

# PAST, PRESENT AND FUTURE OF MEXICO BEACH, THE UNFORGETTABLE COAST

**Michael R. Dombrowski, P.E., President, MRD Associates, Inc.**  
Caroline MacLeod, E.I., Coastal Engineer, Coastal Protection Engineering



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# BACKGROUND

## PAST

## PRESENT

## FUTURE

# BACKGROUND



# MEXICO BEACH, FLORIDA

- Bay County, Florida
- 30 miles east
- Incorporated in 1967
- Population 916 (2020)
- Tourism
- Two Fishing Tournaments
  - GollyWhopper Classic in June
  - MBARA Kingfish in July

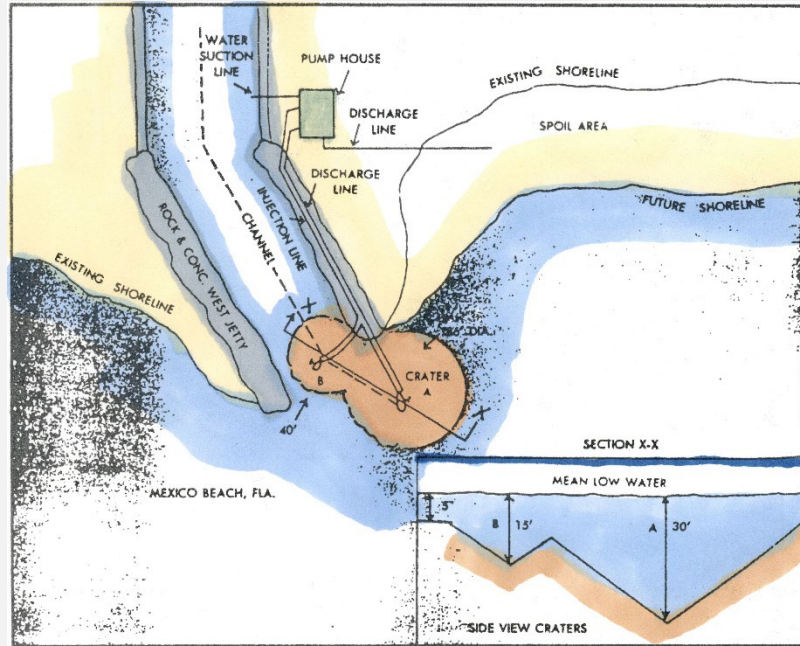


# MEXICO BEACH INLET HISTORY



- Inlet located at the west end.
- Created in the early 1960's.
- Channel follows the historic path of Salt Creek.
- Interior channel along the north side of US 98 and exits 1.9 miles to the east of the inlet channel.
- Supports recreational fishing and diving, and charter boats.
- Maintained by a City owned suction head dredge since 1978.

# MEXICO BEACH INLET HISTORY



- 1960 – Initial inlet construction
- 1971 to 1974 – Dragline (100,000 cy)
- 1974 – CERC USACE Truck mounted jet pump field experiment.
- 1975 – State grant to purchase a fixed twin jet pump system.
- 1975 – Hurricane Eloise
- 1976 – City owned jet pump
- 1978 to present - City owned suction head dredge.

