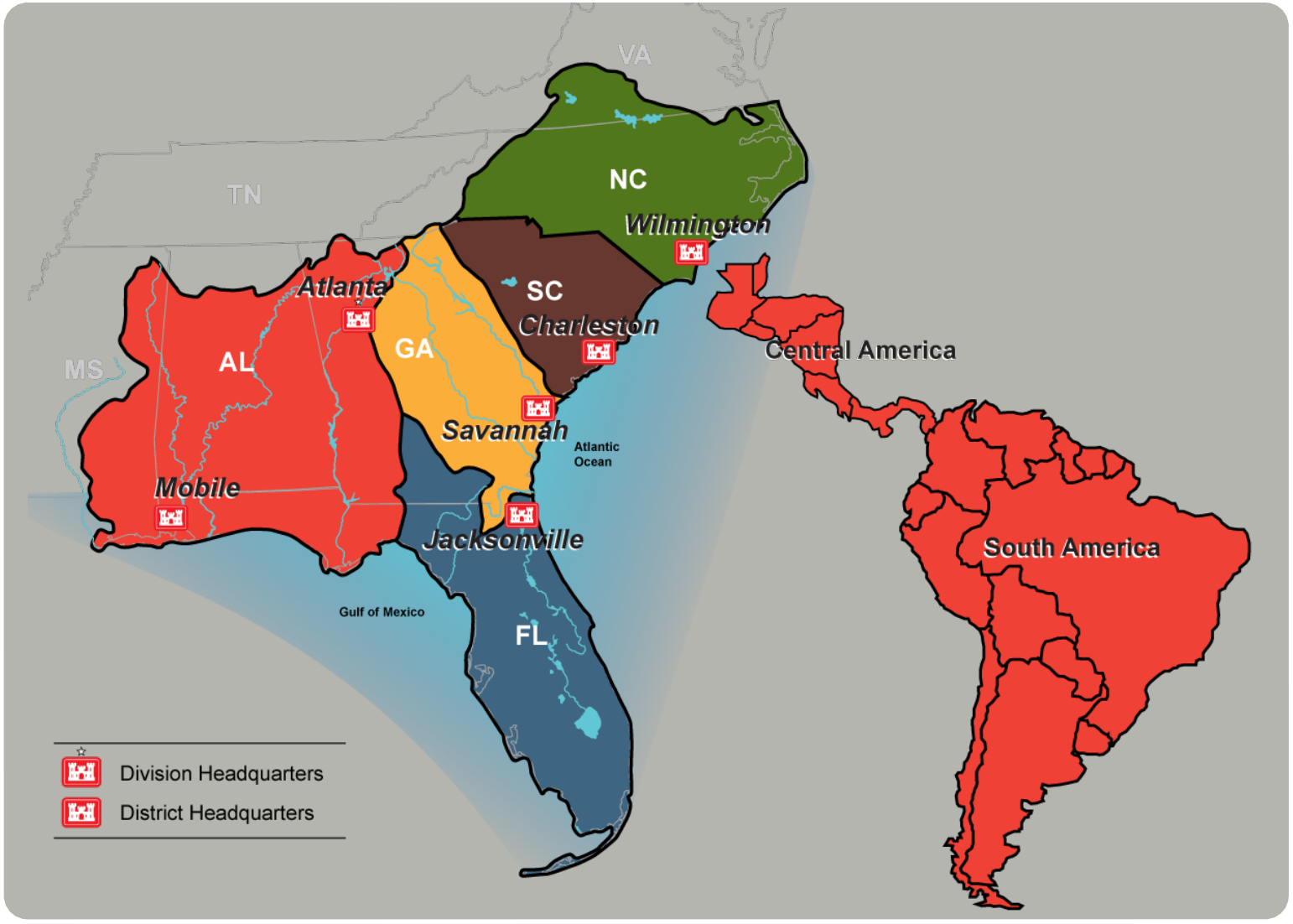

Brigadier General
Diana Holland

Commander and Division Engineer
South Atlantic Division

Division Facts:

The Corps of Engineers' South Atlantic Division is one of eight regional offices of the Corps overseeing military and water-resources design, construction, and operation in the eight states in the Southeast, the Caribbean, and Central and South America. The division has five districts located in Wilmington, NC; Charleston, SC; Savannah, GA; Jacksonville, FL; and Mobile, AL.

The South Atlantic Division designs and builds major military facilities for the Army and Air Force in the Southeast. Serving 11 major Army posts and 13 Air Force bases, the division builds barracks, hospitals, office buildings, commissaries, and other facilities to meet the needs of the American military. Within the division boundaries, 32 percent of the stateside Army and 18 percent of the Air Force find their home, and four major commands have their headquarters. The Mobile and Savannah Districts handle military programs for the division.

Thirty-three multiple-purpose projects in the Southeast provide citizens with flood control, hydroelectric power, water supply, recreation, navigation, and wildlife enhancement. The South Atlantic Division operates and maintains more than 6,000 miles of federal navigable channel and 29 major harbors in the region. The division also has a growing environmental-restoration workload, including the largest single environmental-restoration project in the world, the Everglades Restoration in South Florida.

MOBILE DISTRICT
RIVER BASINS & BOUNDARIES

US Army Corps of Engineers

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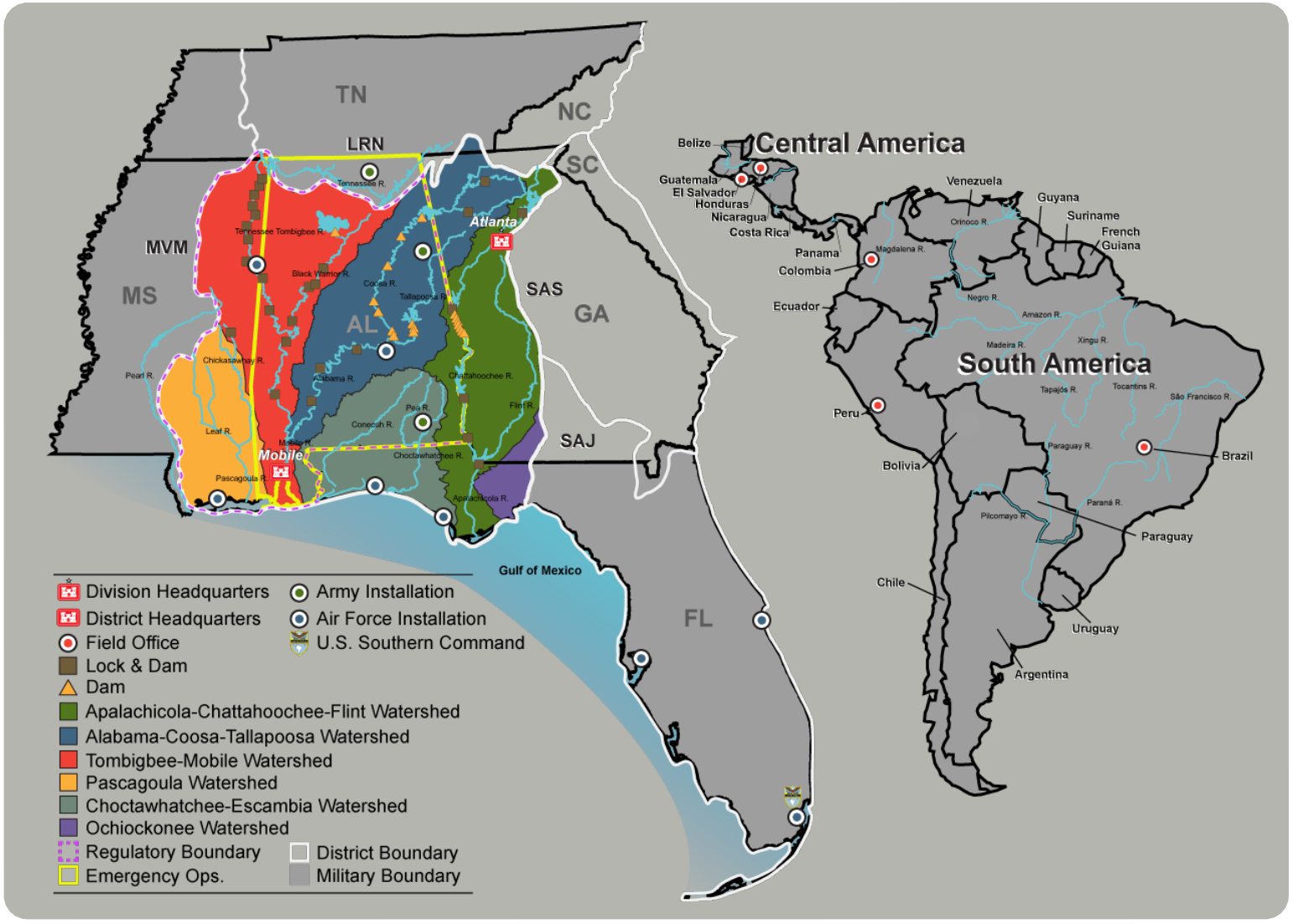

Colonel
James A. DeLapp

Commander and District Engineer
Mobile District

District Facts:

Established in 1815, the Mobile District employs 1,100 civilian personnel and approximately 10 military officers with a presence that covers the states of Alabama, Florida, Georgia, Mississippi as well as all Central and South America. The Mobile District manages a $1 billion Military, Civil Works, and International/Inter-agency Support program that responds to disasters, manages water resource infrastructure, protects the environment, and provides facilities for our national defense and inter-agency partners.

The Civil Works mission includes the operation and maintenance of six major river systems providing over 2,200 miles of navigation, seven deep-water harbors, 21 shallow draft ports, and flood control with over 67 projects that have prevented in excess of $200 million in flood damages over the last ten years. The District's eight hydropower facilities generate 2.06 billion kilowatts of electricity and return $44.8 million of the U.S. Treasury. Mobile also manages one of the largest recreation programs in the Federal government with 27 lakes and 464 recreation areas averaging more than 34.1 million visitors a year.

