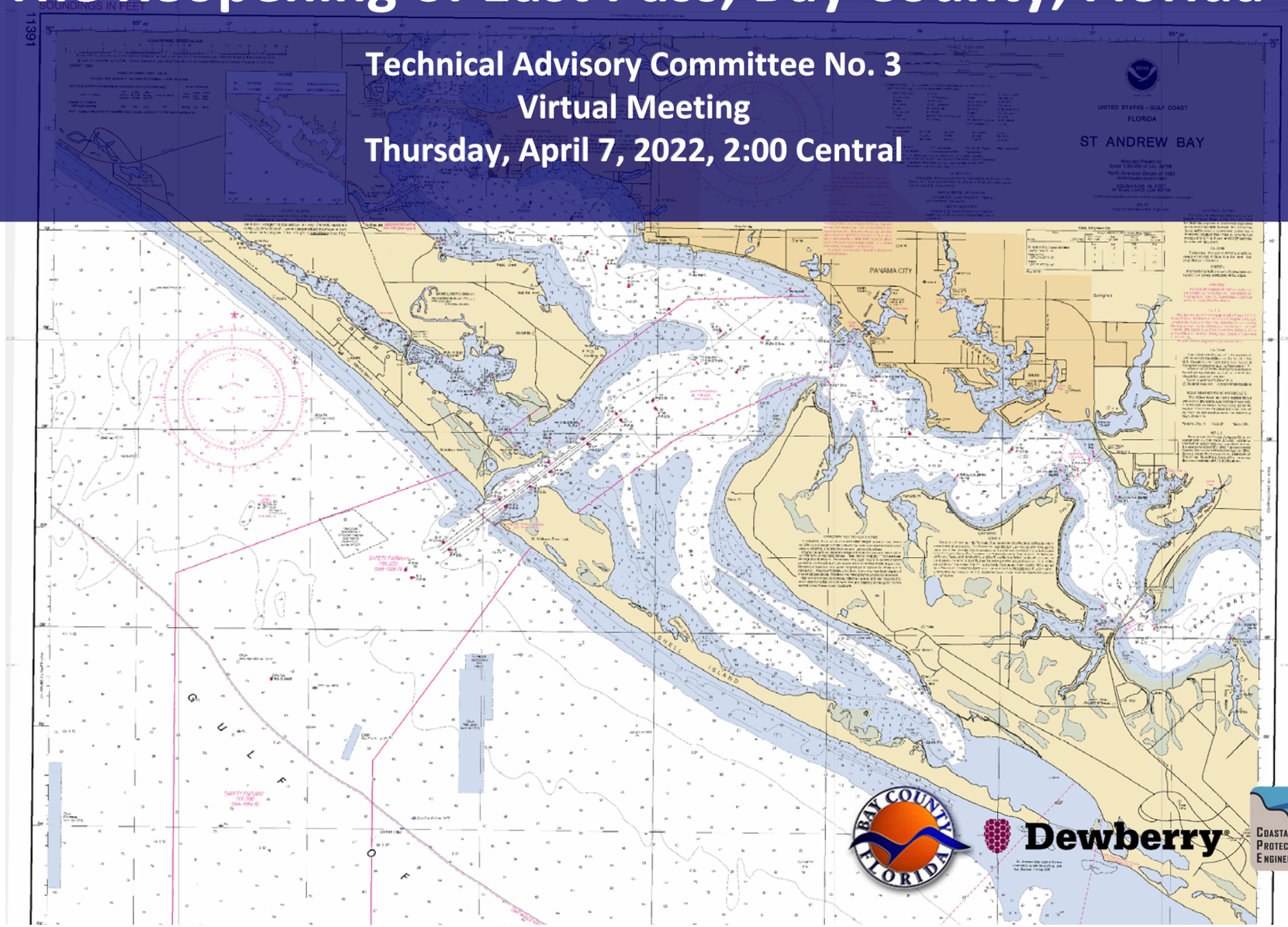
The Reopening of East Pass, Bay County, Florida

Technical Advisory Committee No. 3
Virtual Meeting
Thursday, April 7, 2022, 2:00 Central



BAY COUNTY FLORIDA

Dewberry

COASTAL PROTECTION ENGINEERING

mrd associates, inc.
Coastal Engineering

Agenda

- **Introductions**
- **Project Overview**
- **Schedule**
- **Presentation**
  - Model Developments
  - Preliminary Alternative Analysis
  - Preferred Alternative Analysis
  - Additional Considerations
- **Discussion**

Project Overview

It is the goal is to develop a **feasibility study, preliminary design and permitting for re-opening of the historic East Pass in St. Andrew Bay to a natural, non-armored channel**.

The project approach is to divide the scope of work into three phases to achieve the goals in an efficient and cost-effective manner:

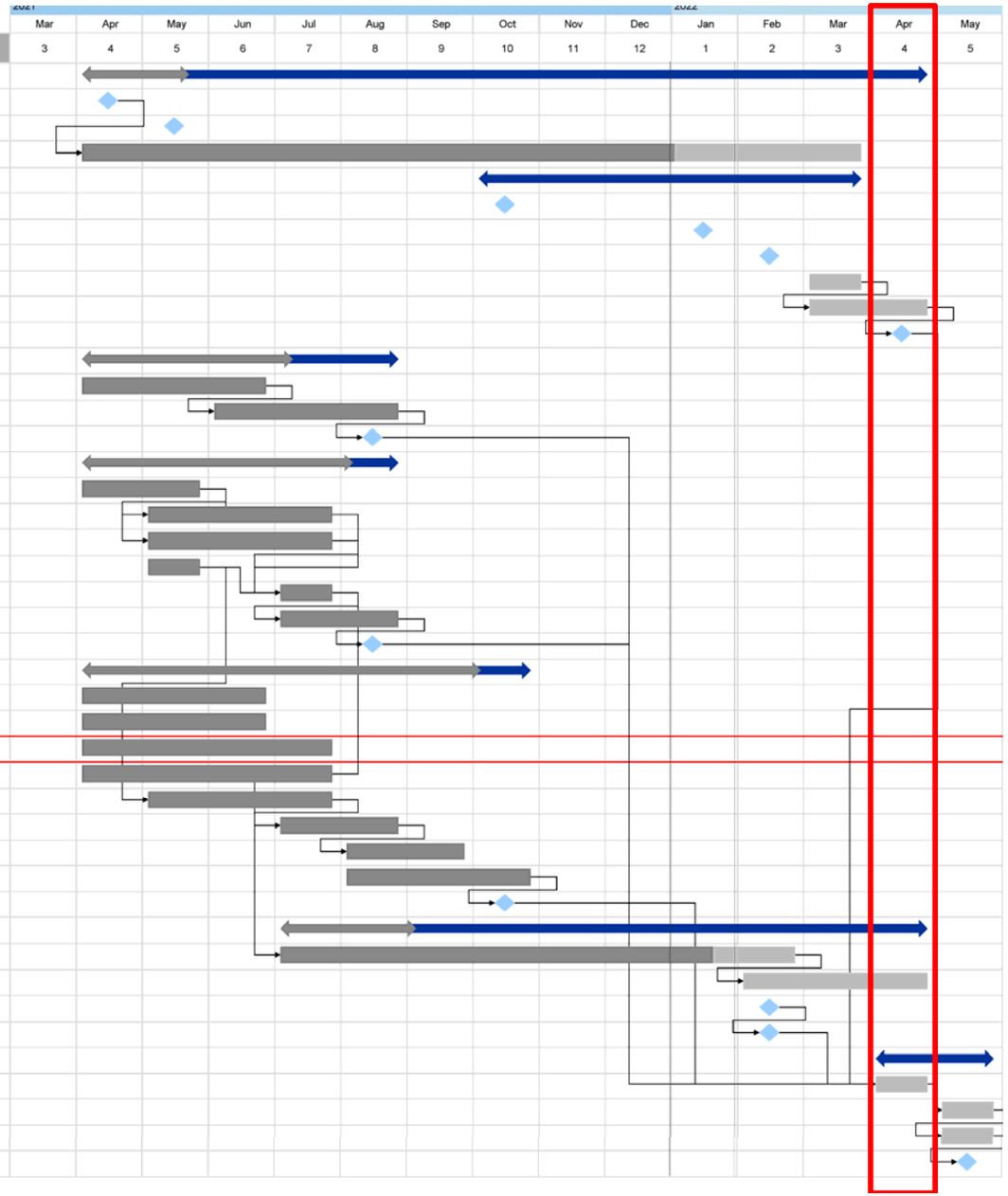
Phase I - Feasibility and Design Study – Year 1
Phase II.A - Permit Support Documentation, Applications and Processing – Year 2,3,4
Phase II.B - Environmental Assessment/ Environmental Impact Statement (EA/EIS) – Year 2,3,4