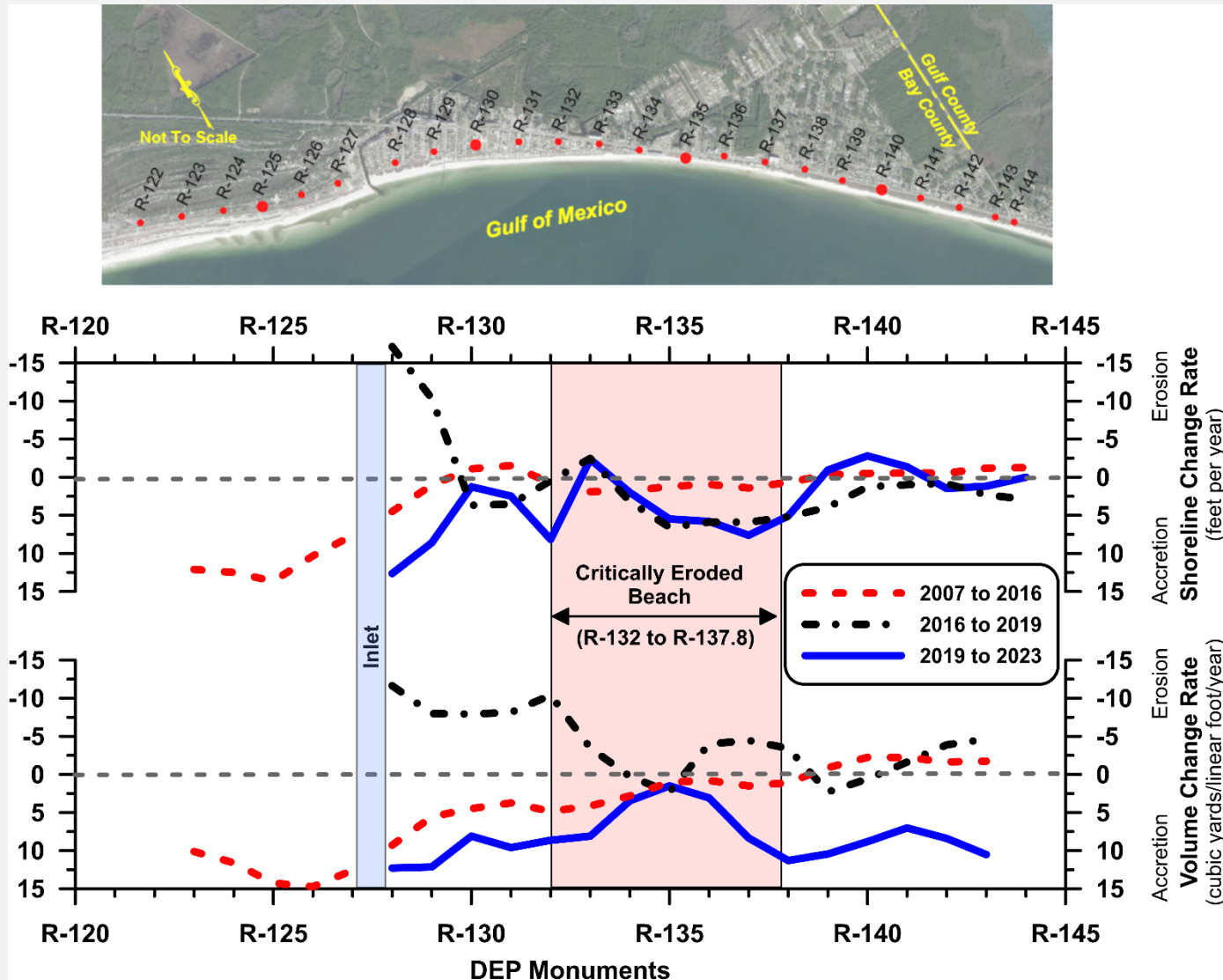


# MEXICO BEACH INLET ISSUES



- Discharge pipe less than 350 feet from the inlet.
- West jetty middle section is not sand tight.
- East jetty is a pile of loose rubble and is not sand tight.
- Deposition from the downdrift shoreline and recycling dredged material back into the inlet.
- Stockpile of dredged material on the downdrift shoreline and not bypassed to the eroding shoreline.

# TOTAL VOLUME AND SHORELINE CHANGE RATES





# CRITICALLY ERODED SHORELINE (R-132 to R-137.8)

Pursuant to rule 62B-36.002(5), Florida Administrative Code (F.A.C.), defines “critically eroded shoreline” as, “a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost.”



# STUDY RECOMMENDATIONS

- Inlet Management Plan (Taylor Engineering, Inc., 1999)
  - Relocation of bypassing placement area 500 feet to the east.
  - Replace east jetty.
  - Continue the present maintenance dredging operations.
- Preliminary Design Assessment (MRD, 2004)
  - Purchase a dredge-head mounted on a crawler crane.
  - Extend west jetty and sand-tighten.
- Inlet Feasibility Study and Beach Management Plan (MRD, 2008)
  - Increase bypassing rate by 22,200 yds<sup>3</sup>/yr (total of 57,000 yds<sup>3</sup>/yr).
  - Beach restoration project - “critically eroded” shoreline (R-132 to R-137.8).
  - Truck haul stock-piled sand to the “critically eroded” shoreline.

# STUDY RECOMMENDATIONS

- Feasibility Study Beach Restoration and Inlet Bypassing (MRD, 2017)
  - Truck haul stock-piled sand to the “critically eroded” shoreline.
  - East jetty improvements.
  - Extend dredge discharge further to the east.
- Mexico Beach Inlet Management Plan (DEP, 2024)
  - Comprehensive beach and inlet hydrographic monitoring program.
  - Sand bypassing shall be performed from the inlet system, including from the inlet channel, the ebb shoal and the west beach sand trap, with stockpiled placement on the adjacent gulf-front beach to the east of the inlet between the east jetty and R-128. The stockpiled material may be trucked to the “critically eroded” shoreline between R-132 and R-137.8.
  - Bypass an average of 32,400 yds<sup>3</sup>/yr.
  - Complete the construction of the authorized east jetty.