Mobile District provides project management, construction, and engineer services to support the Department of Defense Military Construction, International support to U.S. Southern Command (SOUTHCOM), and Inter-Agency Support to NASA, FBI and other federal agencies. The District also provides engineering studies and other technical assistance such as master planning, environmental management and real estate support.

HURRICANE MARIA RECOVERY MISSION IN PUERTO RICO

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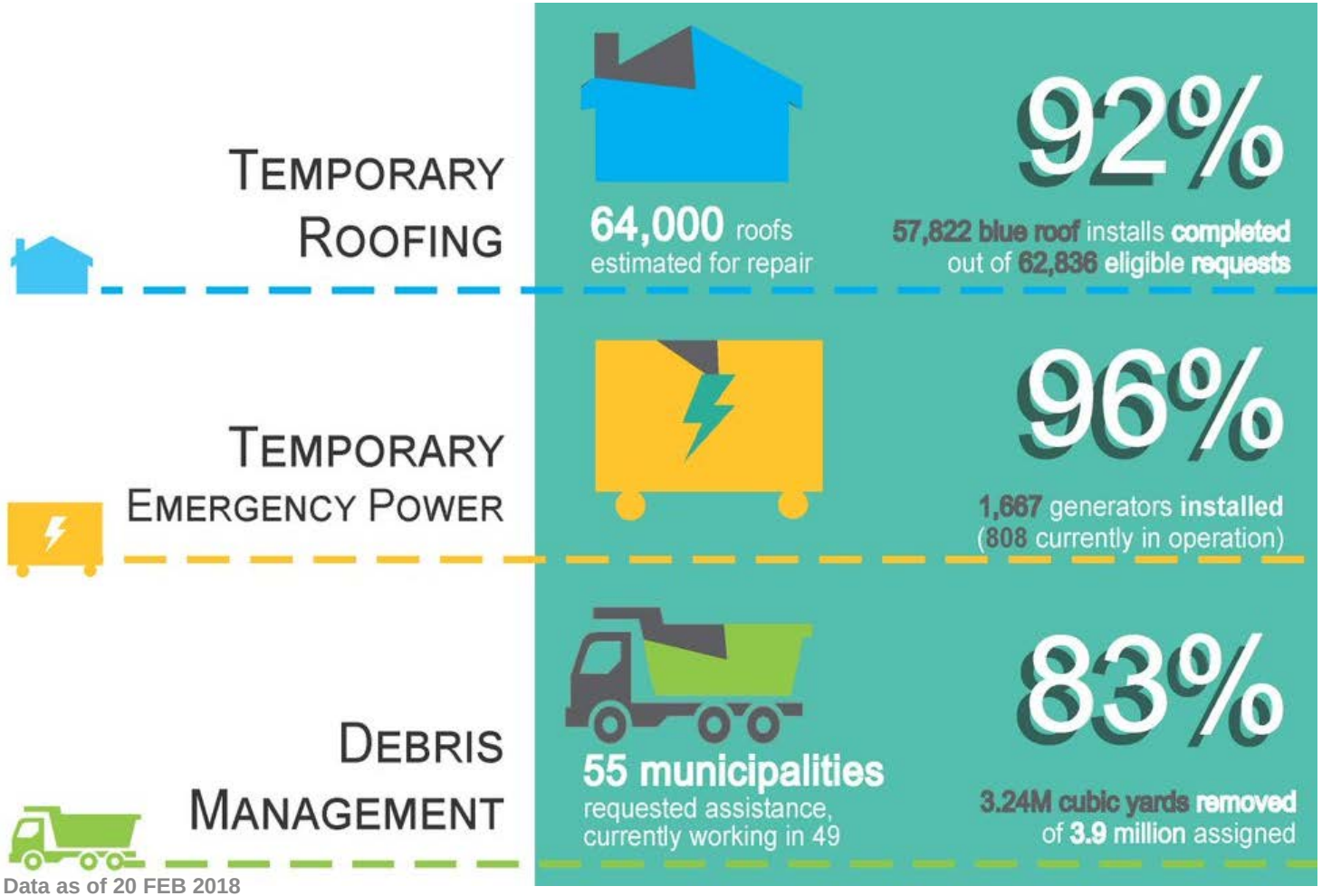
900+ USACE Employees at Peak
4 Field Offices Established



Data as of 20 FEB 2018

By the Numbers

CAT 5 Hurricane

38” of Rainfall

154 Days since Storm

3.4 Million Population

200,000 Require Power

95% Lost Power / Comms

67,000 Roof Repairs

1,600+ Temp Generators

3.9 Million CY of Debris

$90+ Billion in Damages

PUERTO RICO POWER GRID REPAIR

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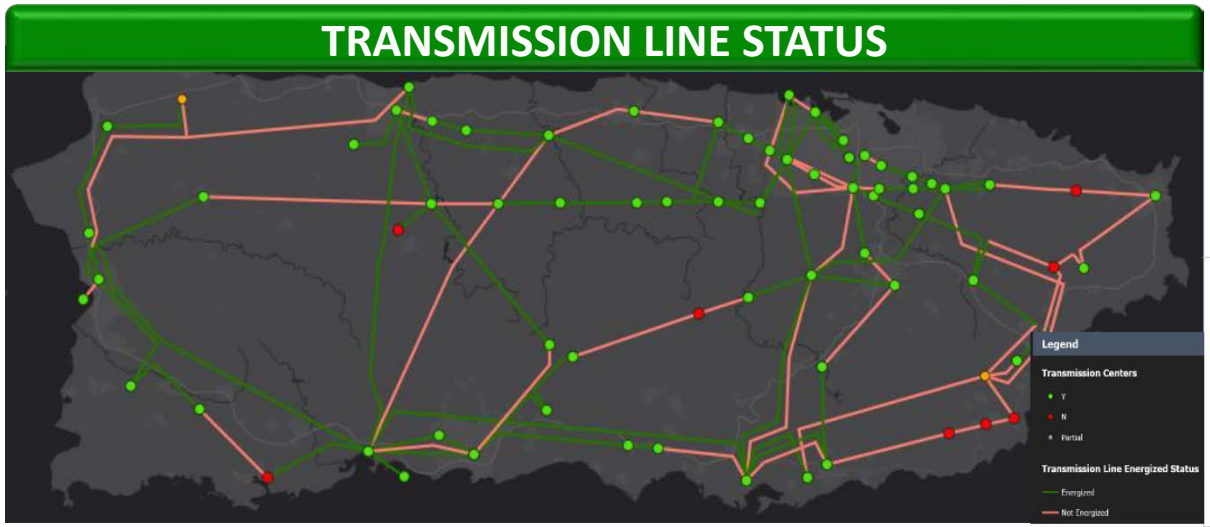
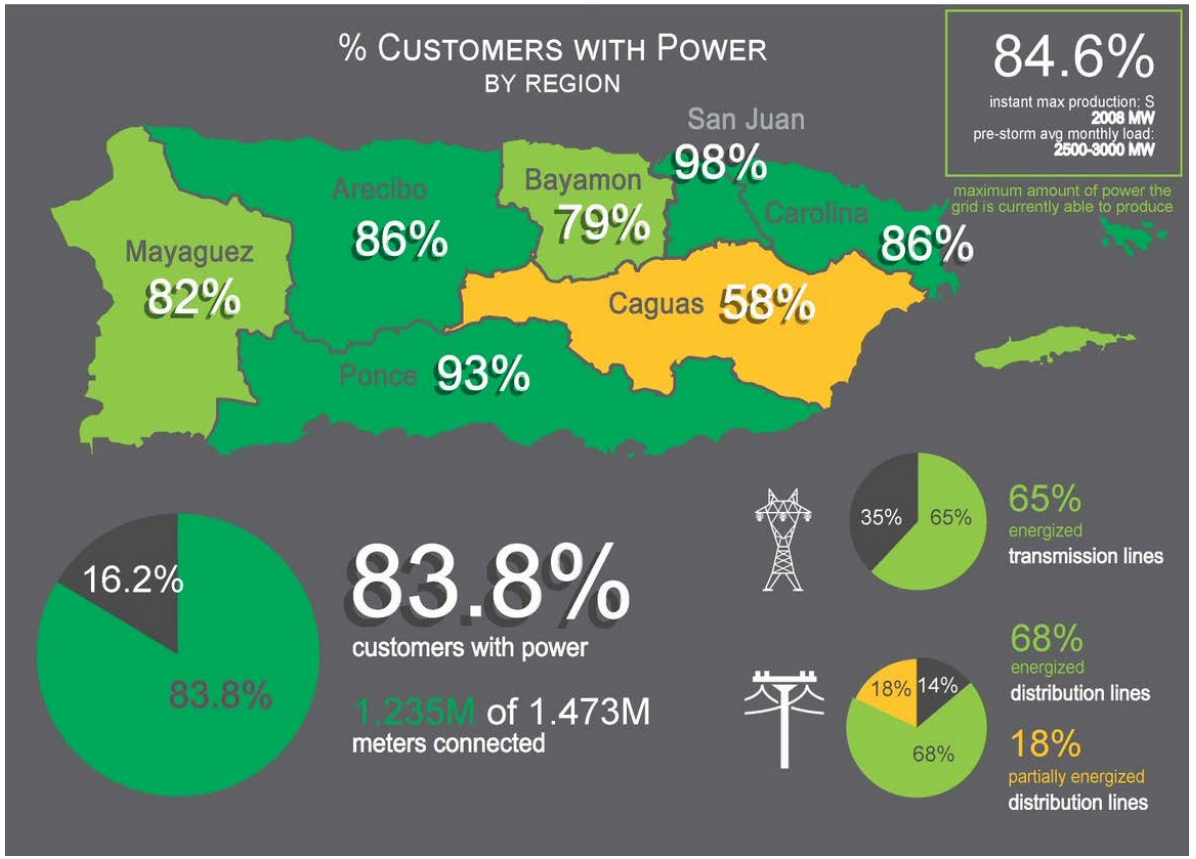
TRANSMISSION LINE STATUS





Data as of 20 FEB 2018

MATERIALS REQUIRED (Not a Complete list)

- ❑ **20 Million** Feet of Conductor (Wire)
- ❑ **60,000** Power Poles (Wood, Metal, Concrete)
- ❑ **134,000** Insulators
- ❑ **6,500** Transformers

PERSONNEL

- **4445** Distribution Workers
- **1034** Transmission Workers
- **5479 TOTAL** Field Workers

MOBILE HARBOR DEEPENING AND WIDENING

"Modernizing the Port of Mobile is necessary because 2/3rds of the Port of Mobile's vessel traffic today is restricted or delayed directly impacting shipper costs and competitiveness."

