

# CURRENT AND FUTURE DREDGING ALONG THE LOWER MISSISSIPPI RIVER

Association of Levee Boards of Louisiana  
79<sup>th</sup> Annual Meeting

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US Army Corps  
of Engineers®



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# TOPICS OF DISCUSSION

- Dredging the Mississippi River
  - Why we Dredge
  - Where we Dredge
  - How we Dredge (Dredging Basics)
- O&M Dredging Program
- Beneficial Use of Dredge Material
- Deepening the River





# DREDGING THE MISSISSIPPI RIVER



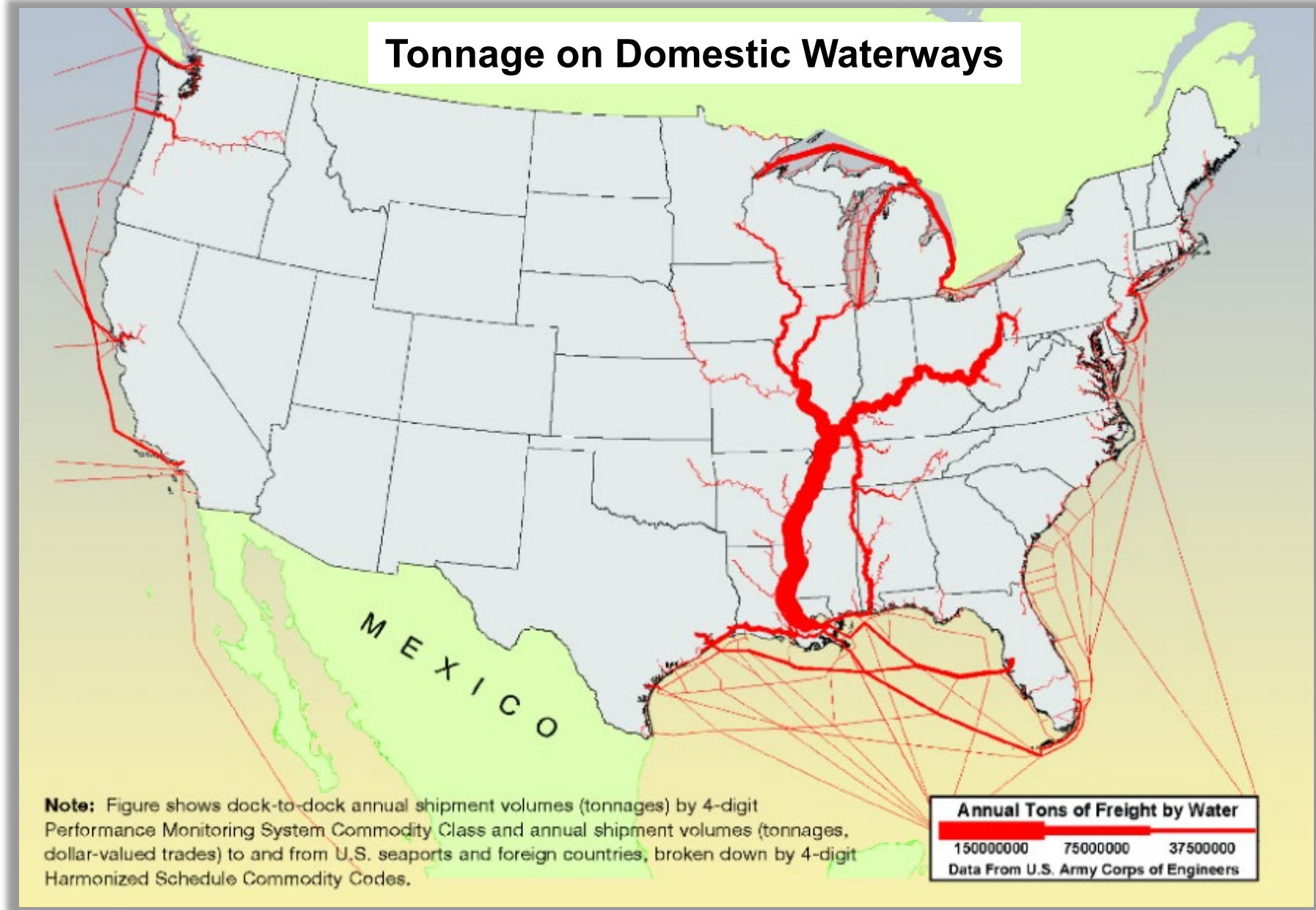
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# WHY WE DREDGE



## Tonnage on Domestic Waterways





# WHERE WE DREDGE





# EARLY ATTEMPTS TO MANAGE THE RIVER

## 1820s: Feds Initiate Navigation Improvements



First MS River survey

Levees for navigation

Snag boats to clear the river

## 1850s: Harrowing Southwest Pass

Even with harrowing, dredging required to maintain 18' depth



## 1855: Lighter Federal Touch



US snag boats sold to non-federal interests

## 1875: The South Pass Eads Jetty System

South Pass Jetties scour out a 30' deep channel





## 4 “MOST BASIC” STAGES OF DREDGING

1. Excavation (loosening/dislodging) the material from the bottom
2. Removal of the loosened material to the dredge vessel
3. Transportation of the material to the placement area
4. Placement of the material

Stages 3 and 4 provide opportunities for NFS-preferred beneficial use/placement sites





# FACTORS INFLUENCING EQUIPMENT USED

- Physical characteristics of sediments
- Quantities to be dredged
- Dredging depth
- Distance to disposal/placement site
- **Physical environment (traffic, rough open water)**
- Contamination level of sediments
- Method of disposal/placement
- Production required
- **Types of dredges available**
- **Dredge availability**