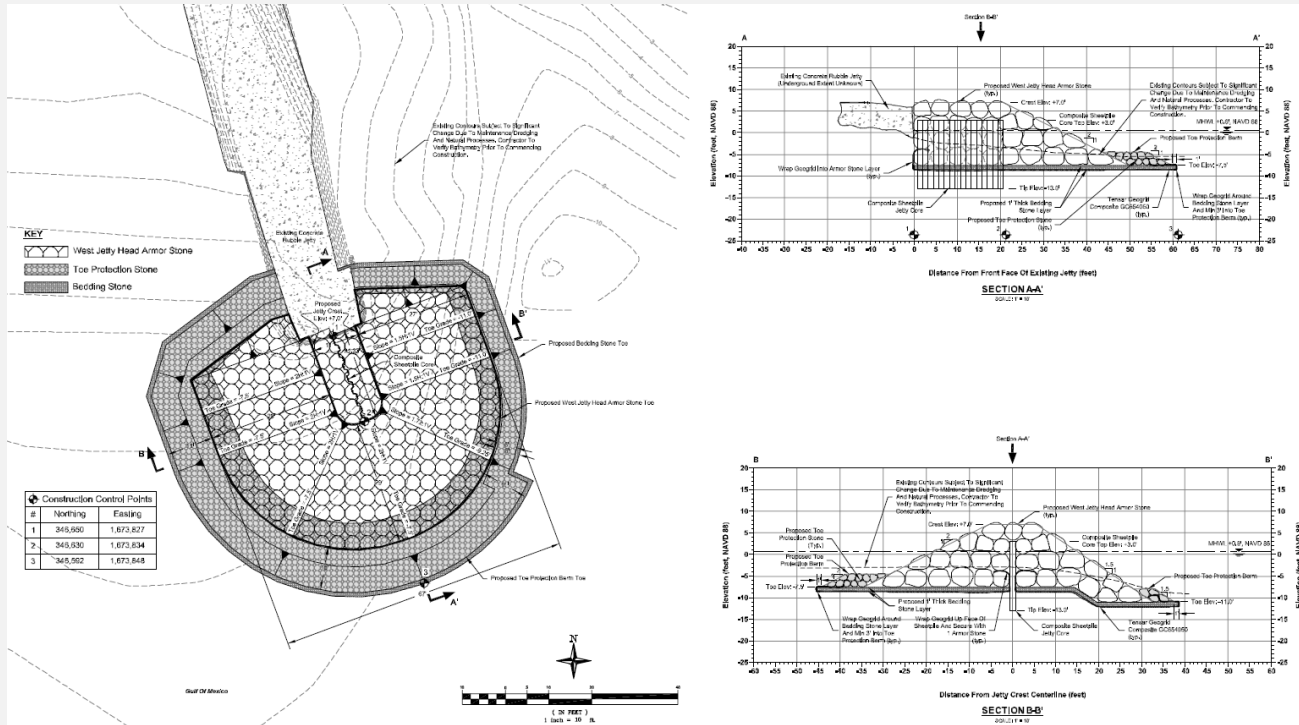


# SUMMARY OF RECOMMENDATIONS

- West and east jetty improvements.
- Extend dredge discharge pipe to the east.
- Maintain an average of 32,400 yds<sup>3</sup>/yr bypassing rate.
- Continue the present maintenance dredging operations.
- Purchase a dredge-head mounted on a crawler crane.
- Sand bypassing, use stockpiled sand on the adjacent beach to the east of the inlet between the east jetty and R-128, and trucked to the “critically eroded” shoreline between R-132 and R-137.8.
- Beach restoration project - “critically eroded” shoreline (R-132 to R-137.8).
- Comprehensive beach and inlet hydrographic monitoring program.

# PAST

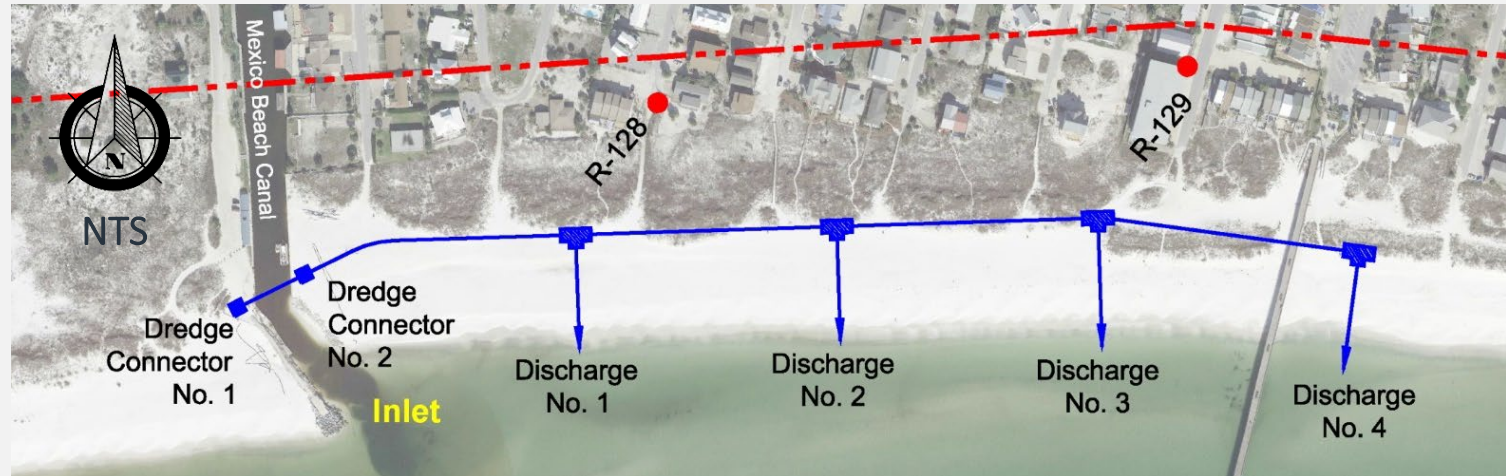
# WEST JETTY IMPROVEMENTS



- Constructed in 2008
- 60-foot extension
- City attempted to sand tighten box culverts



# DREDGE PIPE WITH MULTIPLE DISCHARGE POINTS



- Permitted in 2009, installed in 2010.
- Extended discharge 2,000 feet to the east.
- Installed under the inlet and buried 3 feet below grade on east side per USFWS conditions.
- Difficult to clear clogged pipeline.

NTS

# UPDRIFT SEDIMENT TRAP AND CHANNEL



- DEP/USACE Permits – 2007 and 2009
- Dredge west beach sand trap.
- Maintenance dredge channel: 658' long x 50' wide, -8' NAVD88 deep with 2' allowable over dredge.
- Permit authorizes an average annual of 250,000 yds<sup>3</sup>/yr of the dredged, beach quality sand on the eastern (downdrift) beach below the mean high-water line.
- Stockpile dredged material (DMMA).