The objectives below are the basis for the issuance of a State of Florida permit under Rule 62B-41.005 (11) and (12), Florida Administrative Code (FAC) and it is understood that the County desires to achieve these objectives:

a) The inlet will be hydraulically stable under normal conditions; and,
b) The inlet will balance the sediment budget such that beach restoration and nourishment of the adjacent beaches, or other forms of shoreline stabilization, including jetties, are not required.
c) Restore and enhance water quality within St. Andrew Bay.
d) Not result in significant adverse impacts to endangered species.
e) Provide a Public Benefit(s).
f) Not have an adverse impact on the existing St. Andrew Bay Entrance Channel.
g) Qualify for the necessary regulatory permits from the Florida Department of Environmental Protection and the U.S. Army Corps of Engineers.

Schedule

WBS	Task Name	Start	Finish	Duration
1	**Project Planning and Administration**	**Wed 14-Apr-21**	**Mon 11-Apr-22**	**286**
1.1	Notice to Proceed	Wed 14-Apr-21	Wed 14-Apr-21	1
1.2	Public Meeting	Thu 20-May-21	Thu 20-May-21	1
1.3	Project Coordination	Thu 15-Apr-21	Thu 31-Mar-22	251
1.4	**Technical Advisory Committee (TAC)**	**Thu 14-Oct-21**	**Mon 28-Mar-22**	**23**
1.4.1	TAC Meeting No. 1	Thu 14-Oct-21	Thu 14-Oct-21	1
1.4.2	TAC Meeting No. 2	Thu 13-Jan-22	Thu 13-Jan-22	1
1.4.3	TAC Meeting No. 3	Thu 24-Feb-22	Thu 24-Feb-22	1
1.4.4	TAC Meeting No. 4	Tue 01-Mar-22	Mon 28-Mar-22	20
1.5	Summary Report	Tue 29-Mar-22	Fri 08-Apr-22	9
1.6	Submit Report to County	Mon 11-Apr-22	Mon 11-Apr-22	1
2	**Literature Review**	**Wed 14-Apr-21**	**Mon 02-Aug-21**	**79**
2.1	Research, Compile and Review	Wed 14-Apr-21	Mon 14-Jun-21	44
2.2	Summary Report	Tue 15-Jun-21	Sun 01-Aug-21	34
2.3	Submit Report to County	Mon 02-Aug-21	Mon 02-Aug-21	1
3	**Data Collection**	**Wed 14-Apr-21**	**Mon 30-Aug-21**	**154**
3.1	Preparation and Scheduling	Wed 14-Apr-21	Mon 17-May-21	24
3.2	Wave/Current Bottom-Mounted ADCP	Tue 18-May-21	Mon 05-Jul-21	35
3.3	Tides and Salinity Data Collection	Tue 18-May-21	Mon 05-Jul-21	35
3.4	Boat Mounted ADCP	Mon 03-May-21	Fri 28-May-21	20
3.5	Data Processing and Analysis	Tue 06-Jul-21	Fri 23-Jul-21	14
3.6	Summary Report	Mon 26-Jul-21	Fri 27-Aug-21	25
3.7	Submit Report to County	Mon 30-Aug-21	Mon 30-Aug-21	1
4	**Feasibility and Design Assessment**	**Wed 14-Apr-21**	**Mon 18-Oct-21**	**352**
4.1	Sediment Transport Modeling	Wed 14-Apr-21	Mon 14-Jun-21	44
4.2	Shoreline Analysis	Tue 27-Apr-21	Tue 29-Jun-21	46
4.3	Topography and Bathymetry	Tue 27-Apr-21	Sat 31-Jul-21	69
4.4	Environmental Sensitive Areas	Tue 27-Apr-21	Sat 31-Jul-21	69
4.5	Dual Inlet Modeling	Mon 31-May-21	Thu 15-Jul-21	34
4.6	Effects on SABE	Fri 16-Jul-21	Mon 16-Aug-21	22
4.7	Alternative Inlet Locations	Tue 17-Aug-21	Thu 30-Sep-21	33
4.8	Summary Report	Tue 31-Aug-21	Fri 15-Oct-21	34
4.9	Submit Report to County	Mon 18-Oct-21	Mon 18-Oct-21	1
5	**Coastal Numerical Modeling**	**Mon 26-Jul-21**	**Fri 15-Apr-22**	**192**
5.1	Model Set-up, Calibration and Validation	Mon 26-Jul-21	Fri 18-Feb-22	150
5.2	Alternative Analysis	Mon 21-Feb-22	Fri 15-Apr-22	40
5.3	Summary Report	Fri 25-Feb-22	Fri 25-Feb-22	1
5.4	Submit Report to County	Mon 28-Feb-22	Mon 28-Feb-22	1
6	**Feasibility and Design Study Report**	**Tue 12-Apr-22**	**Wed 04-May-22**	**17**
6.1	DRAFT Report	Tue 12-Apr-22	Fri 29-Apr-22	14
6.2	Public Workshop and Meeting	Mon 02-May-22	Mon 02-May-22	1
6.3	FINAL Report	Tue 03-May-22	Tue 03-May-22	1
6.4	Submit Report to County	Wed 04-May-22	Wed 04-May-22	1