# SELF-PROPELLED HOPPER DREDGE



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# HOPPER DREDGE



**Draghead**

**Dragarm  
Assembly**



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# HOPPER DREDGE DISCHARGE



Split Hull



Bottom Dump Door



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# HOPPER DREDGES

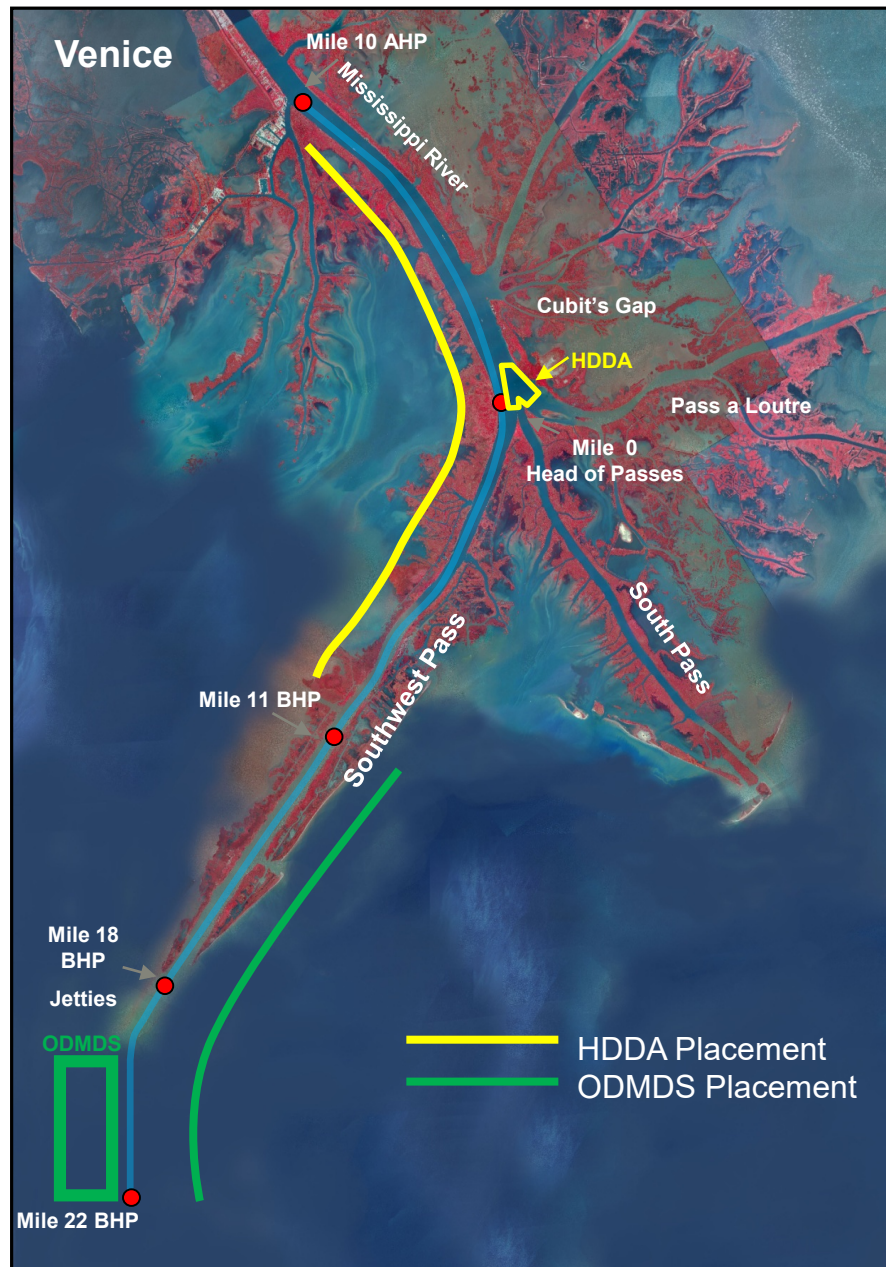
## Advantages

- **Dredge type most suitable for rough open water**
- Can move quickly to job under its own power
- **Minimizes traffic interference**
- Improves navigation depth quickly
- Economical for long haul distance

## Limitations

- Cannot work in shallow depths
- **Cannot dredge continuously**
- Excavates with less precision
- Difficulty dredging hard banks
- Difficulty dredging consolidated materials





# HOPPER DREDGES IN SW PASS

## Material disposal:

- Head of Passes Hopper Dredge Disposal Area (HDDA)
  - Dredged from river miles 10 AHP to 11 BHP
  - Available for future beneficial placement
- Ocean Dredged Material Disposal Site (ODMDS)
  - Dredged from river miles 11 to 22 BHP
  - Located on the right-descending side of the bar channel
- Agitation dredging
  - River Miles 18-22 BHP (Jetties & Bar Channel)





# CUTTERHEAD DREDGE



Discharge Pipeline

Cutterhead /Intake line



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# CUTTERHEAD



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Source: Great Lakes Dredge and Dock Co.



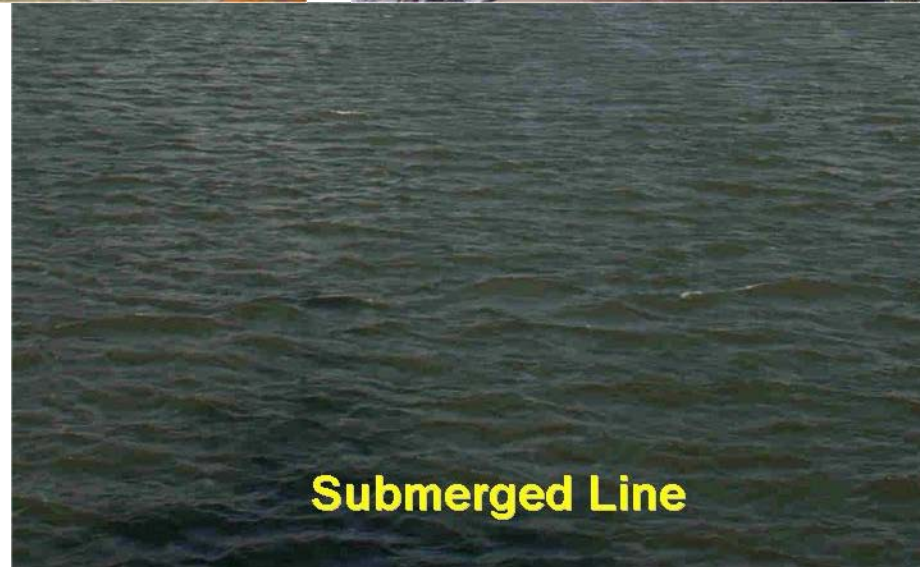
# DISCHARGE PIPELINES



Floating Line



Shore Line



Submerged Line







# BOOSTER PUMPS



Source: Great Lakes Dredge and Dock Co.