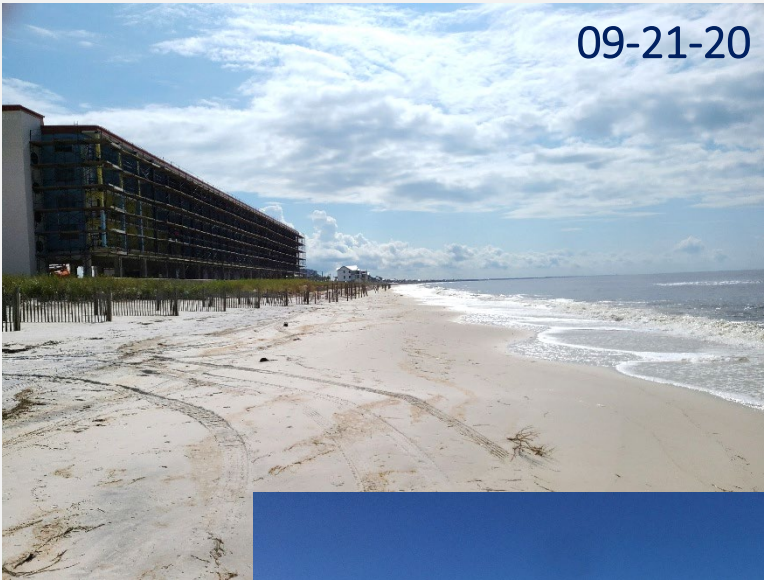


# SAND BYPASSING – TRUCK HAUL



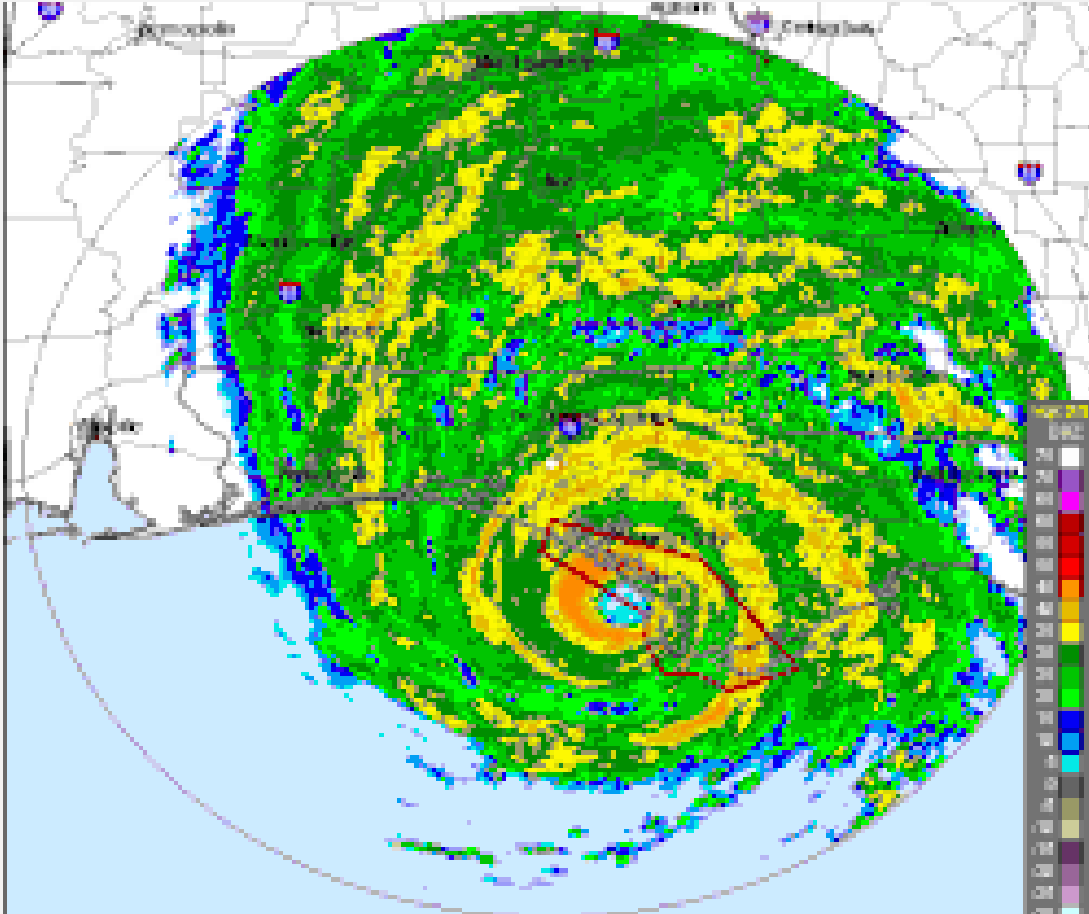


# SAND BYPASSING – TRUCK HAUL



- DEP Permit Modification – 2019
- 2021 implementation of the inlet bypassing of sand stockpiled to the east of the inlet.
- Trucked haul sand to the “critically eroded” shoreline (R-132 to R-137.8).
- 18,750 yds<sup>3</sup>; 4,750 feet (0.9 miles).
- Sand placed above the MWH line.
- Construction cost: \$397,510

## CATEGORY B - FEMA BERMS



- 1998 and 2006
  - 121,820 yds<sup>3</sup>
  - Total cost: \$2.2 Million
- 2008 – Hurricane Gustav
  - Constructed in 2009
  - 14,345 yds<sup>3</sup>; 9,393 feet (1.8 miles)
  - R-128.5 to R-138
  - Total cost: \$780,000
- 2018 – Hurricane Michael
  - Constructed in 2019
  - 97,000 yds<sup>3</sup> ; 16,200 feet (3.1 miles)
  - R-127.5 to R-144
  - 155,320 native dune plants
  - Total cost: \$4.6 Million

# NEW DREDGE



Dredge-head mounted  
on a mobile crane



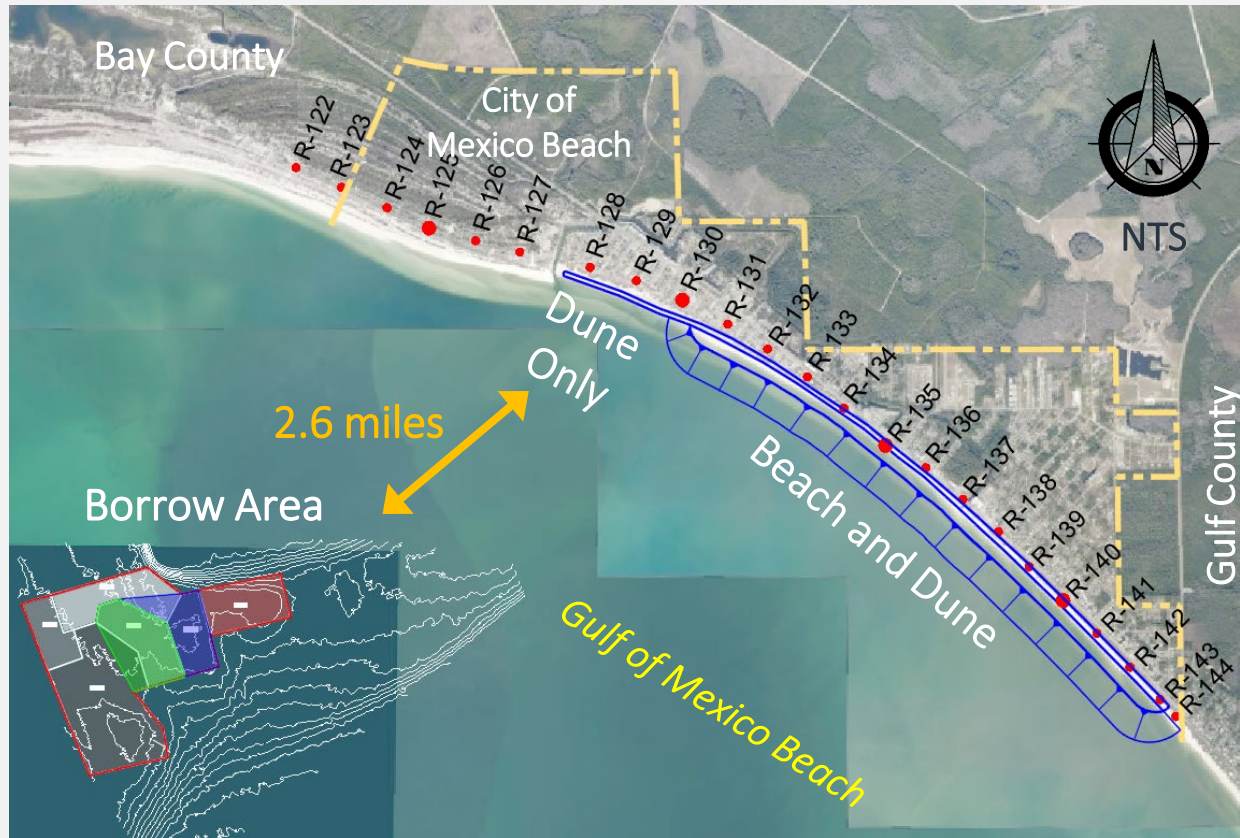
Old and New City-owned dredge (2024)