Delft3D Modeling: Model Development

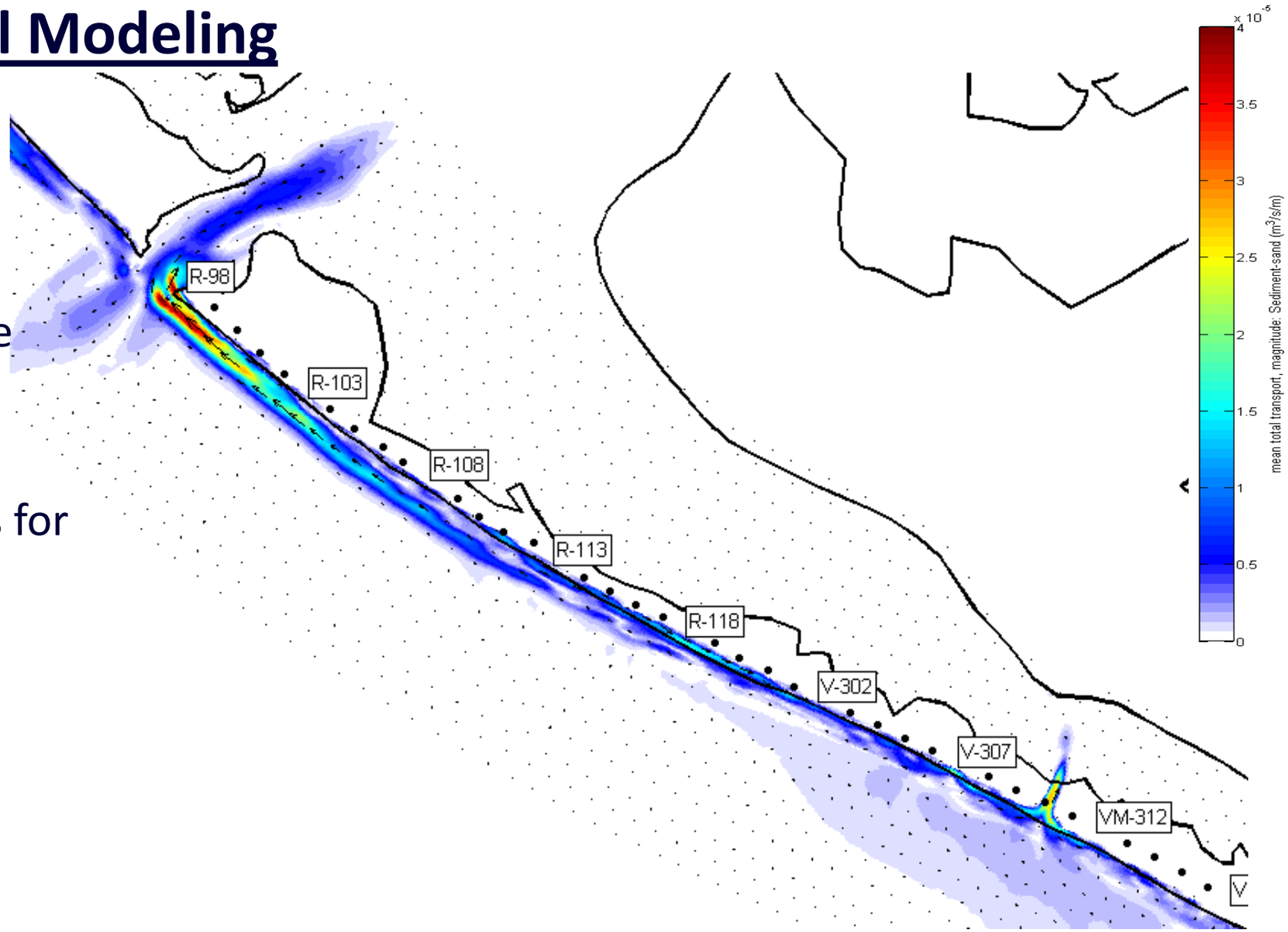
Delft3D Numerical Modeling

Completed

- Sediment Transport Calibration
- Preliminary Alternative Analysis

In Progress

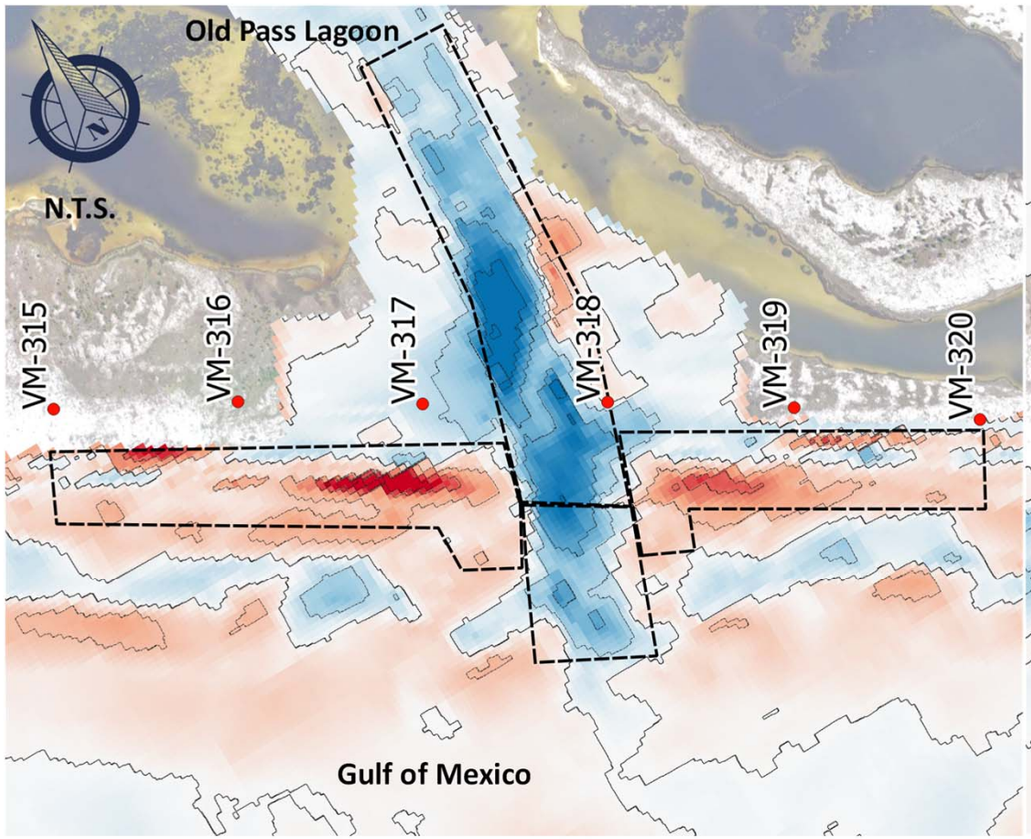
- Water Quality Analysis for preferred alternative