Source: GIW





# HYDRAULIC PLACEMENT



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# SPIDER BARGE



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# CUTTERHEAD DREDGES



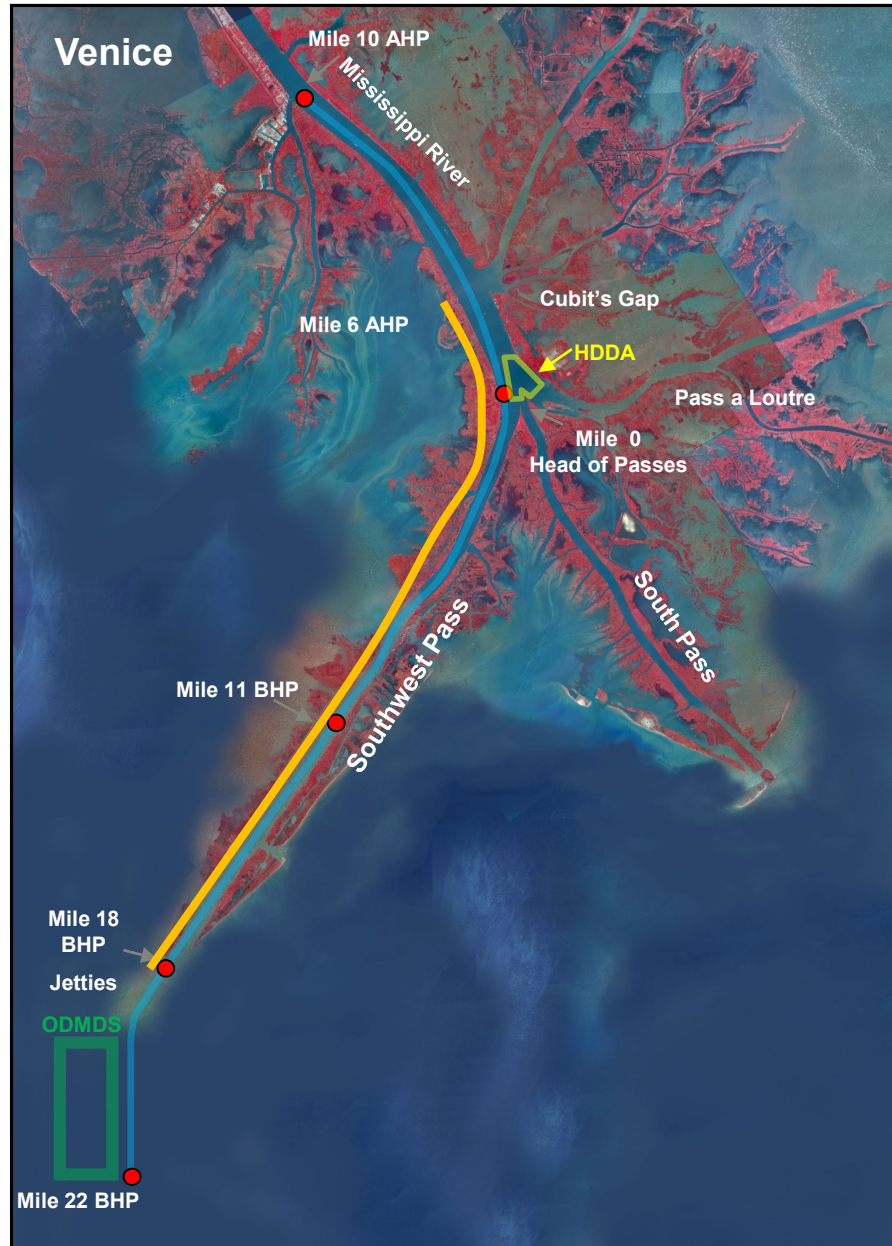
## Advantages

- Capable of excavating most types of materials
- Can pump directly to disposal sites
- Can dredge almost continuously
- Can dredge some rock types without blasting

## Limitations

- Limited capability in rough open water
- Most are not self-propelled
- Difficulty with coarse sand in high currents
- Pipeline can be an obstruction to navigation
- Debris in sediment can reduce efficiency





# CUTTERHEAD DREDGES IN SW PASS

- Applicability in Southwest Pass :
  - River Miles 6 AHP to 18 BHP
  - Significant shoaling, depth exceeding 6 feet across channel
- Higher risk to navigation safety:
  - Cubit's Gap
  - Head of Passes
  - Jetty/bar channel
- Material disposed of in accordance with the current Federal Standard