- James K. Lyons, ASPA Director

Full Service Seaport
- ✓ 10th Largest in the U.S.
- ✓ 58M+ Tons of Cargo Handled Port-wide

Growth Steadily Climbs
- ✓ Record 2017 20% Container Growth
- ✓ Ranked #2 Steel Port in U.S.
- ✓ Ocean Carriers continue to add service

Strong Exporter of U.S Materials and Goods

Contributes Significantly to the Economy
- ✓ 153,000+ Jobs
- ✓ $25.1B in economic value

GENERAL REEVALUATION REPORT SCHEDULE

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

- 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 transmitted to Corps Headquarters

- Headquarters’ review of final report
- Final SEIS; Alabama state and Federal agency review
- GRR approval
- Record of Decision signed

MOBILE HARBOR GENERAL REEVALUATION REPORT

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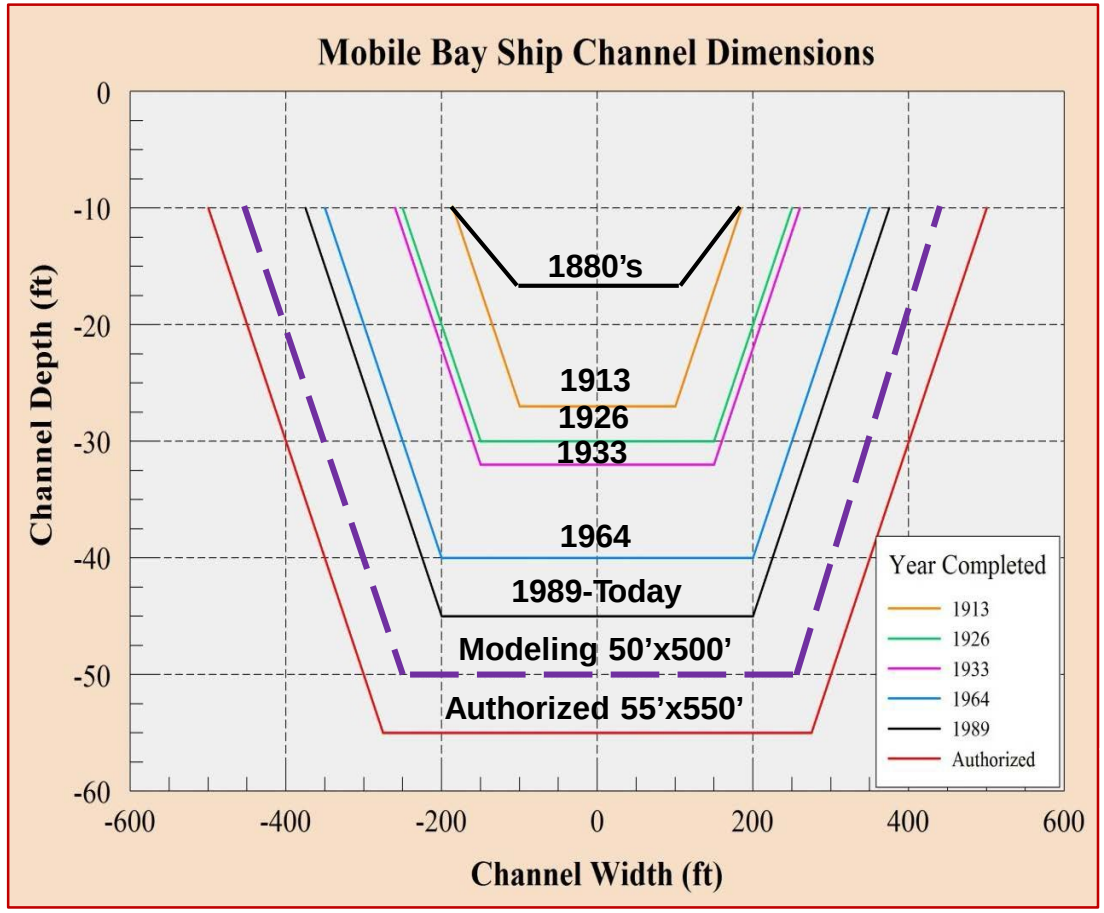
4-year $7.8M STUDY
Began Nov 2015 Complete Nov 2019



Current Measures Under Consideration

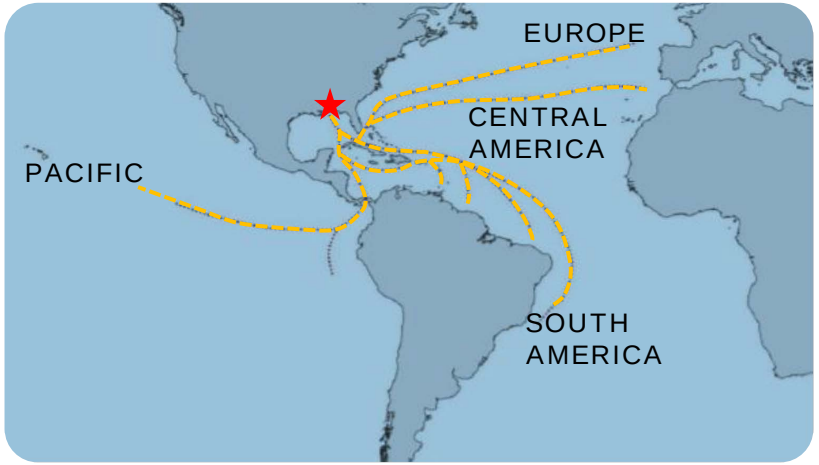
- Deepening: 48' to 50' (50' to 52' at entrance)
- Widener: 100' (3 miles)
- Bend Easing
- Turning Basin Modification

Tentatively Proposed Placement Locations

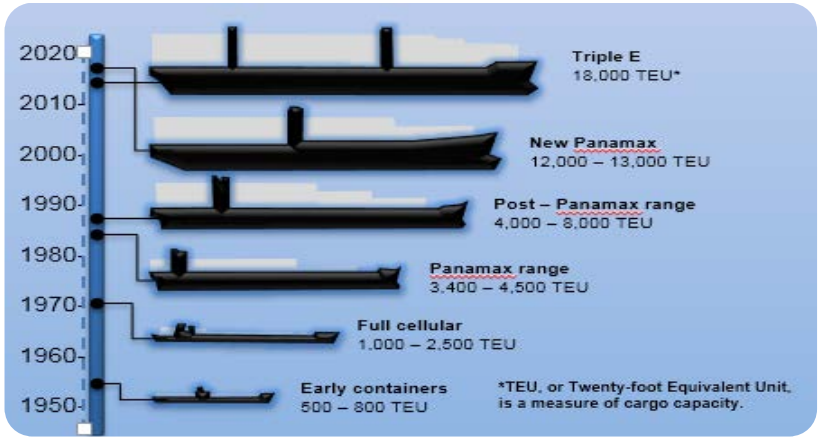
- Formerly mined relic shell area
- Sand Island Beneficial Use Area (SIBUA)
- Pelican/Sand Island Complex
- Ocean Dredged Material Disposal Area Site (ODMDS)

Release of Draft Supplemental Environmental Impact Statement scheduled for June 2018

ECONOMIC CONSIDERATIONS



Mobile Harbor Trade Routes



Evolution of container ships

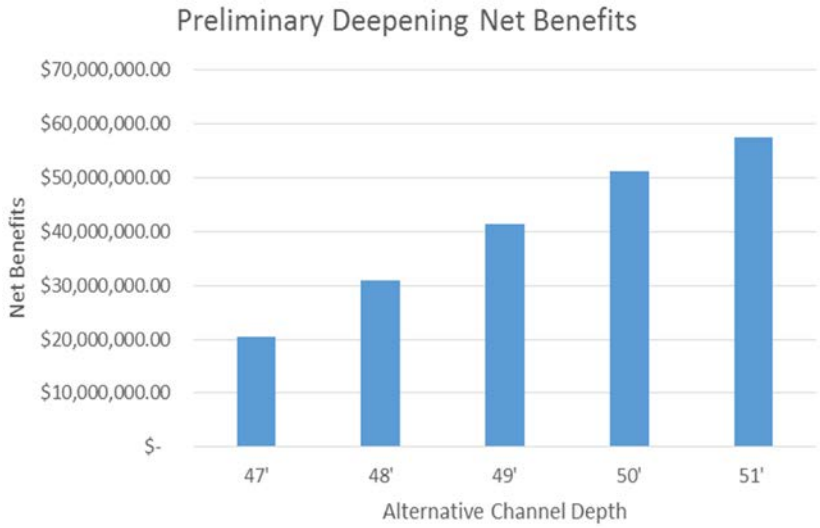
Post-Panamax ships make up 16% of the world's container fleet today, but carry 45% of the cargo. New Panamax ships are the largest that can pass through the new locks in 2016.