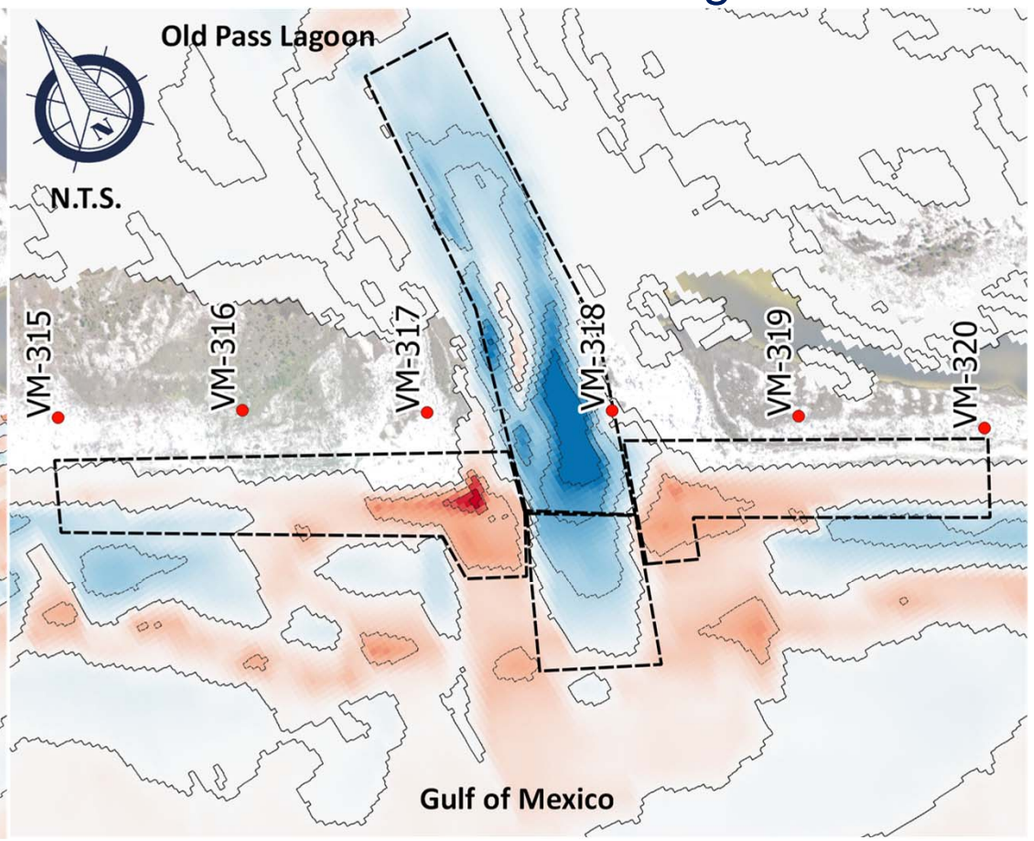
Model Development

Calibration Results

Measured Changes

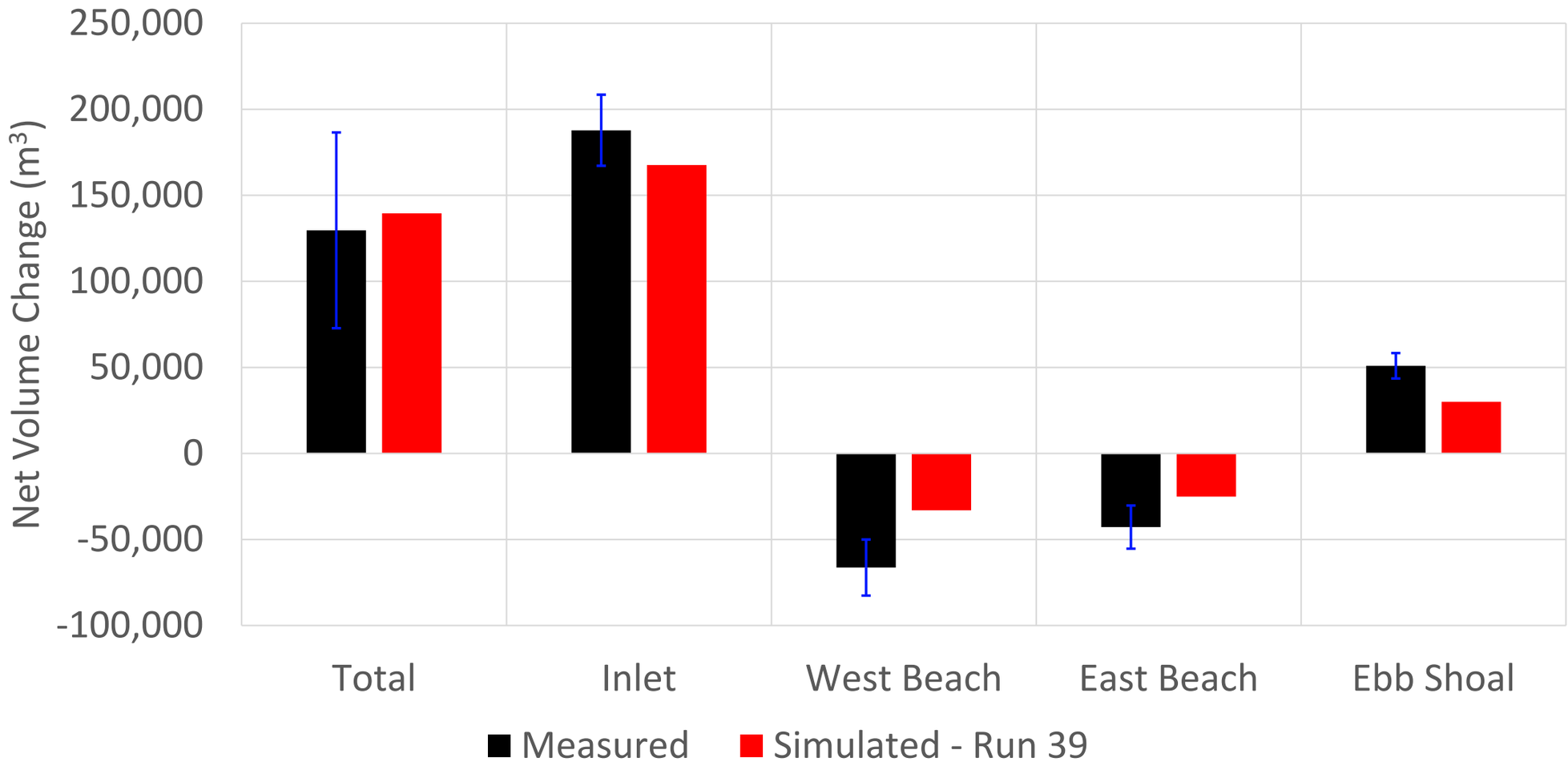


Simulated Changes



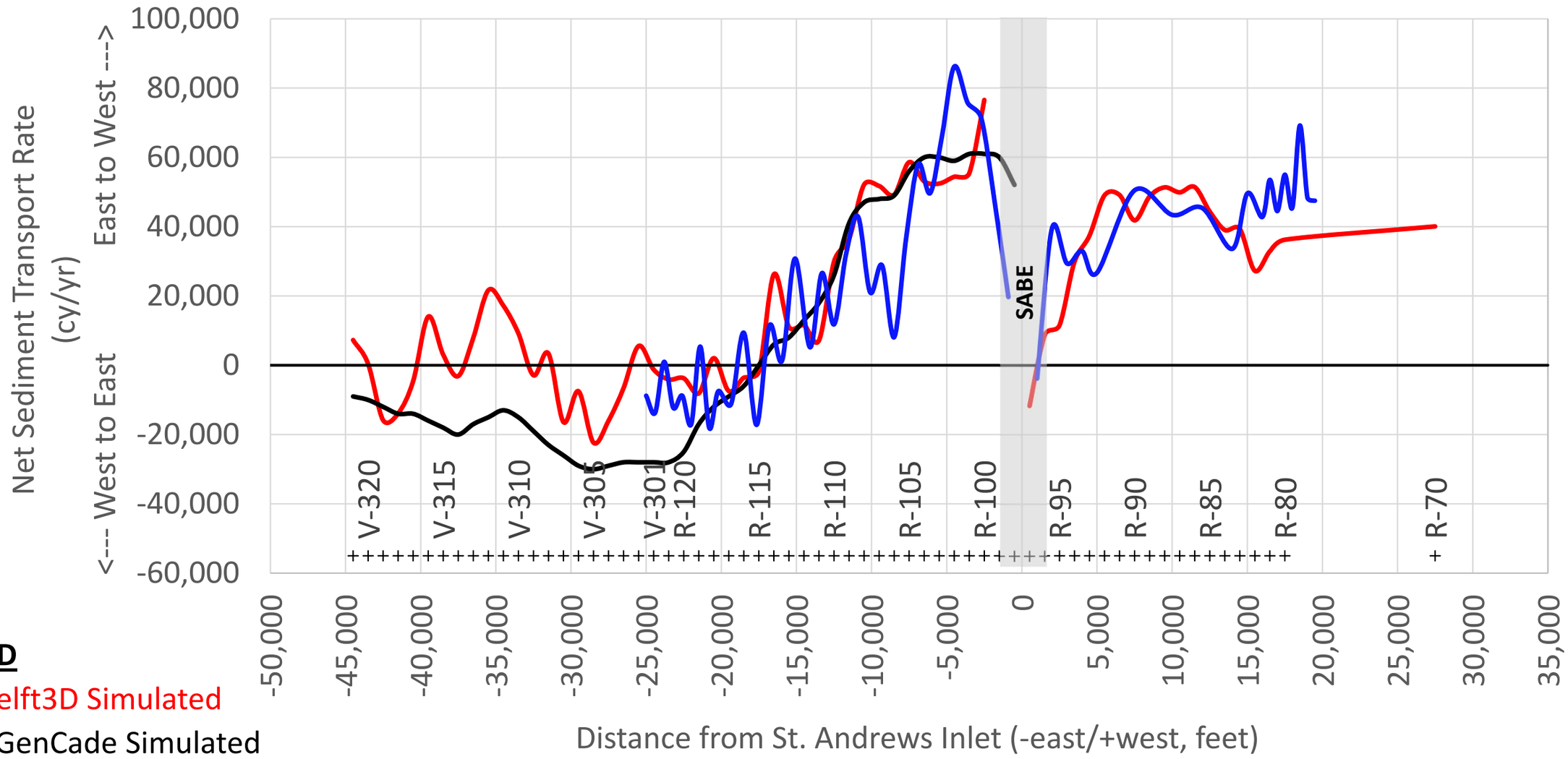
Model Development

Calibration Results



Model Development

Comparison of Sediment Transport Rates



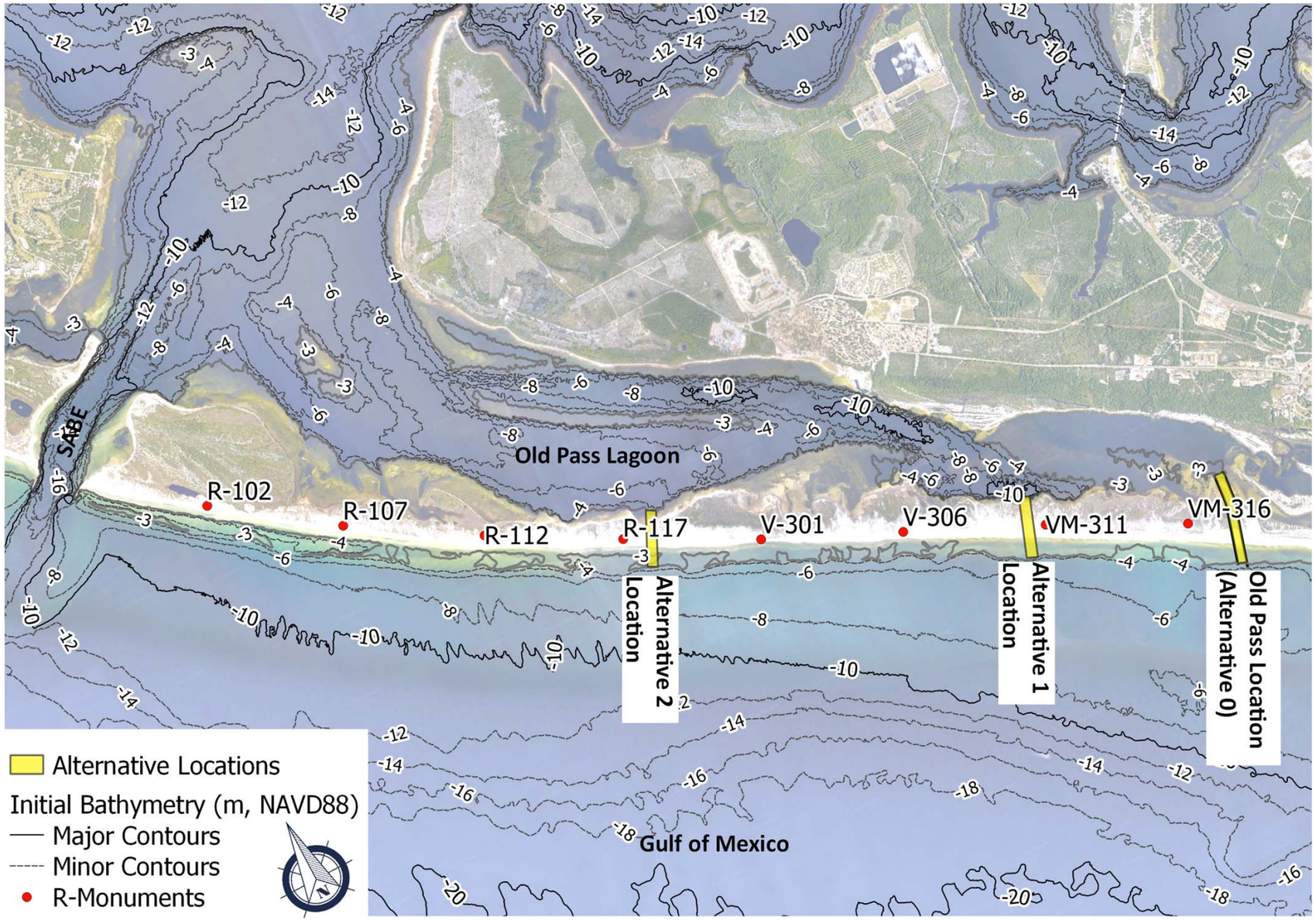
LEGEND

Red: Delft3D Simulated