# O&M DREDGING PROGRAM



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# PURPOSE OF MISSISSIPPI RIVER SHIP CHANNEL O&M

## Maintaining Navigation

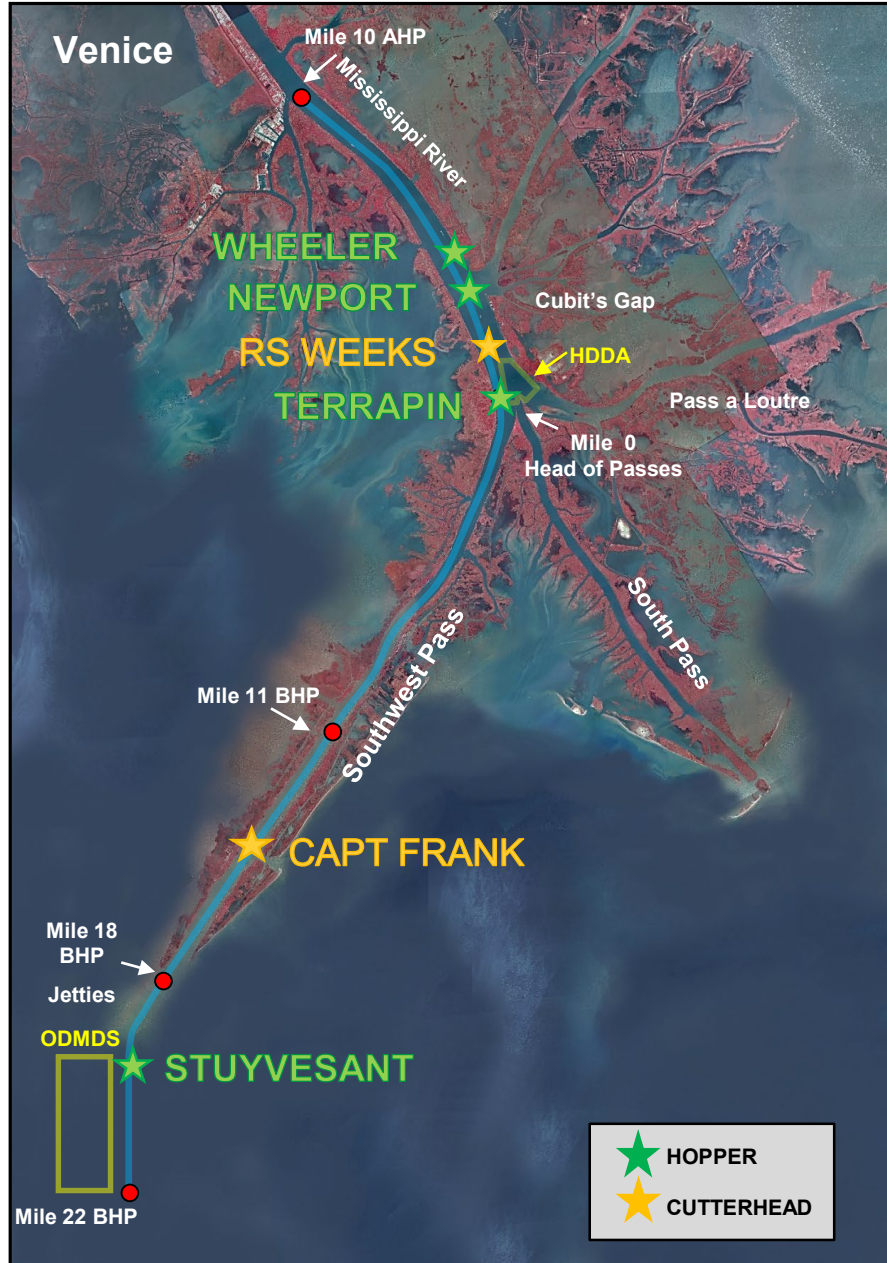
### Operating in “Emergency Mode”

- High river conditions
- Shoaling in navigation channel
- Draft restrictions
- Vessel movements impacted





# “Emergency Mode” Operations, Lower Mississippi River (12 Mar 19)



## CHANNEL CONDITIONS:

- ❖ ALL VESSELS ARE RESTRICTED TO 41 FEET MAXIMUM DRAFT TO ENTER OR EXIT THE MISSISSIPPI RIVER. NO ALTERNATE ROUTES EXIST.
- ❖ ONE WAY TRAFFIC - MILE 1.5 AHP TO 4.5 AHP FOR VESSELS DRAFTING GREATER THAN 40 FEET.
- ❖ ONE WAY TRAFFIC – MILE 153 TO 155 AHP DUE TO BARGE SINKING ON 10 MAR 19 IN THE VICINITY OF BELMONT DEEP DRAFT CROSSING.

## DREDGE STATUS: INTERMITTENTLY DOWN FOR FOG

### ONGOING:

- WHEELER (Red Flag Call Out #3-2019): 1 Mar 19 – 31 Mar 19
- NEWPORT: 28 Nov 18 – 1 Jun 19
- TERRAPIN ISLAND: 17 Feb 19 – 24 Mar 19
- STUYVESANT: 6 Mar 19 – 5 Jun 19
- RS WEEKS: 15 Dec 18 – 1 Apr 19
- CAPTAIN FRANK: 19 Feb 19 – 1 Apr 19