Concepts Behind Mobile Harbor Economic Analysis

- Growth is assumed only to the capacity of the facilities
- Deeper channels allow vessels to load more efficiently
- Channel widening reduces transit delays/wait times to gain efficiencies
- The project benefits are reduction in transportation costs

Major Components of Mobile Harbor Economic Analysis

- Commodity Forecast
- World Fleet Forecast
- Mobile Fleet Forecast
- Historic Vessel Calls



National Economic Development (NED) Plan maximizes net benefits at 51 foot depth

MOBILE BAY ENVIRONMENTAL IMPORTANCE

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Setting for Mobile Bay

- Shallow bay (≈ 9’), long deep channel
- 2nd largest delta, 4th largest drainage area in U.S.
- High biodiversity
- Fresh, brackish, estuarine & marine habitats
- National Estuary designation, 1995

Coastal Considerations

- Ongoing Studies
- Beneficial use of dredged material
- Effects on coastal processes

Impacts to Other Resources

- Close coordination with State and Federal Agencies (USFWS, EPA, ADEM, ADCNR, NMFS)
- Endangered Species
- Wildlife
- Commercial fisheries
- Recreational fishing
- Sea level rise
- Cultural resources

AQUATIC RESOURCES ASSESSMENT

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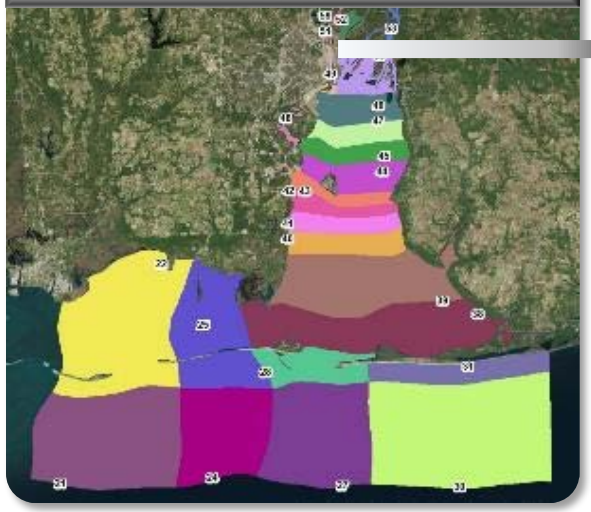
Overview

- Assessing potential impacts to wetlands, submerged aquatic vegetation, benthic invertebrates, oysters, fish
- Model outputs compare 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

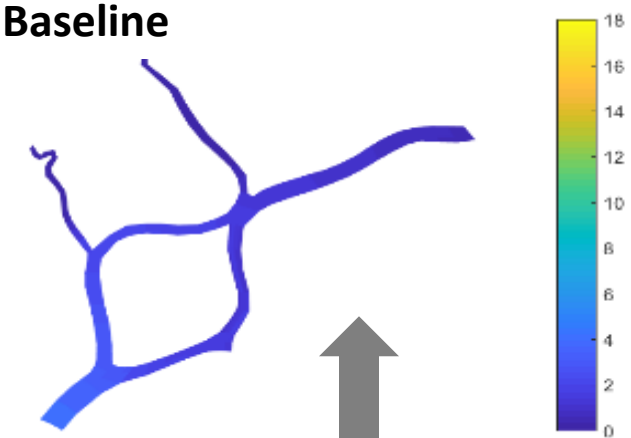
Model grid consists of 30 blocks & 48,000 cells



Model Block 54

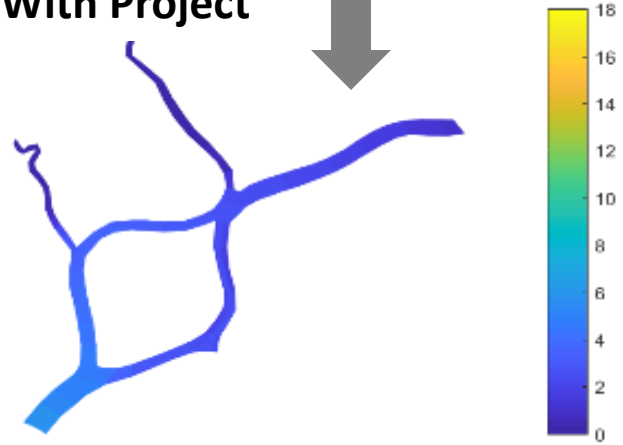
Mean Salinity - July 2010

Baseline



No Measurable Change

With Project



AQUATIC RESOURCES ASSESSMENT – WETLANDS

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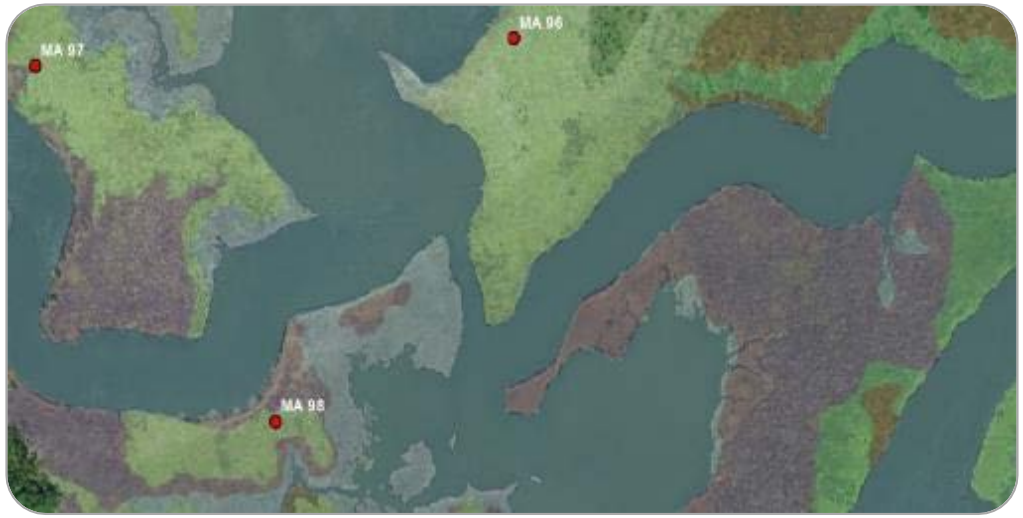
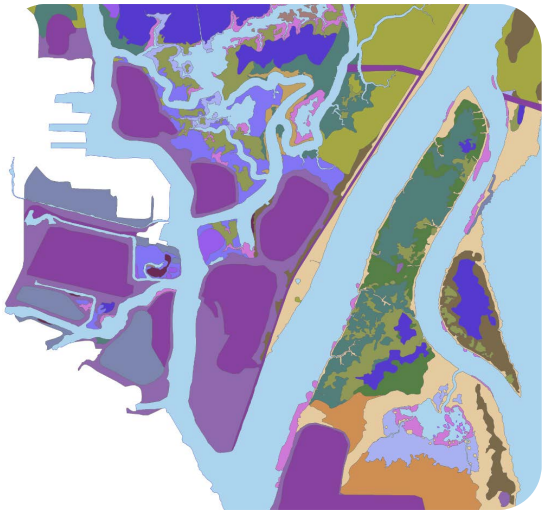
Approach

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



Results

- **No wetland losses anticipated**
- 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)

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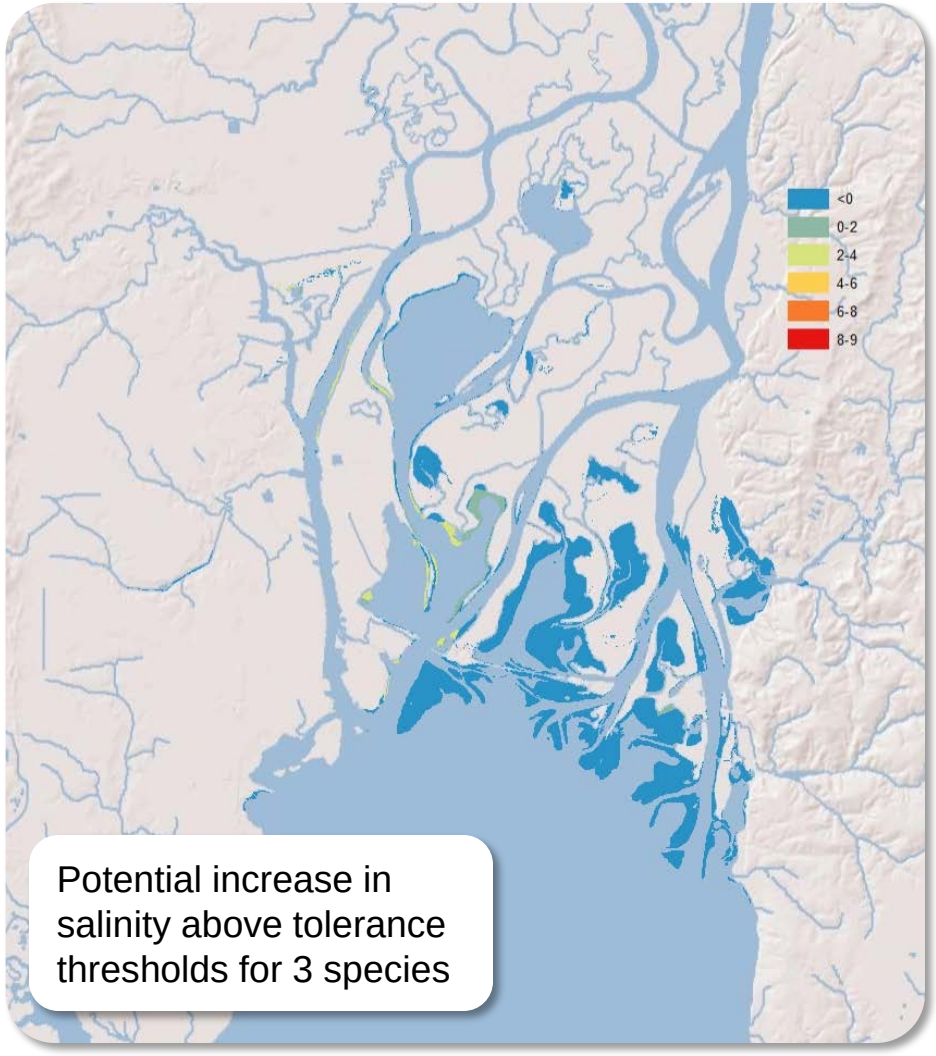
Approach