Black: GenCade Simulated

Blue: Mike Simulated (CP&E, 2006)

Alternative Analysis: Alternative Locations



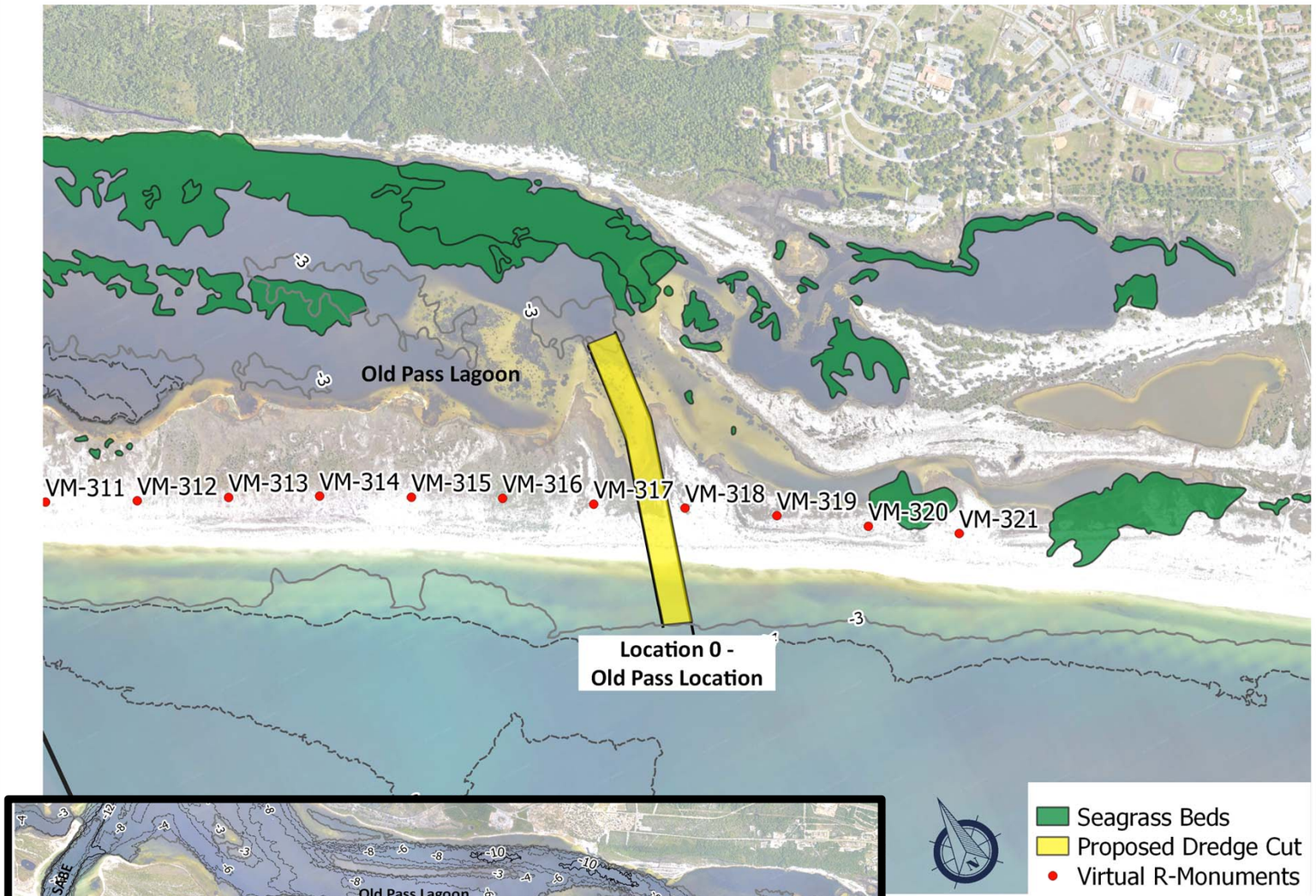
Model Setup

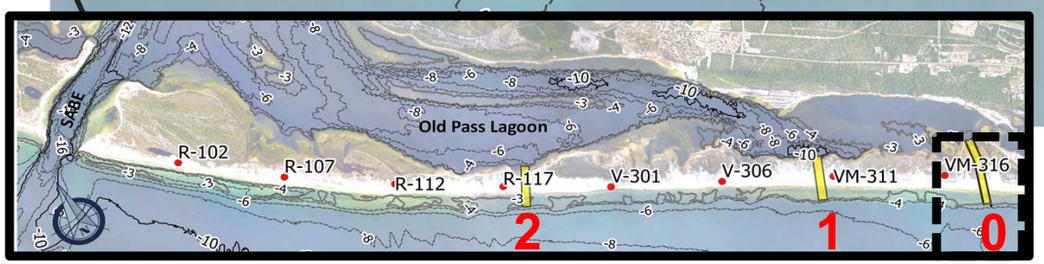
- 5-year runs
- Average annual wave climate (12 wave cases)
- Repeated mean tide
- Initial Bathymetry sources:
  - Post-Sally Lidar (2018)
  - USACE channel survey (2021)