### SCHEDULED:

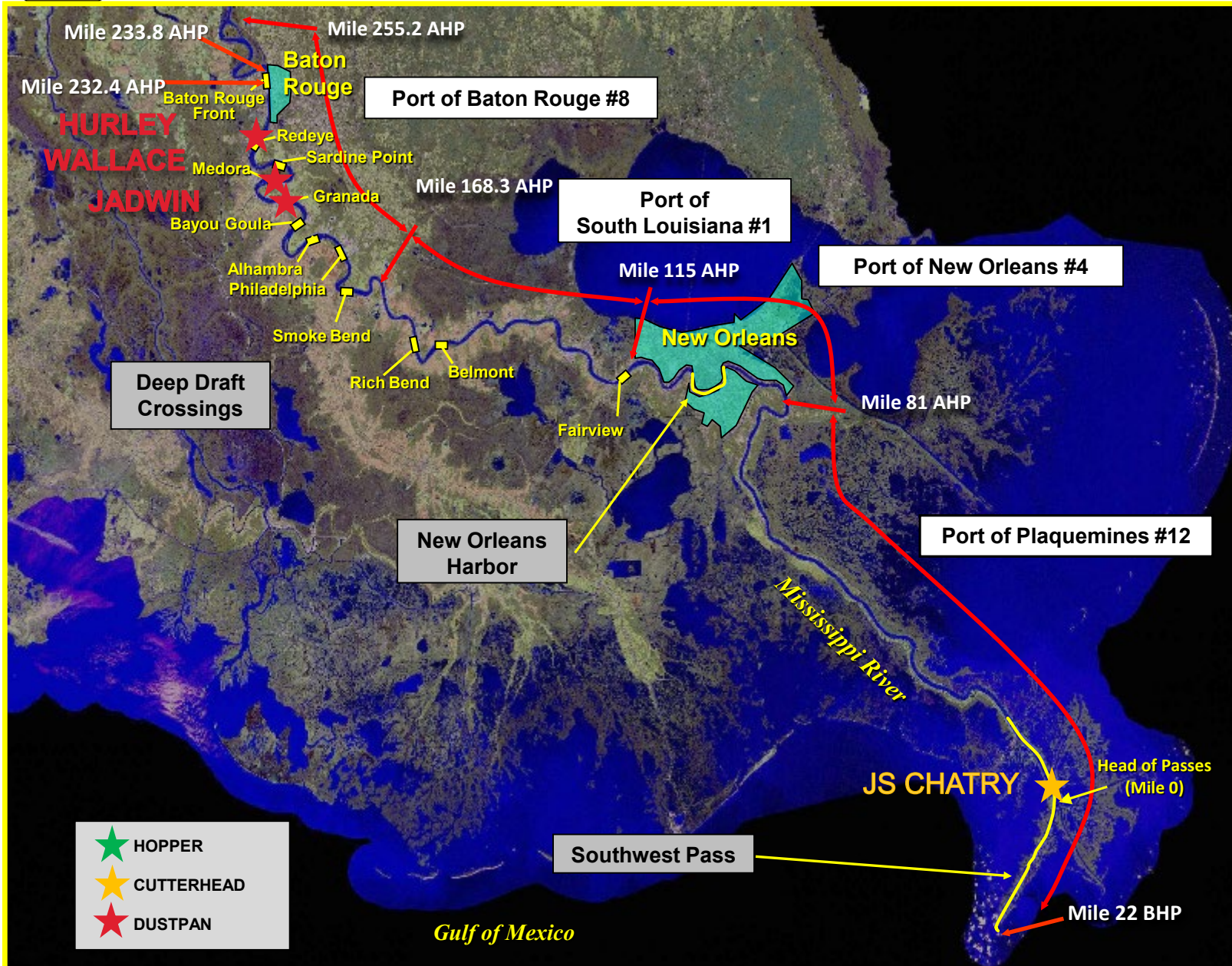
- GLENN EDWARDS: 28 Mar 19 – 1 Jun 19
- BAYPORT: 27 Mar 19 – 24 Apr 19





# Mississippi River Status Update

## 2 December 2019



### CHANNEL CONDITIONS:

- ❖ AS OF 20 SEP 19, THE PILOTS INCREASED THE MAXIMUM DRAFT TO 47 FEET.

### Southwest Pass Dredge Status:

- BID OPENINGS:
  - 5 Nov 19 – SWP Hopper #13-19 – 2 bids unawardable.
    - Converted to RFP 8 Nov & negotiations are ongoing.
  - 20 Nov 19 – Gulf Coast Regional Hopper
    - 1 bid received, Manson Construction, Dredge Newport.

### Hopper Dredge Disposal Area (HDDA):

- JS CHATRY: 19 Nov 19 – 31 Dec 19
  - EW ELLEFSEN substitution: 31 Dec 19 – 1 Mar 20

### Deep Draft Crossings Dredge Status:

Dustpan Dredges –

- WALLACE MCGEORGE – Medora Crossing (Mile 212), EDC 22 Dec.
- JADWIN – Granada Crossing (Mile 205), EDC early 3 Dec 19.
- HURLEY – Redeye Crossing (Mile 224), EDC 4 Dec 19.



# MISSISSIPPI RIVER O&M FUNDING



**\$250-\$300M needed annually to maintain authorized dimensions**

## Total Funding Received

- FY19: \$148M
  - President's Budget: \$89M
  - Additions: \$59M\*
- 5-year average (FY15-19): \$138M
  - President's Budget: \$85M
  - Additions: \$53M\*
- 10-year average (FY10-19): \$122M
  - President's Budget: \$78M
  - Additions: \$44M\*

Approximately  
\$80-\$100M  
annually for  
SW Pass

\* Includes funds from Congressional Conference, Work Plan, Supplemental and Reprogrammings





# DREDGING CHALLENGES



- US Dredging Fleet Capacity
  - Private Commercial Fleet
  - Government Fleet
- Challenges securing needed dredge assets
  - Temporarily realigning/releasing limited fleet to address emergencies
  - Dredge Bids exceeding IGE by 40%+
    - Southwest Pass Hopper Dredge bid opening
    - Houma Navigation Canal (HNC) bid opening
- FY20 Regional Hopper Dredge Contract solicitation
  - Solicitation for a hopper dredge with a defined scope and schedule for dredging in Mississippi River Southwest Pass & Gulfport Bar Channel





# OPPORTUNITIES FOR BENEFICIAL USE



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# SOUTHWEST PASS O&M BENEFICIAL USE