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

Results

- **No loss of SAV habitat expected**
- 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), water celery, and coon's tail for short duration
- No major differences seen between baseline and post-project conditions under sea level rise scenario



Potential increase in salinity above tolerance thresholds for 3 species

AQUATIC RESOURCES ASSESSMENT – OYSTERS

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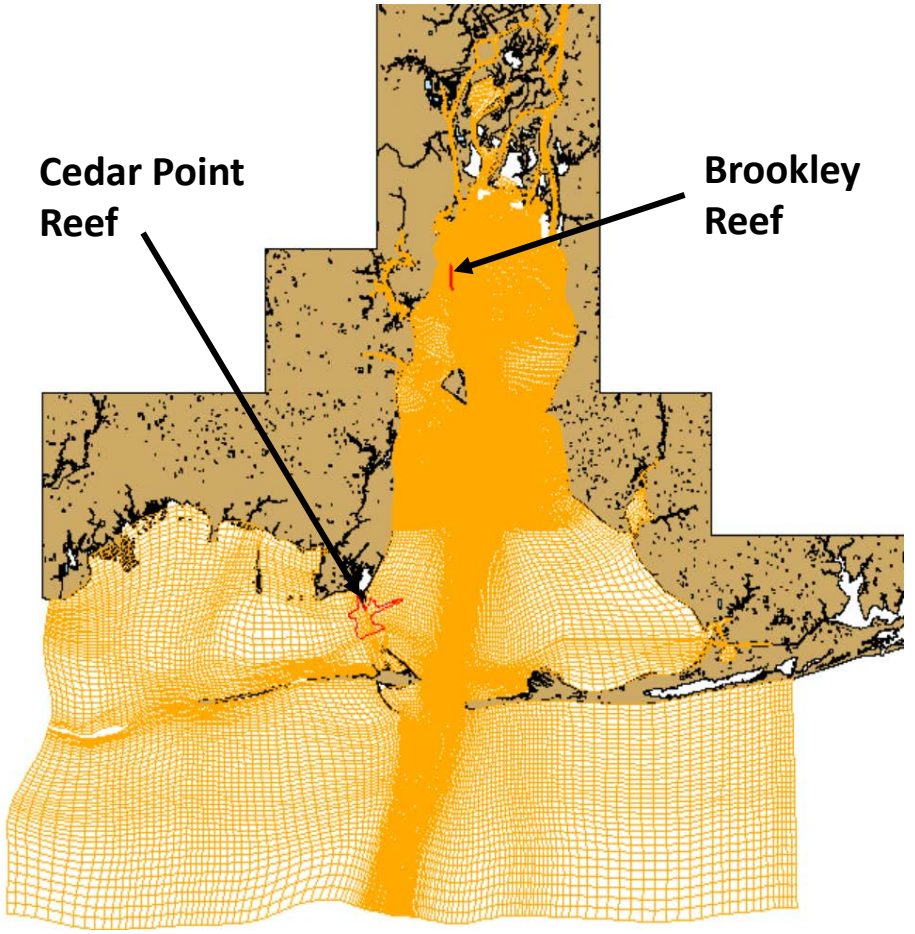
Approach

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

Results

- **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

Oyster Larvae Tracking Domain



AQUATIC RESOURCE ASSESSMENT – BENTHICS

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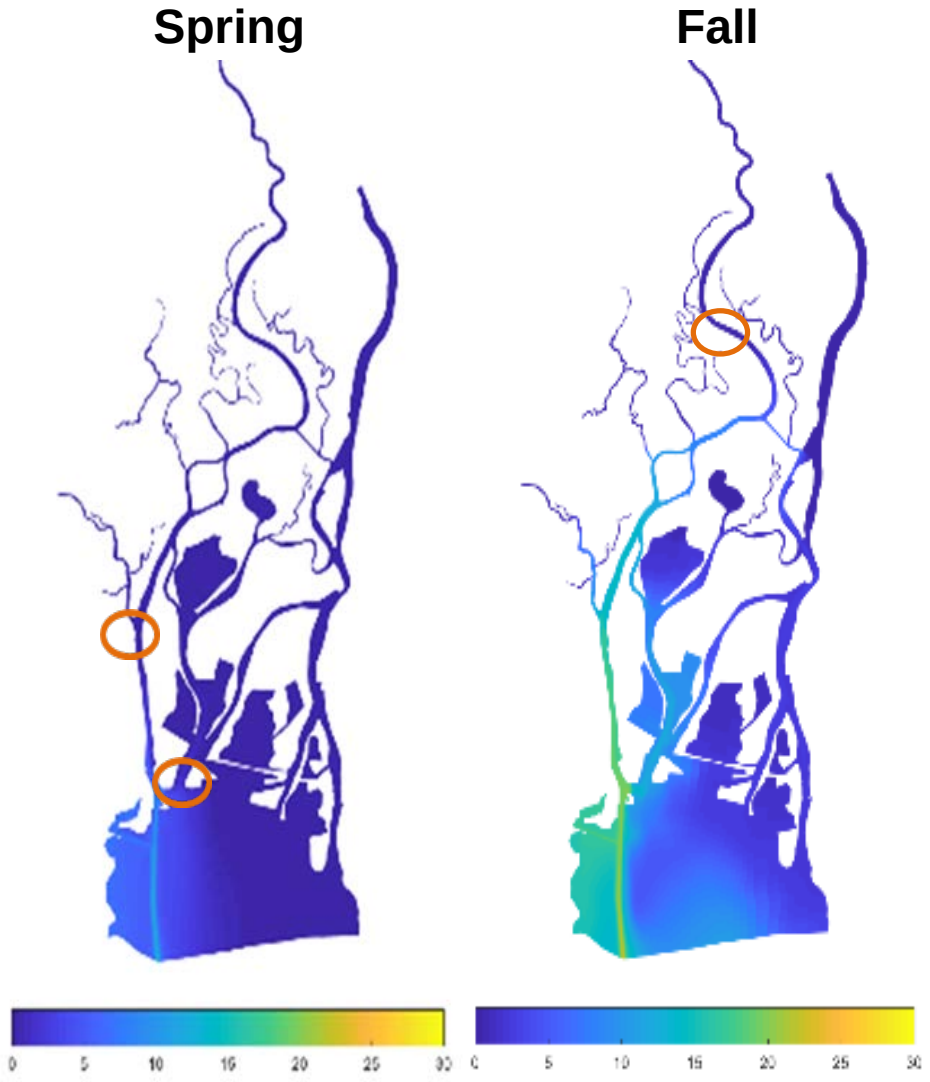
Approach

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

Results

- **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



AQUATIC RESOURCES ASSESSMENT – FISH

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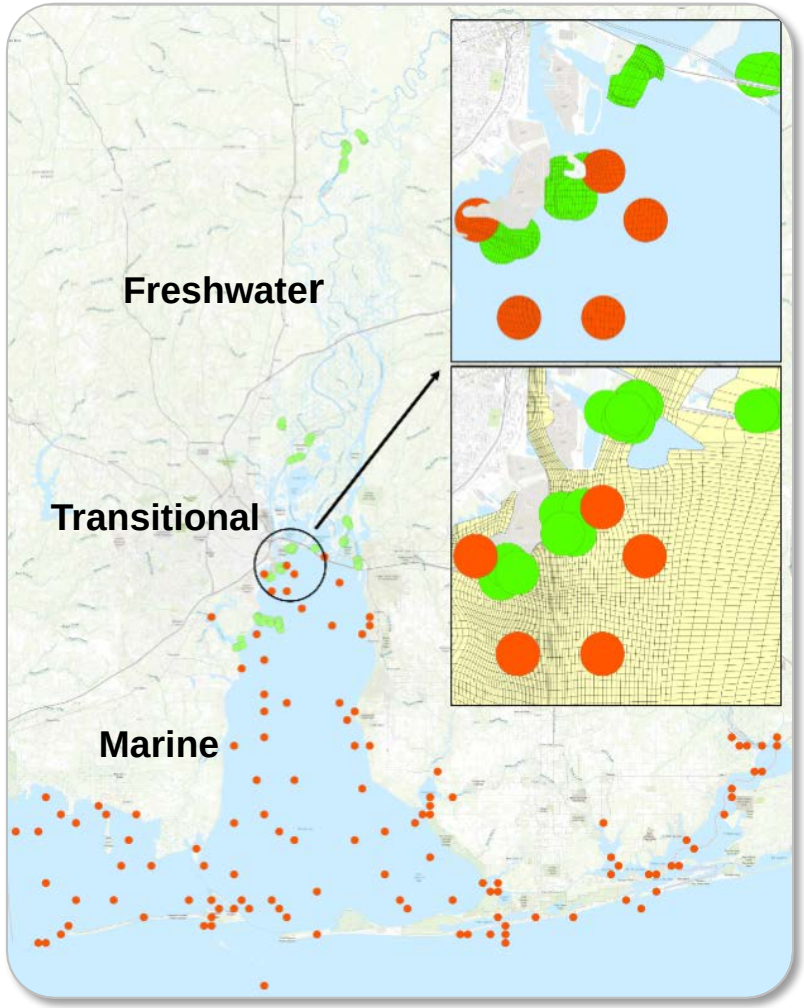
Approach