Alternative Analysis

- Infilled volume within the limits of the channel
- Change in cross-sectional area
- Channel depth at the end of the simulation

Alternative Analysis: Alternative Locations





Location Map

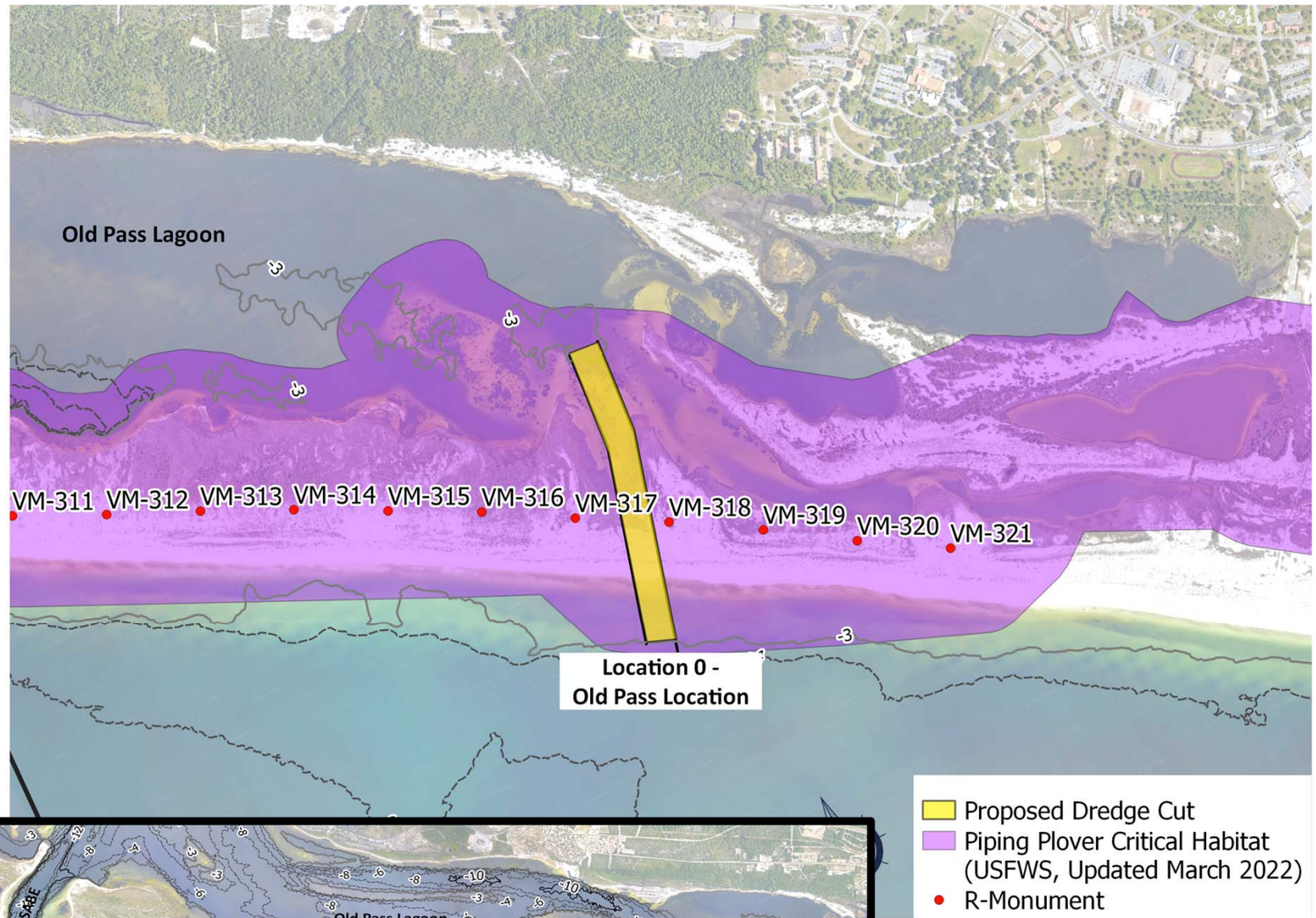
Preliminary Analysis

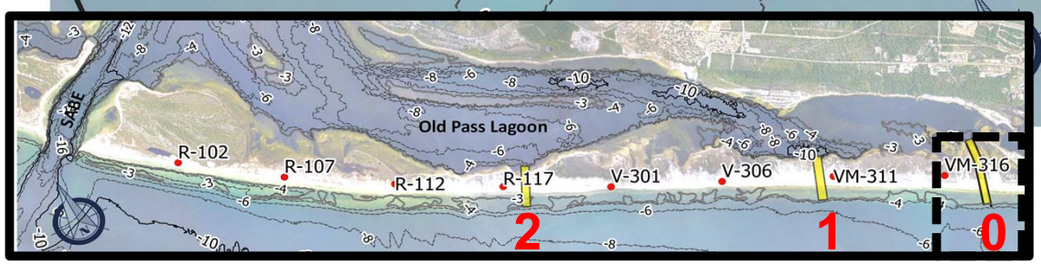
- **Historic Old Pass Location**

  Positives
  - Outside of Aquatic Preserve
  - Limited Seagrasses

  Challenges
  - Shallow depths within the Bay
  - Historically closed within 2-3 years