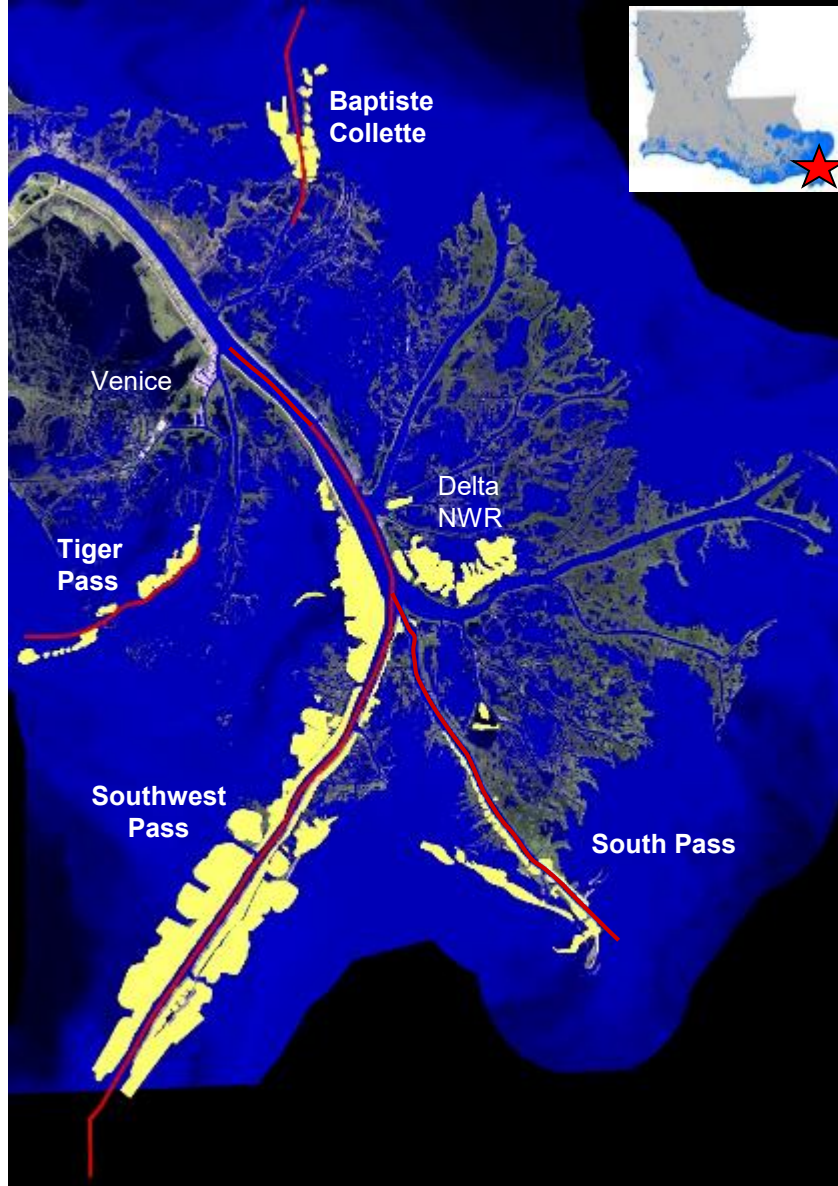
**Since 2009, use of cutterhead dredges and the quantity of material available for beneficial use have significantly increased**

- From 1996-2008, nearly 14 MCY dredged annually
  - Cutterheads accounted for less than 10 percent of quantity dredged
  - 45 percent of dredged material available for beneficial use
- In 2009, in order to increase beneficial placement, use of cutterhead dredges resumed and has increased in the years since
- From 2009 to 2017, nearly 19 MCY dredged annually
  - Cutterheads accounted for 36 percent of quantity dredged
  - **74 percent of dredged material available for beneficial use**
- In 2017, over 24 MCY dredged
  - Cutterheads accounted for 51 percent of quantity dredged
  - **77 percent of dredged material available for beneficial use**