- 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

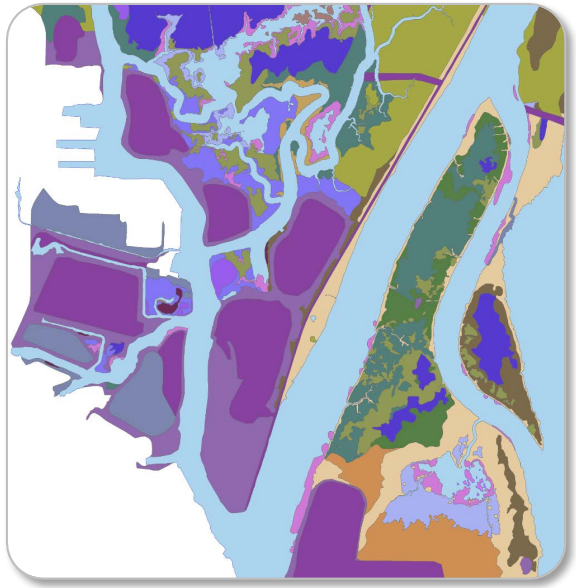
Results

- **No impacts expected due to salinity for:**
  - ✓ Freshwater species
  - ✓ Freshwater species entering estuary
  - ✓ Resident estuary species
  - ✓ Marine species entering estuary
  - ✓ Marine species



AQUATIC RESOURCES ASSESSMENT – SUMMARY

- **No major impacts (i.e., loss of resources) anticipated for:**
  - ✓ **Wetlands**
  - ✓ **SAV**
  - ✓ **Oysters**
  - ✓ **Benthic Invertebrates**
  - ✓ **Fish**
- Project impacts remain negligible under 0.5 meter sea level rise scenario



DREDGED MATERIAL PLACEMENT

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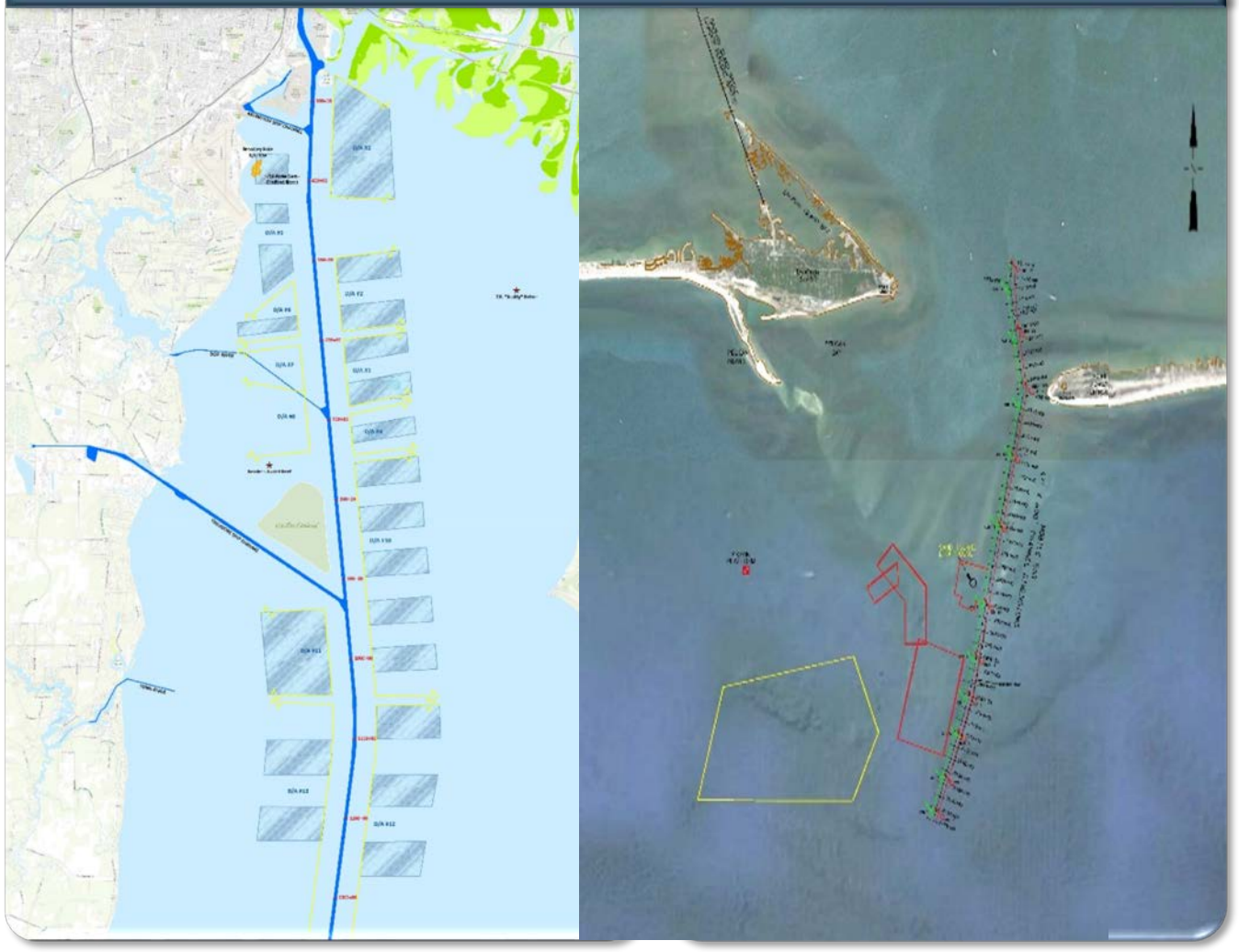
New Work Placement

Maintenance Dredging



ENGINEERING ANALYSIS – SEDIMENT TRANSPORT

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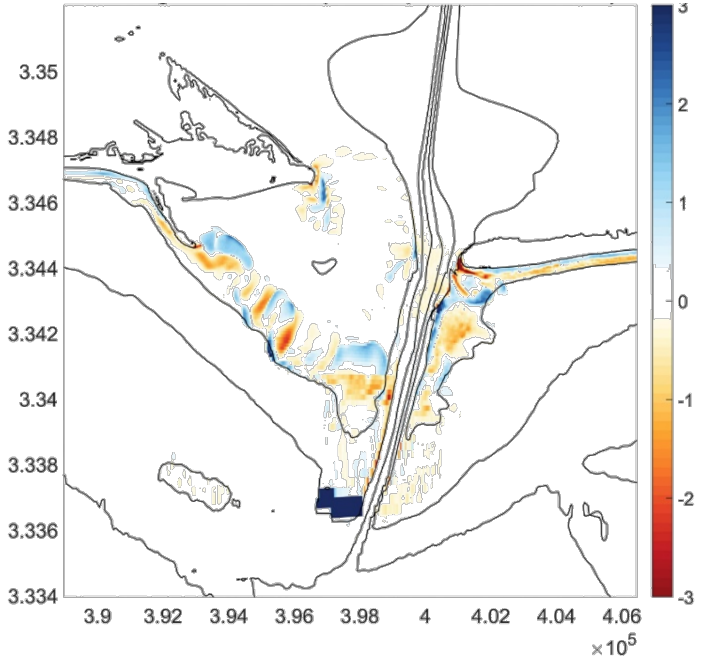
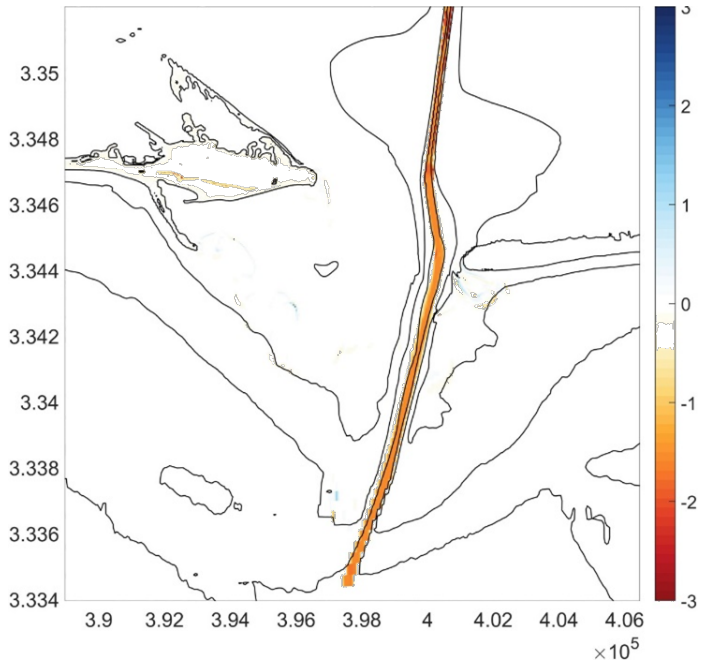
- Increases in average annual shoaling of 5-20% estimated within the navigation channel.
- Minimum bed level changes between with project and existing conditions estimated in the bay and ebb-tidal shoal.