# PRESENT



# BEACH RESTORATION PROJECT



- 3.1+/- miles (R-127.5 to R-144)
- Total volume: 920,000 yds<sup>3</sup>
- Dune only (R-127.5 to R-130)
  - 0.5 miles; 12,000 yds<sup>3</sup>
- Beach and dune (R-130 to R-144)
  - “Critically Eroded” (R-132 to R-137.8)
  - 1.6 miles; 908,000 yds<sup>3</sup>
- 618,000 native dune plants
- FRS Shell Extractor
- Weeks Marine; Bid \$27,180,950
- Commence pumping February 5<sup>th</sup>
- Completion by April 15<sup>th</sup>



# OFFSHORE BORROW AREA

- 2.7 miles Southwest of R-129.
- Dredge cut from -24.5 ft to -28.0 ft NAVD88.
- Total 4.27 million cubic yards.
- Up to 1.5 million cubic yards to construct the initial project.

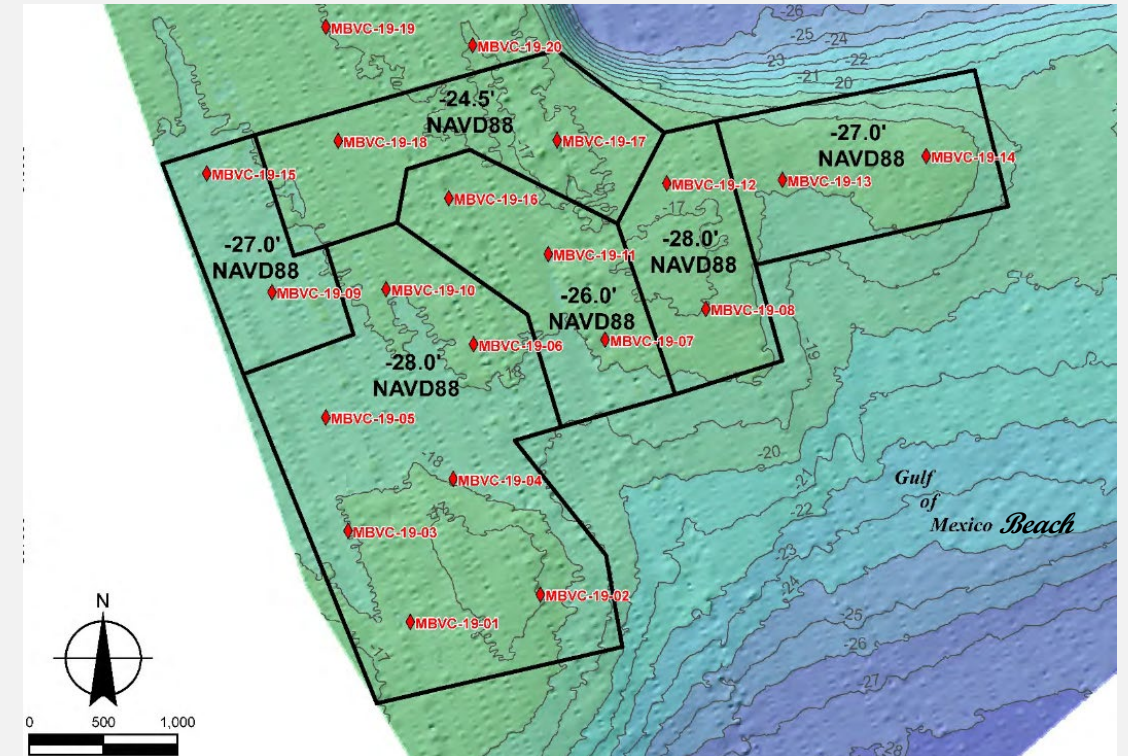
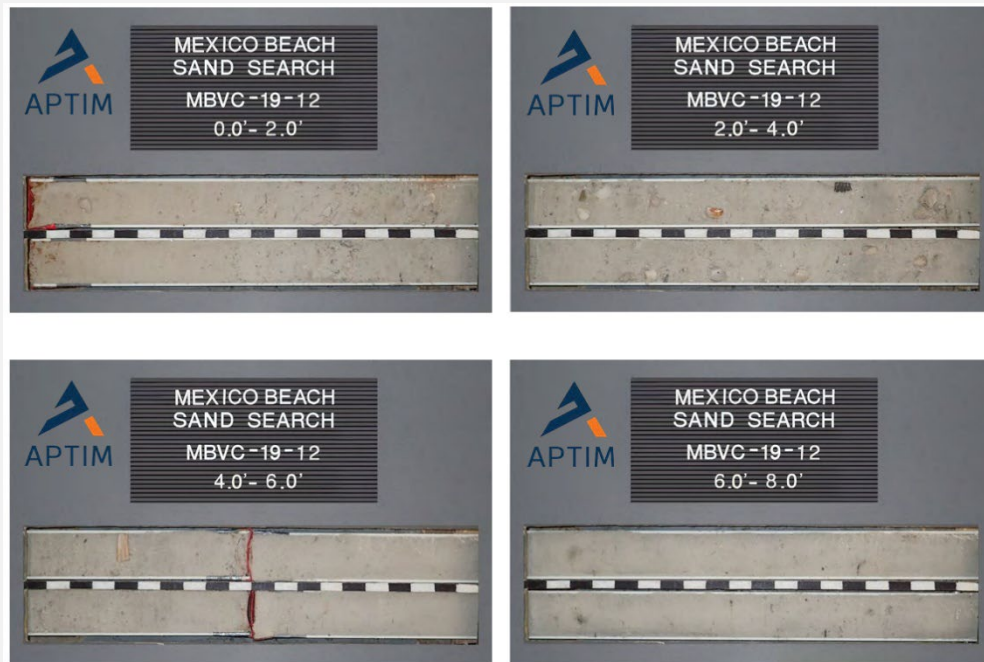
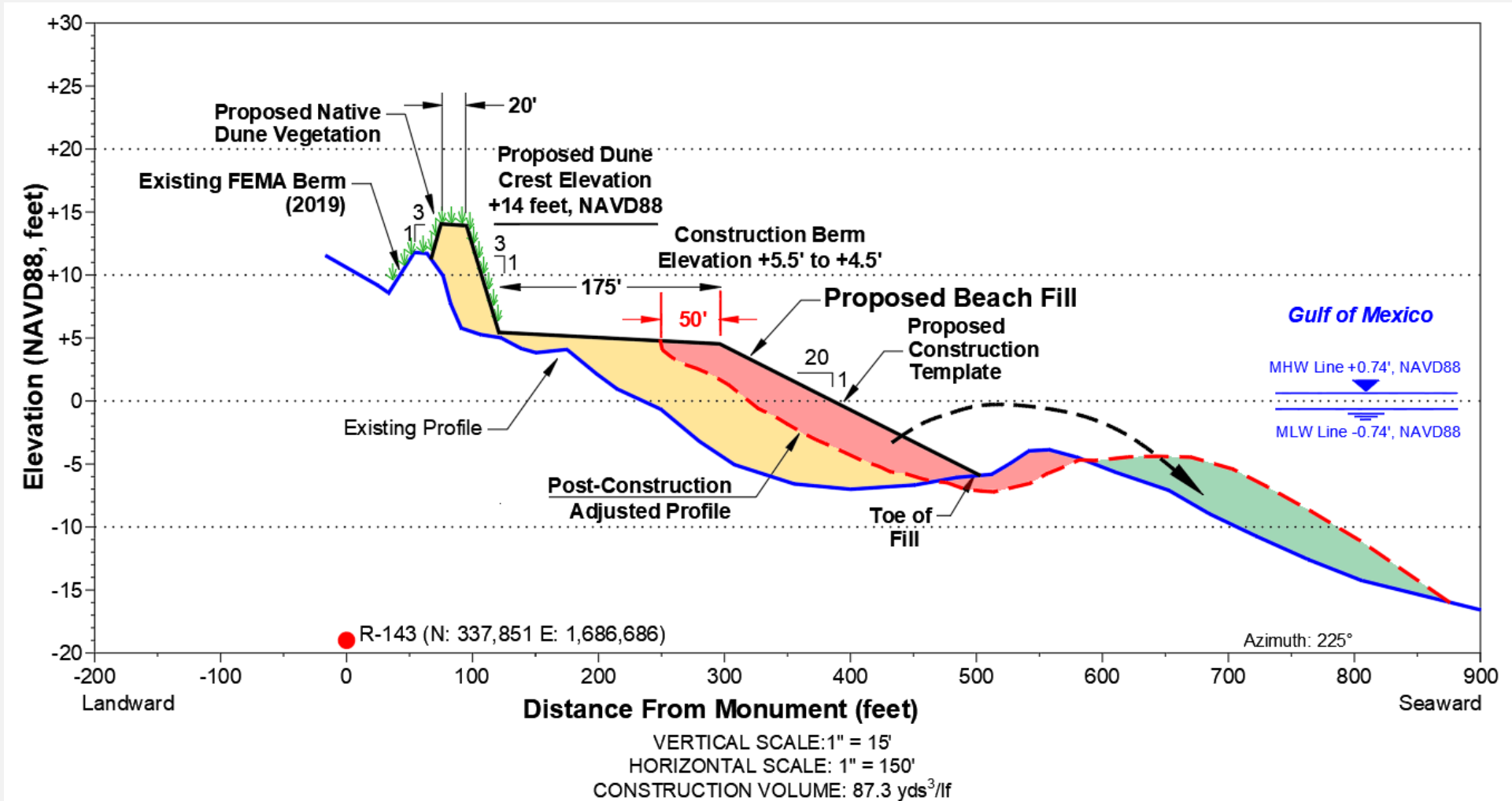


Table 6: Beach and borrow area characteristics.