# ***BENEFICIAL USE OF DREDGED MATERIAL***



## **Lower Mississippi River**

### **Coastal Habitat Acres Created**

**Southwest Pass - 20,026 Acres**

**South Pass - 1,971 Acres**

**Tiger Pass - 624 Acres**

**Baptiste Collette - 1,923 Acres**

 **Navigation Channels**

 **Beneficial Use Sites**



# BENEFICIAL USE OF DREDGED MATERIAL

## Head of Passes Hopper Dredge Disposal Area (HDDA) BU Placement

### West Bay

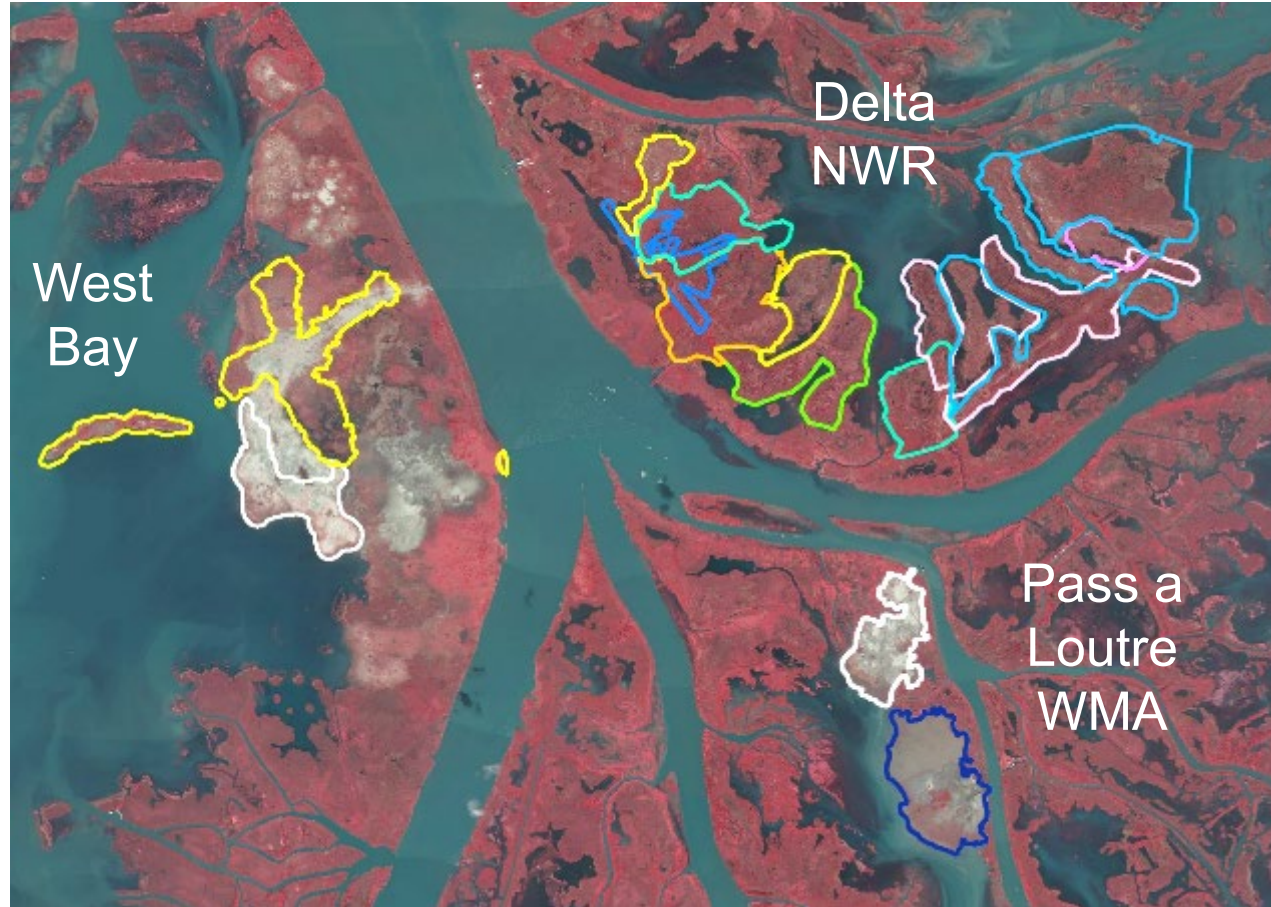
- FY 15 HDDA – 370 Acres
- FY 15 LCA BUDMAT – 80 Acres
- FY 17 LCA BUDMAT – 226 Acres

### Delta NWR

- FY 98 – 197 Acres
- FY 04 – 274 Acres
- FY 07 – 340 Acres
- FY 08 – 388 Acres
- FY 10 – 466 Acres
- FY 11 – 70 Acres
- FY 13 – 851 Acres
- FY 15 – 221 Acres

### Pass a Loutre WMA

- FY 17 N SAWDUST BEND – 178 Acres
- FY 18 S SAWDUST BEND – 285 Acres



West Bay Total = 676 Acres  
 DNWR Total = 2,807 Acres  
 Pass a Loutre WMA Total = 463 Acres





# Miss River, Head of Passes - 1985







# Miss River, Head of Passes - 2015



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Slidell, LA 70368-7833  
A SCW owned and operated business



# SOUTHWEST PASS DREDGING COSTS



Hopper or Cutterhead Dredges:  
\$3.00 - \$3.50/cy

We receive ~\$125M/year on  
~\$250M/year requirement  
OR  
~50% of the requirement





# BENEFICIAL USE BEYOND O&M

- USACE seeks all opportunities to maximize beneficial use of dredge material
- **The Federal Standard** is defined as the least costly, environmentally acceptable, and engineering sound disposal alternative
- If beneficial use costs are within the current Federal Standard, then beneficial placement is 100% Federal cost
- If beyond the current Federal Standard, other authorizations allow Non-Federal Sponsor to fund and/or cost share incremental costs
  - 100% NFS contribution, LCA BUDMAT, CWPPRA, Section 204, Section 1122 of WRDA 16, Other





# LCA BENEFICIAL USE OF DREDGED MATERIAL (BUDMAT) PROGRAM

- Implemented in coastal Louisiana for the beneficial use of material dredged from federally maintained waterways
- \$100 million program
- Cost shared with local sponsor - 75% Fed/25% Non-Fed
- Allows for placement of material beyond the Federal Standard
- Two projects constructed to date:
  - West Bay Diversion Receiving Area
  - Tiger Pass - Phase I
- Projects under study/design:
  - Tiger Pass - Phase II
  - Houma Navigation Canal
  - Calcasieu/Sabine
  - Barataria Waterway
  - Mississippi River Outlets at Venice
  - St. Bernard Parish Wetlands





# LCA BUDMAT – WEST BAY



- Completed June 2016
- Project located in Plaquemines Parish, La
- The NFS was Plaquemines Parish Government
- 2.4M cubic yards placed
  - Dredge material source: HDDA
  - 44 acres of marsh created
  - Crescent shape - 6,135 feet in length
  - Maximum elevation of +4.0 to +4.5 feet NAVD88
  - 300-foot crown width
- Total Cost: \$11.7M
  - Includes O&M funded mob/demob
- Dredging/placement costs: ~\$4.85/cy
- Within 20 years, project is expected to generate 246 acres of marsh and 430 acres of SAV habitat.

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# LCA BUDMAT – WEST BAY



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# LCA BUDMAT – TIGER PASS



- Completed in 2017
- 1.65M cubic yards
  - Dredge material source: HDDA
  - 85 acres of ridge and marsh created
  - 1 mile ridge @ 6.5 elevation, with 500-foot marsh platform
- Included in State Master Plan
- Design paid by Plaquemines Parish Government
- Construction cost shared with PPG, the State of Louisiana and Corps
- Total Cost: \$18.6M
  - Includes O&M funded mob/demob
- Dredging/placement costs:  
~\$11.25/cy

Taken January 13, 2018  
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# LCA BUDMAT – TIGER PASS







# LCA BUDMAT – TIGER PASS



## Tiger Pass "1"

- Source Material – MS River Hopper Dredge Disposal Area (HDDA)
- Material was barged 12 miles, then pumped 2 miles for placement on Spanish Ridge