Alternative Analysis: Alternative Locations





Location Map

Preliminary Analysis

- **Historic Old Pass Location**

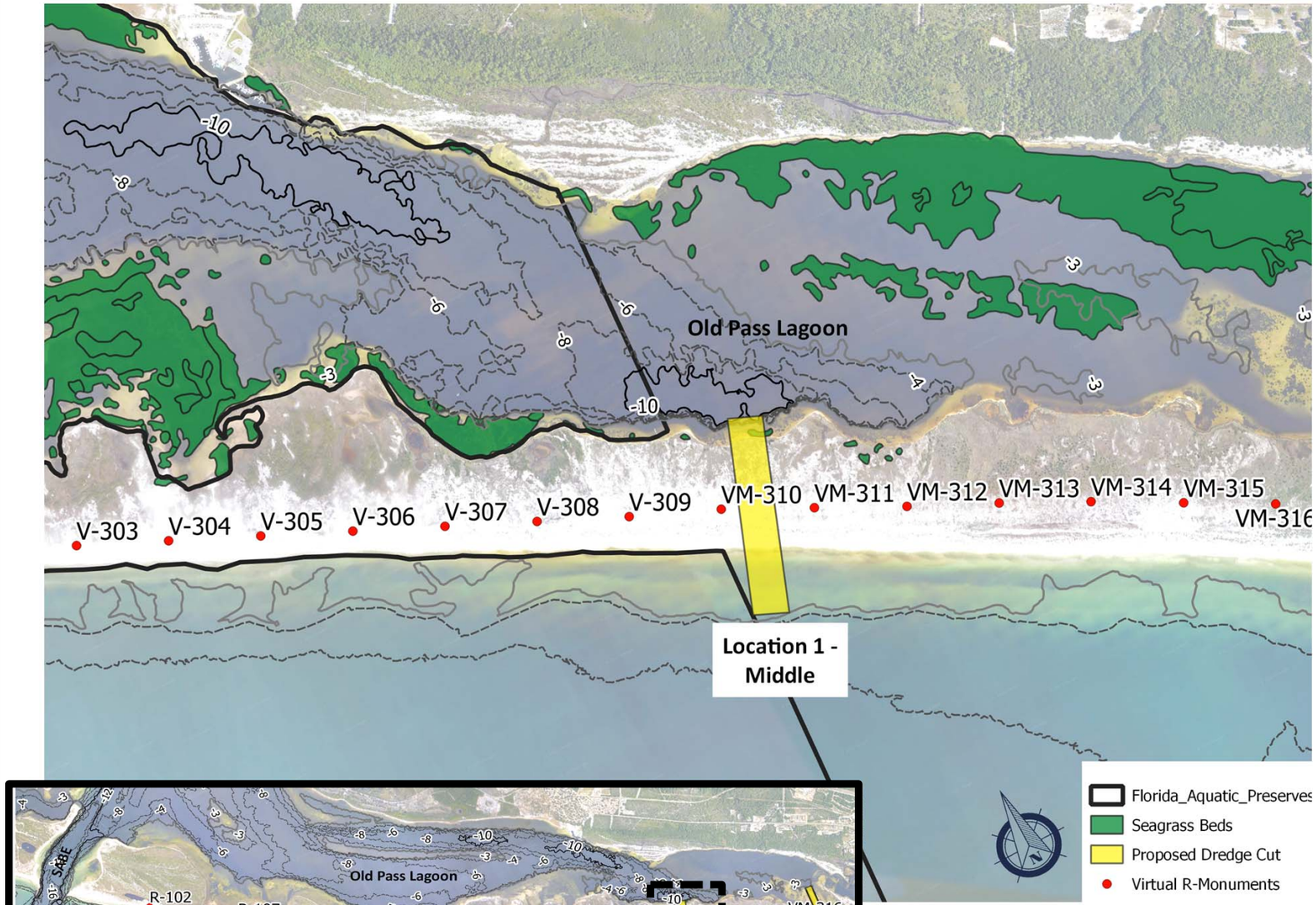
Positives

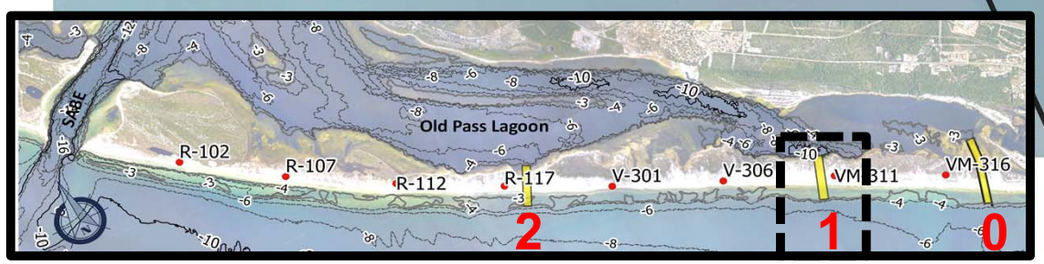
- Outside of Aquatic Preserve
- Limited Seagrasses

Challenges

- Shallow depths within the Bay
- Historically closed within 2-3 years
- Within Piping Plover Critical Habitat
- Within Gulf Sturgeon Critical Habitat
- Within Beach Mouse Critical Habitat

Alternative Analysis: Alternative Locations





Location Map

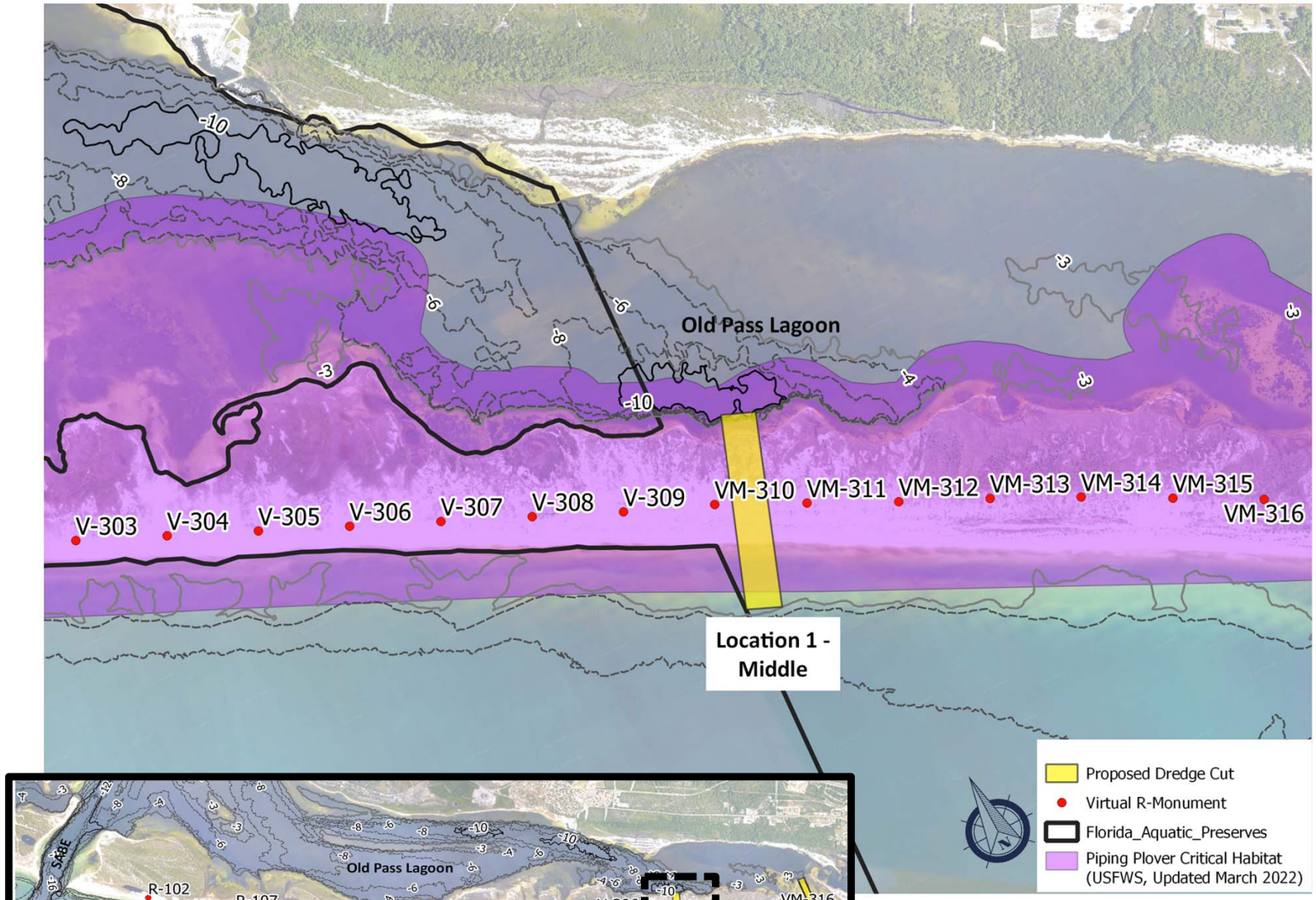
Preliminary Analysis

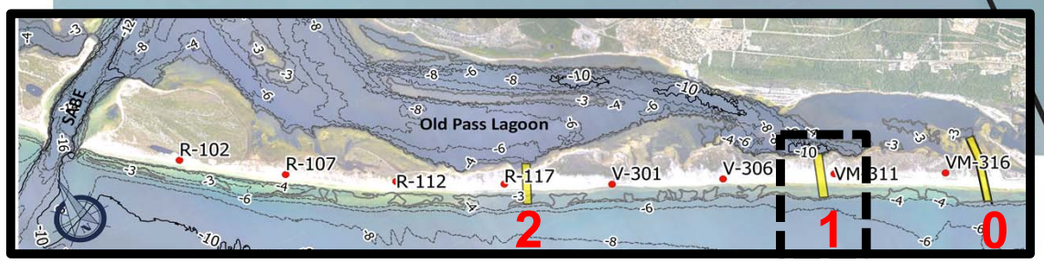
- Historic Old Pass Location
- **Alternative 1 Location**

Positives

- Bay depths greater than 10 m
- Narrow barrier island
- Outside of Aquatic Preserve
- Limited Seagrasses