Borrow Area	Carbonate Content <sup>1</sup>	Mean Grain Size <sup>2</sup>	Sorting <sup>2</sup>	Fines <sup>3</sup>	Average Wet Munsell Color Value <sup>4</sup>
	(%)	(mm) (phi)	(phi)	(%)	
<b>Mexico Beach Borrow Area</b>	2.00	0.25 (1.99)	0.84	0.89	8
<b>Mexico Beach (R-130 to R-142)</b>	1.53	0.25 (2.02)	0.69	9.68	6



# CONSTRUCTION TEMPLATE





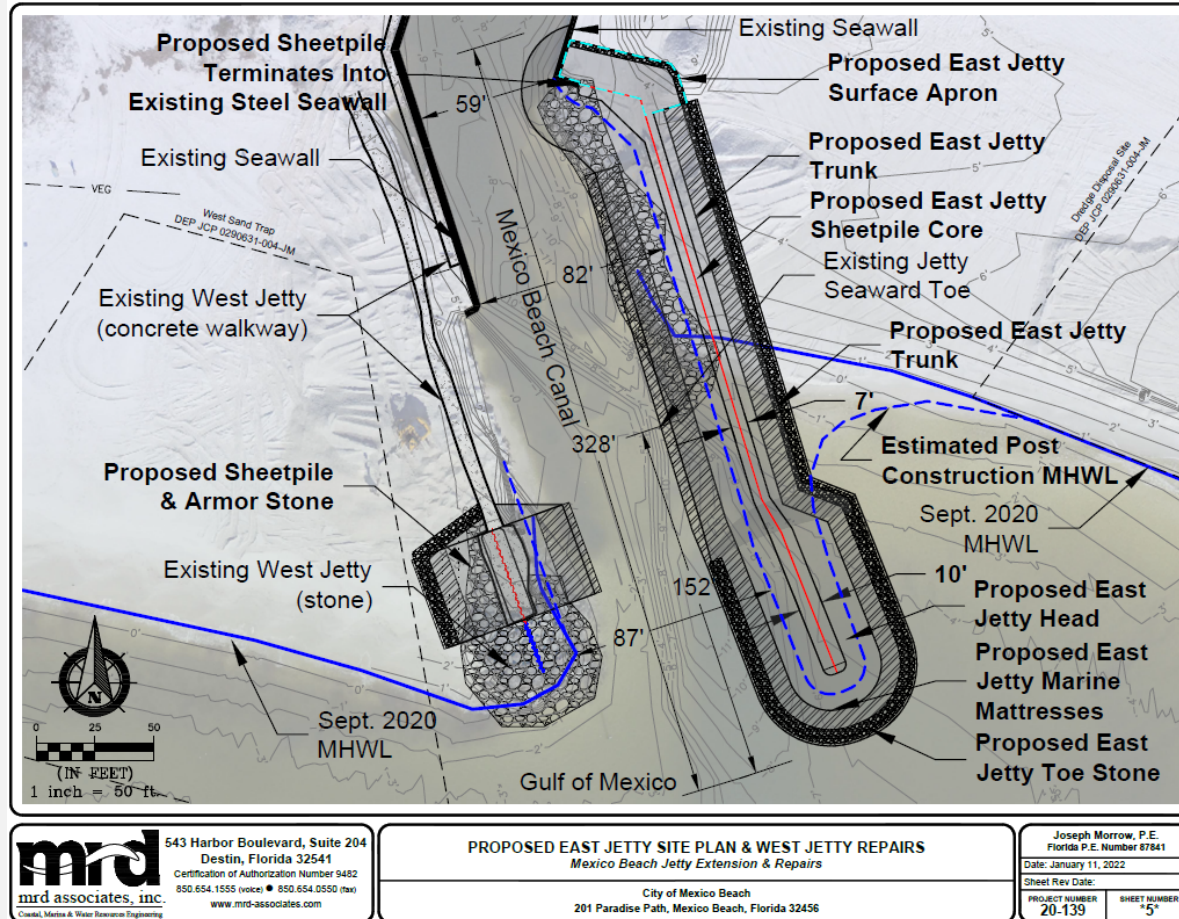
# FUTURE

# MEXICO BEACH JETTIES



- Sand tighten the west jetty.
- Construct the east jetty.
- Reduce the volume of sand transported back into the channel.
- Reduce maintenance dredging.
- Improve safe navigability.

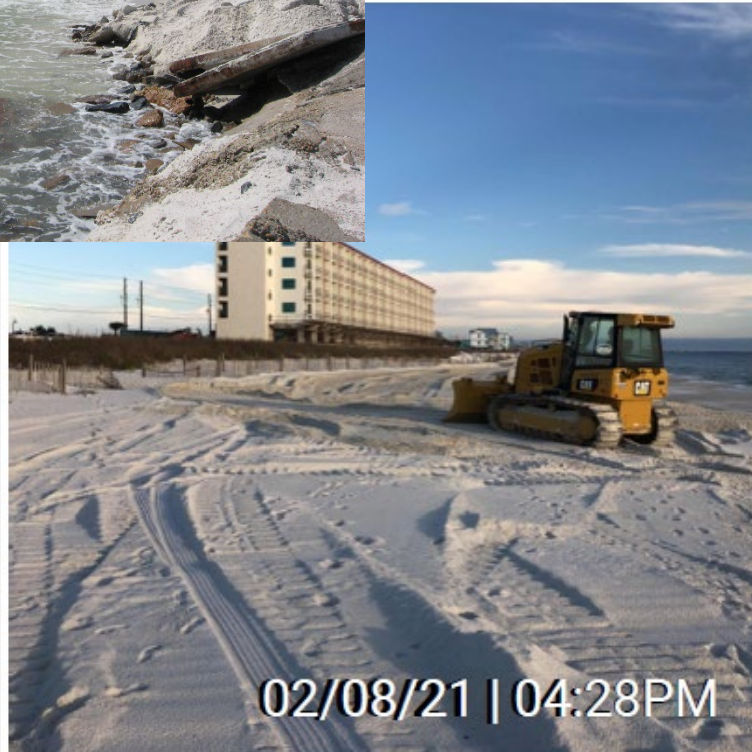
# MEXICO BEACH JETTIES



- East jetty 339 feet along centerline
- West jetty middle section: 42 feet
- Sheet pile core: 290 feet
- Head Armor Stone  $W_{50}$ : 3 tons
- Armor/Toe Stone: 11,600 tons
- Marine Mattress: 9,800 sf
- Bedding Stone: 1,650 tons
- Estimated cost: \$3.9 million
- FEMA Funded