# LCA BUDMAT – TIGER PASS



## Tiger Pass “1”

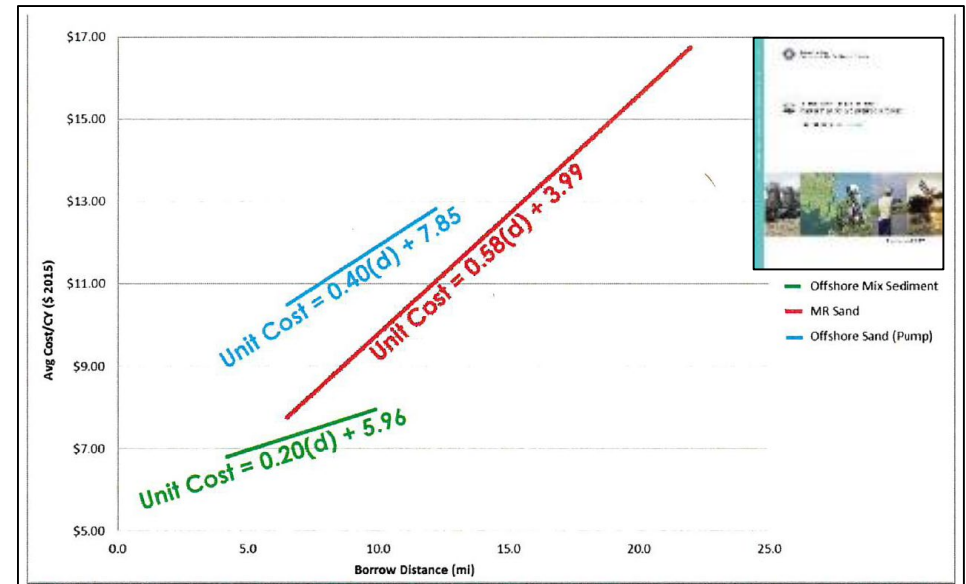
- Hopper Barges were then hydraulically pumped out through discharge pipe to placement site utilizing the Off-loader shown





# SUMMARY OF COSTS

- Hopper or Cutterhead O&M Dredging (Federal Standard): ~\$3.00 - \$3.50/cy
- LCA BUDMAT West Bay dredging and BU: ~\$4.85/cy
  - 3.5-mile transport via pipeline
  - 44 acres at total cost of \$11.7M
- LCA BUDMAT Tiger Pass dredging and BU: ~\$11.25/cy
  - 12-mile transport via barge
  - 85 acres at total cost of \$18.6M
- State Master Plan Costs for dredging and BU, by distance material is pump:  
 $\$[(0.58 * \text{distance pumped}) + 3.99]/\text{cy}$ 
  - 5 Miles: \$6.89/cy
  - 10 Miles: \$9.79/cy
  - 20 Miles: \$15.59/cy



Source: 2017 Coastal Master Plan





# MISSISSIPPI RIVER DEEPENING



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# Mississippi River Baton Rouge to the Gulf of Mexico





# MISSISSIPPI RIVER SHIP CHANNEL, GULF TO BATON ROUGE, DEEPENING STUDY



- USACE and LaDOTD partnership
- A Director's Report was signed on 2 Aug 2018
- Confirmed the economic justification and environmental compliance of deepening the Mississippi River Ship Channel
- Recommends a 50-foot channel from the Gulf of Mexico through the Port of Baton Rouge
- Total cost of \$245M over multiple years
  - Dredging: \$165M
  - Relocations: \$80M
- B/C ratio is 7.2
- Industry stakeholders have expressed interest, including contributing funds, to advance the project





# MISSISSIPPI RIVER SHIP CHANNEL DEEPENING CONSTRUCTION FUNDING REQUIREMENTS, BY YEAR (IN MILLIONS OF DOLLARS)

Year	Dredging						Utility Relocations			Total Funding Requirements (Dredging and Relocations)			
	Southwest Pass			Crossings			Non-Federal Funding	Utility Owner	Total Amount	Federal	Non-Federal	Utility Owners	Total Amount
	Federal Funding	Non-Federal Funding	Total Amount	Federal Funding	Non-Federal Funding	Total Amount							
1	\$21.00	\$7.00	\$28.00							\$21.00	\$7.00	\$0.00	\$28.00
2	\$21.00	\$7.00	\$28.00				\$8.00	\$8.00	\$16.00	\$21.00	\$15.00	\$8.00	\$44.00
3	\$21.00	\$7.00	\$28.00				\$8.00	\$8.00	\$16.00	\$21.00	\$15.00	\$8.00	\$44.00
4	\$12.00	\$4.00	\$16.00	\$3.00	\$1.00	\$4.00	\$10.00	\$10.00	\$20.00	\$15.00	\$15.00	\$10.00	\$40.00
5				\$3.00	\$1.00	\$4.00	\$14.00	\$14.00	\$28.00	\$3.00	\$15.00	\$14.00	\$32.00
6				\$21.75	\$7.25	\$29.00				\$21.75	\$7.25	\$0.00	\$29.00
7				\$21.00	\$7.00	\$28.00				\$21.00	\$7.00	\$0.00	\$28.00
<b>Total</b>	<b>\$75.00</b>	<b>\$25.00</b>	<b>\$100.00</b>	<b>\$48.75</b>	<b>\$16.25</b>	<b>\$65.00</b>	<b>\$40.00</b>	<b>\$40.00</b>	<b>\$80.00</b>	<b>\$123.75</b>	<b>\$81.25</b>	<b>\$40.00</b>	<b>\$245.00</b>

- Dredging: 75% Federal and 25% Non-Federal (LaDOTD) cost share
- Relocations: 100% Non-Federal cost (LaDOTD and Utilities)
- Schedule informed by anticipated Fed/Non-Fed funding allocations





# CLOSING REMARKS

- Nation depends on Mississippi River for economic prosperity
- Challenges/opportunities in maintaining navigation
- Future of Lower Mississippi River