Mobile Pass Sediment Transport Modeling (Delft 3D)

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

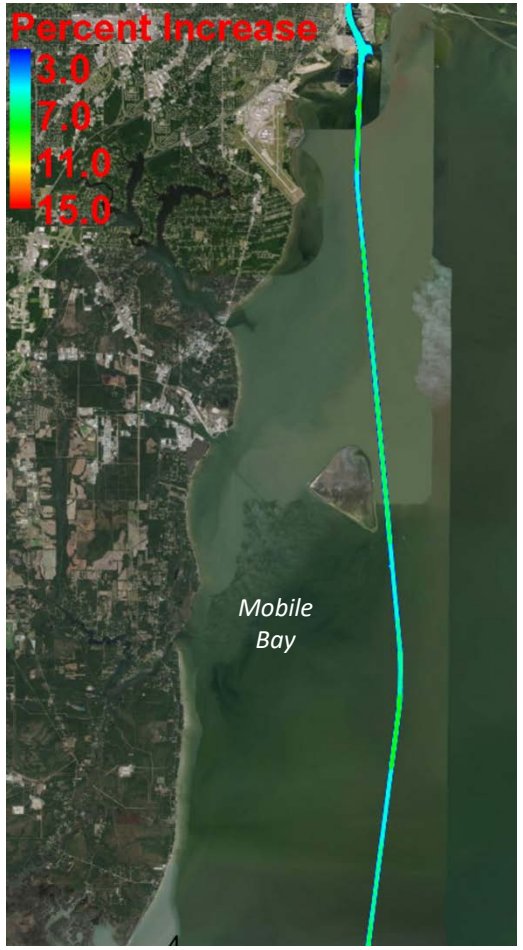


With Project – Existing Condition
Bed Level Change (+/- Erosion/Deposition, m)



Mobile Bay Sediment Transport Modeling (SEDZLG)

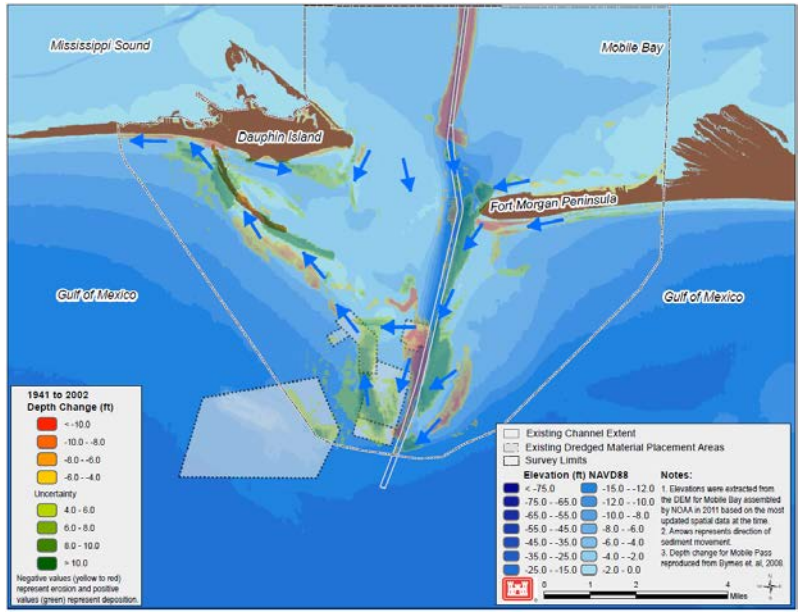
With Project Simulation
Percent Increase in Channel Shoaling



ENGINEERING ANALYSIS – MOBILE PASS EVOLUTION

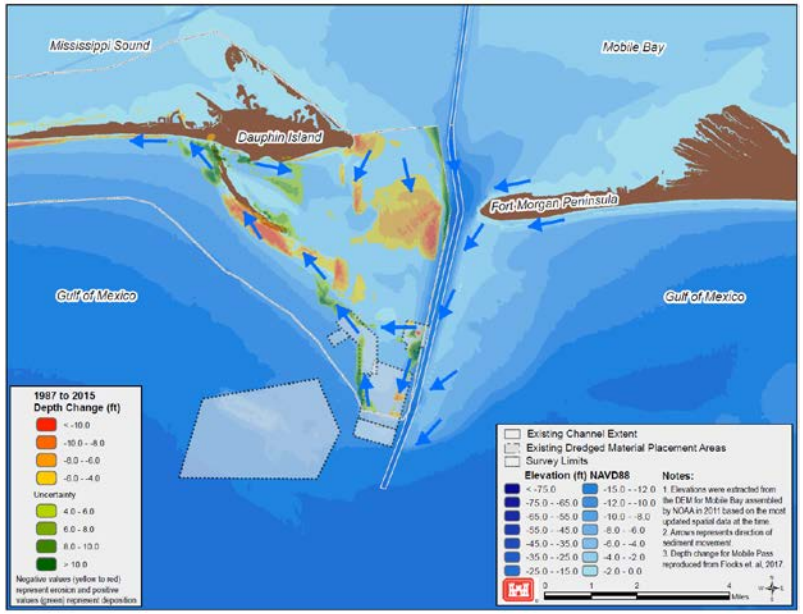
Short and long term representation of sediment movement along the ebb-tidal shoal. Three quadrants showing how sand moves along the system.

Mobile Pass Bed Level Change 1941 to 2002 (+/- Erosion/Deposition, ft)



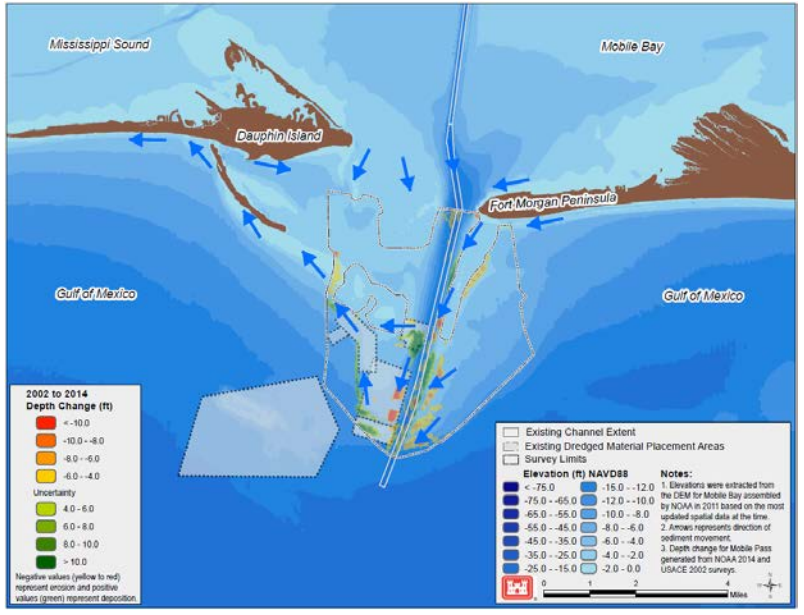
Depth change reproduced from Byrnes et. al, 2008 "Evaluation of Channel Dredging on Shoreline Response at and Adjacent to Mobile Pass, Alabama"

Mobile Pass Bed Level Change 1987 to 2015 (+/- Erosion/Deposition, ft)



Depth change reproduced Flocks, et. al, 2017 "Analysis of Seafloor Change around Dauphin Island, Alabama, 1987–2015" Open-File Report 2017–1112.

Mobile Pass Bed Level Change 2002 to 2014 (+/- Erosion/Deposition, ft)



Depth change generated from USACE 2002 and NOAA 2014 surveys.

Mobile Pass Bed Level Change 1941 to 2002
(+/- Erosion/Deposition, ft)

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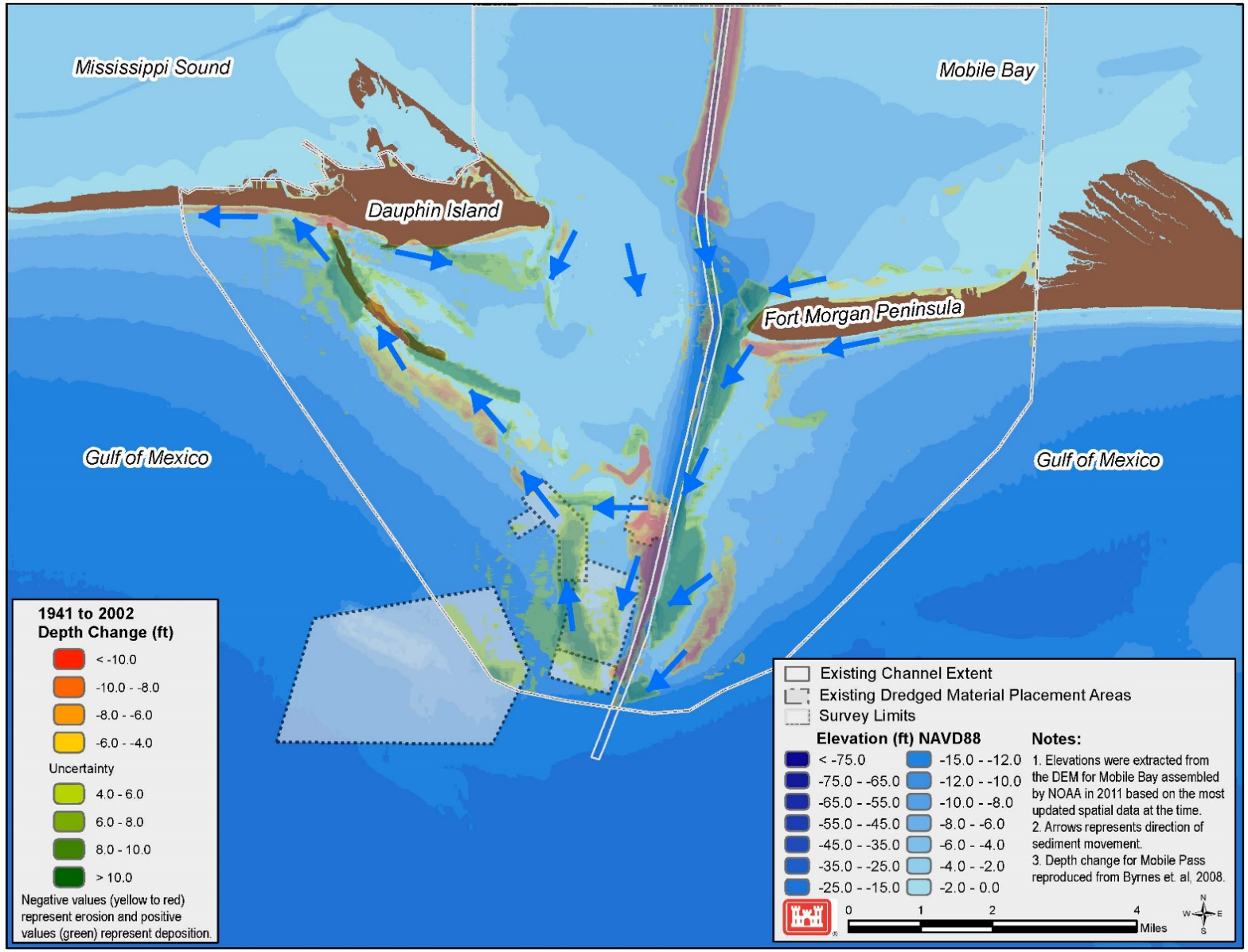