## OTHER PROJECTS

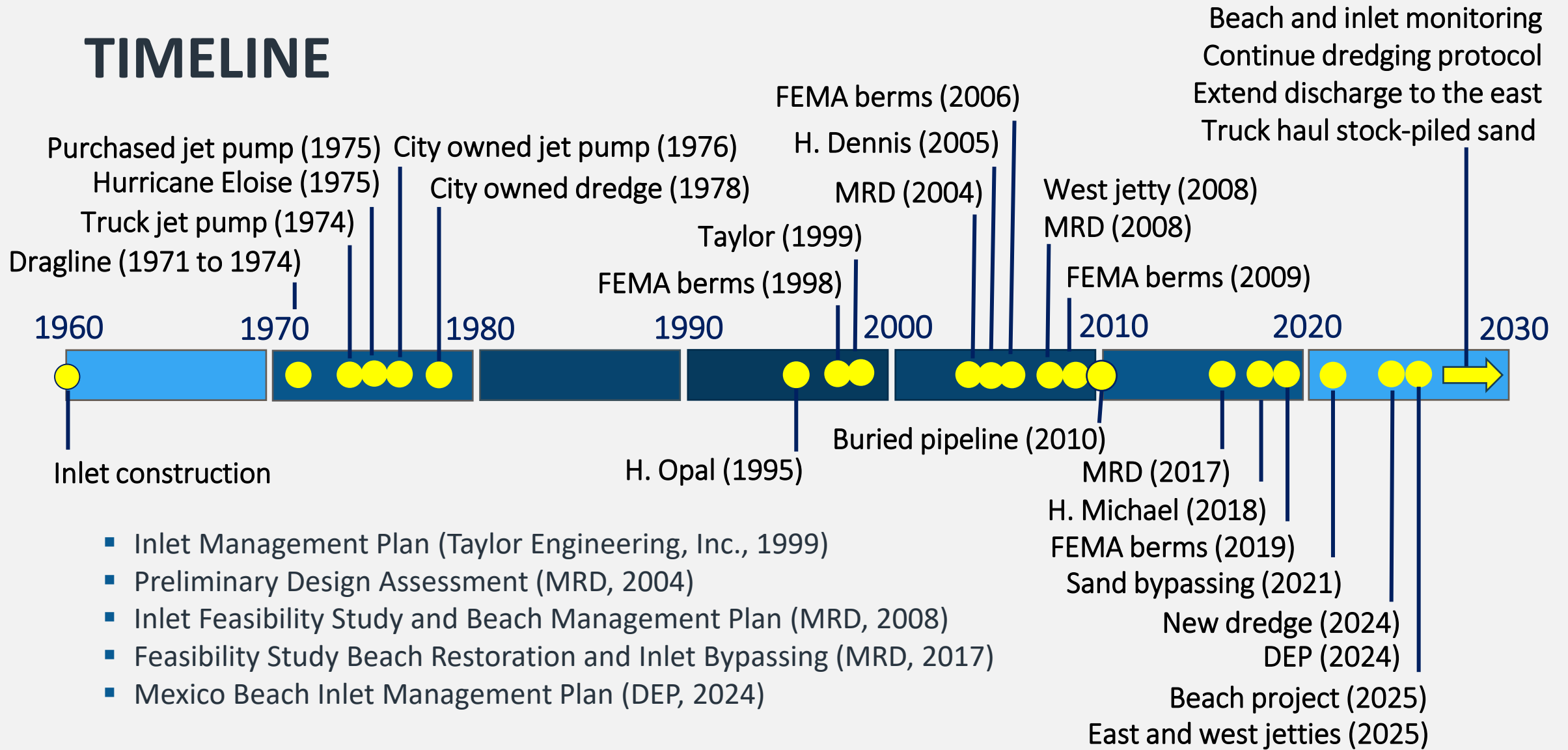


- Beach and inlet monitoring.
- Continue the current dredging protocol to maintain 32,400 yds<sup>3</sup>/yr bypassing rate.
- Extend discharge to the east.
- Conduct periodic truck haul bypassing to the “critically eroded” shoreline using the stock-piled sand.

# SUMMARY OF RECOMMENDATIONS

- West and east jetty improvements. ✓
- Extend dredge discharge pipe to the east. ✓
- Maintain an average of 32,400 yds<sup>3</sup>/yr bypassing rate. ✓
- Continue the present maintenance dredging operations. ✓
- Purchase a dredge-head mounted on a crawler crane. ✓
- Sand bypassing, use stockpiled sand on the adjacent beach to the east of the inlet between the east jetty and R-128, and trucked to the “critically eroded” shoreline between R-132 and R-137.8. ✓
- Beach restoration project - “critically eroded” shoreline (R-132 to R-137.8). ✓
- Comprehensive beach and inlet hydrographic monitoring program. ✓

# TIMELINE





A photograph of a sunset over the ocean. The sun is a bright yellow orb in the center of the sky, surrounded by soft, orange and yellow clouds. The ocean is a deep blue-grey color with gentle waves. In the foreground, a person's feet are visible, resting on a metal railing or deck. The feet are bare, and the person is wearing a blue and white patterned bracelet on their left wrist. The text "Au revoir!" is superimposed in the center of the image in a bold, blue, italicized font.

***Au revoir!***

# THANK YOU!



**Michael Dombrowski, P.E.**

**President**

**MRD, A Coastal Protection Engineering Company**

Mobile: 850.598.1545

[mdombrowski@coastalprotectioneng.com](mailto:mdombrowski@coastalprotectioneng.com)

**Caroline MacLeod, E.I.**

**Coastal Engineer**

**MRD, A Coastal Protection Engineering Company**

Mobile: 410.739.9312

[cmacleod@coastalprotectioneng.com](mailto:cmacleod@coastalprotectioneng.com)