Mobile Pass Bed Level Change 1987 to 2015
(+/- Erosion/Deposition, ft)

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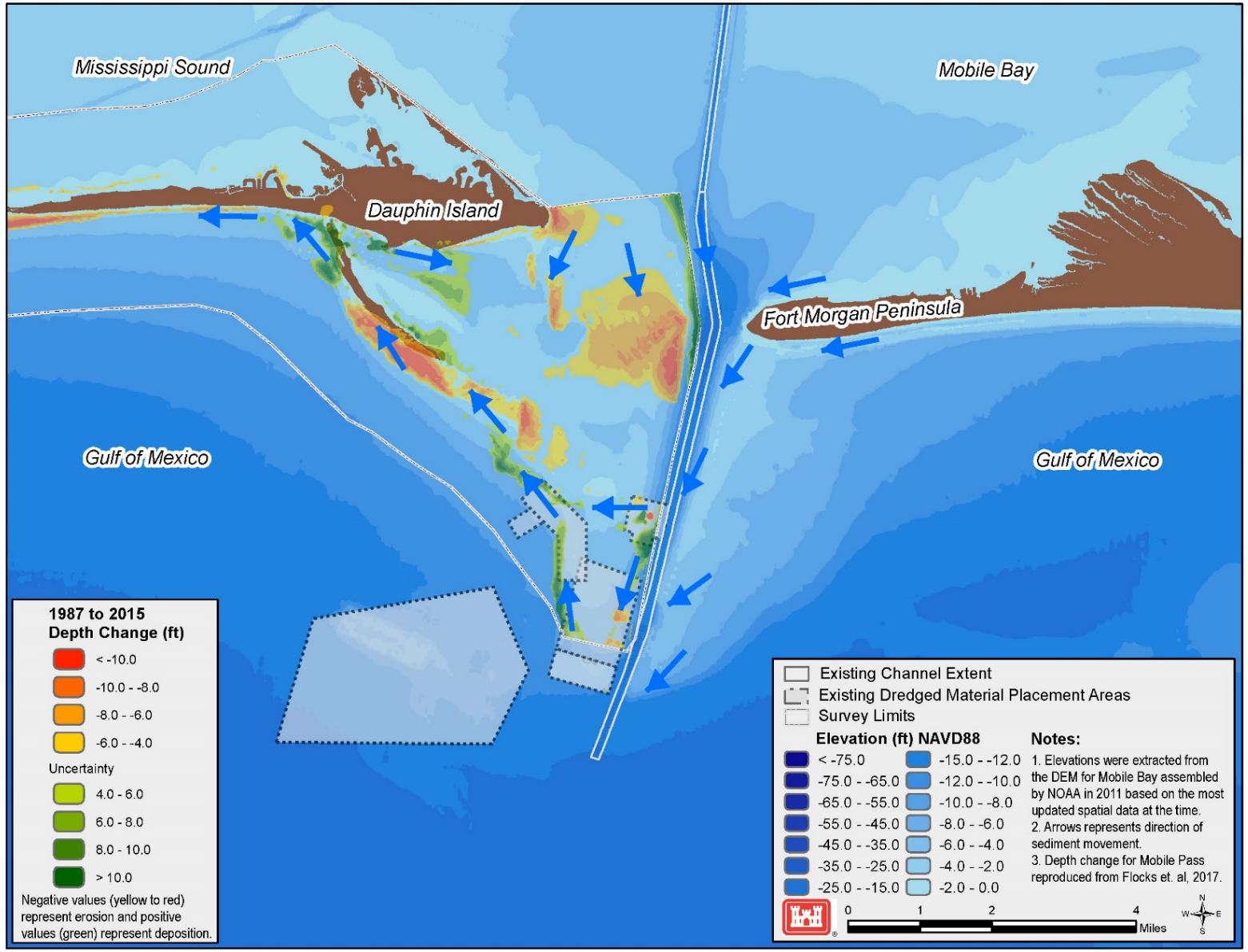

Mobile Pass Bed Level Change 2002 to 2014
(+/- Erosion/Deposition, ft)

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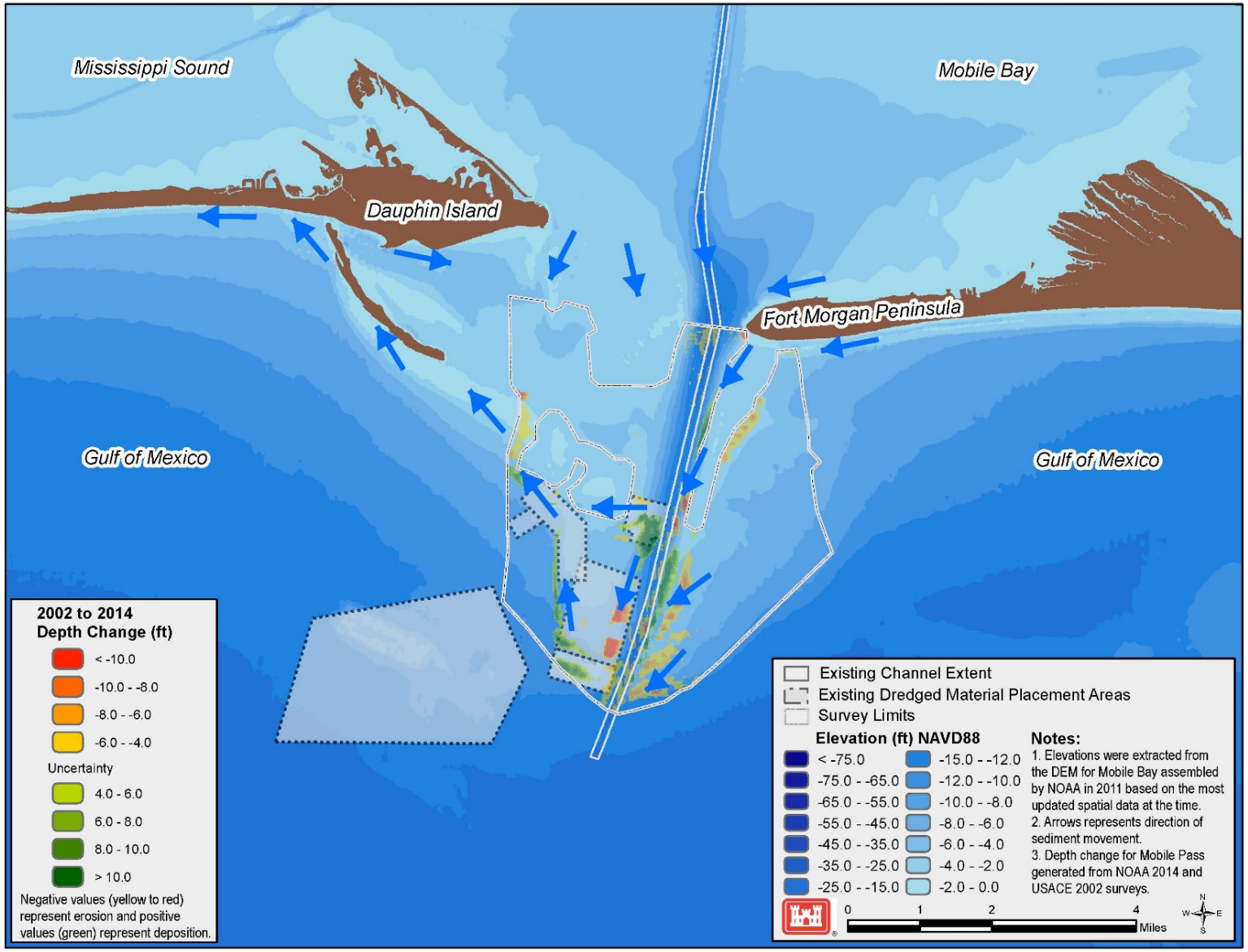

IN CONCLUSION…

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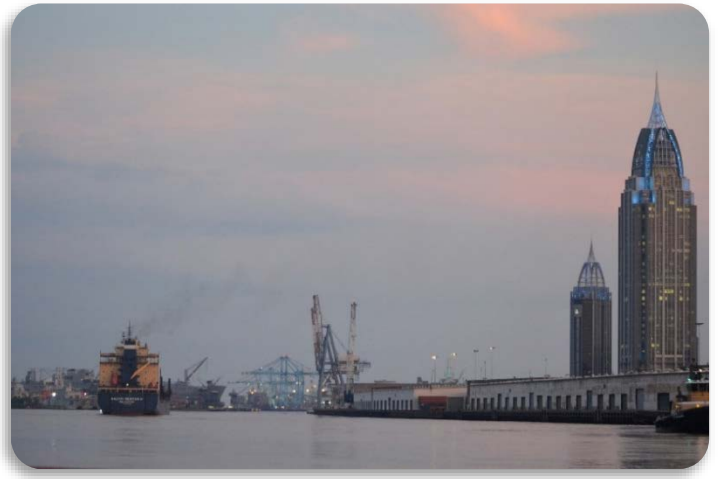
Summary

- Study is evaluating depth of 48 to 50 foot with a 100 foot, 3-mile widener
- Data collection and engineering models complete
- Preliminary analysis indicates that habitat impacts appear to be minimal
- Alternate placement sites are being considered for bar channel maintenance material

What's Next

- Initiate mitigation analysis
- Finalize proposed project dimensions
- Update engineering/economic costs based on mitigation assessments
- Present Tentatively Selected Plan
- Complete Draft Report with SEIS
- Release Draft Report June 2018



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