Alternative Analysis: Alternative Locations





Location Map

Preliminary Analysis

Historic Old Pass Location

Alternative 1 Location

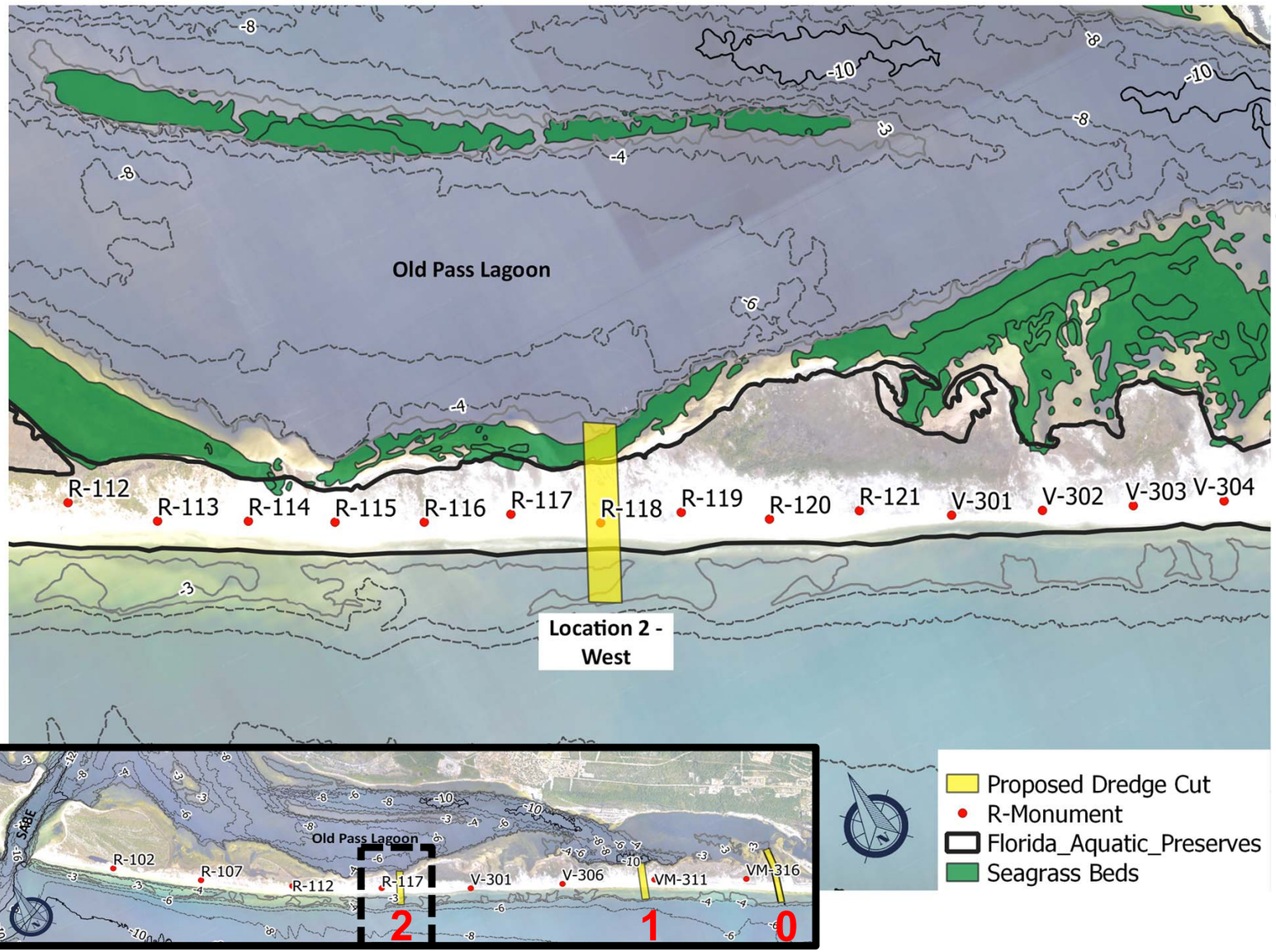
Positives

- Bay depths greater than 10 m
- Narrow barrier island
- Outside of Aquatic Preserve
- Limited Seagrasses

Challenges

- Within Piping Plover Critical Habitat
- Within Gulf Sturgeon Critical Habitat
- Within Beach Mouse Critical Habitat

Alternative Analysis: Alternative Locations



Location Map

Preliminary Analysis

- Historic Old Pass Location
- Alternative 1 Location
- **Alternative 2 Location**

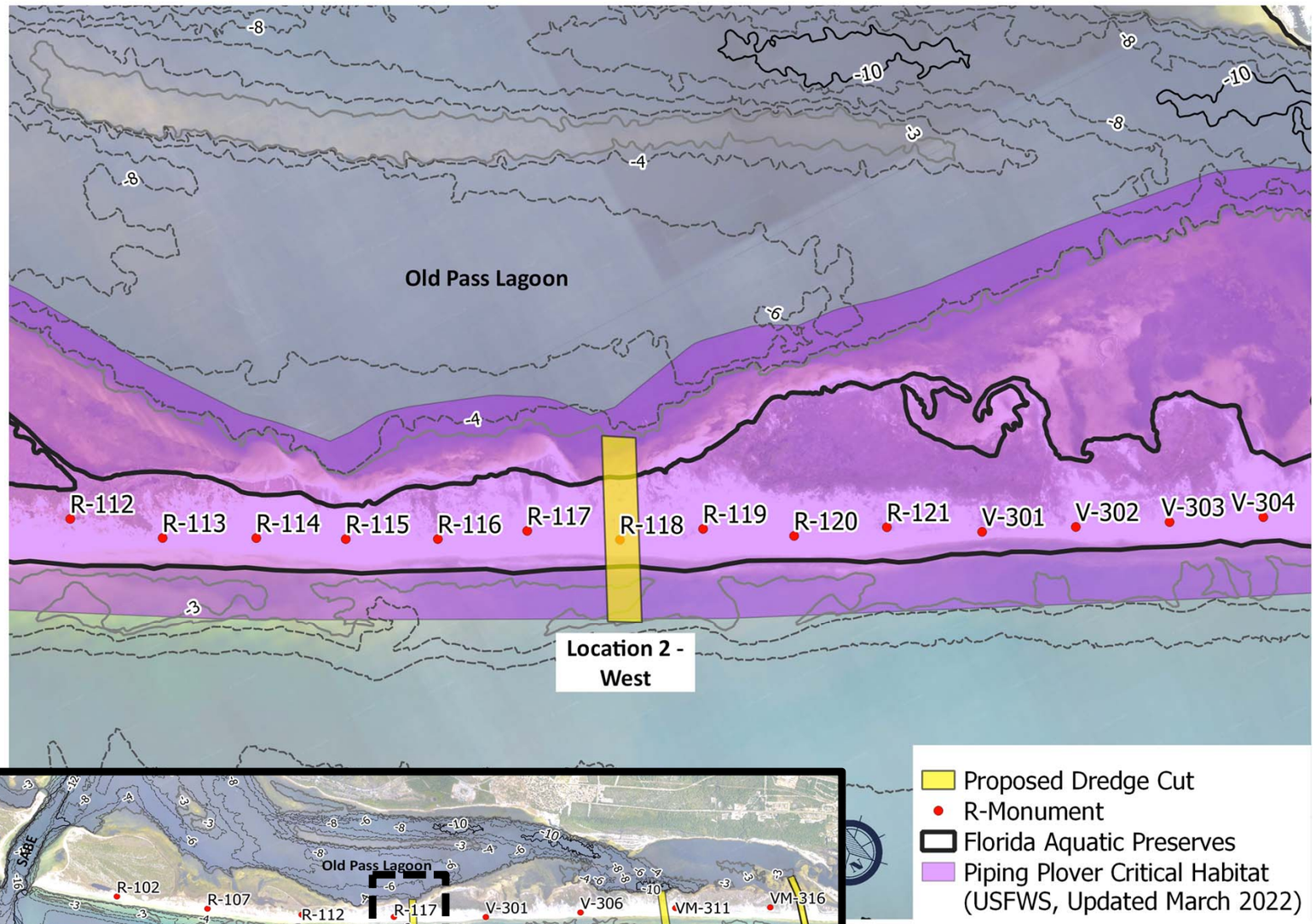
Positives

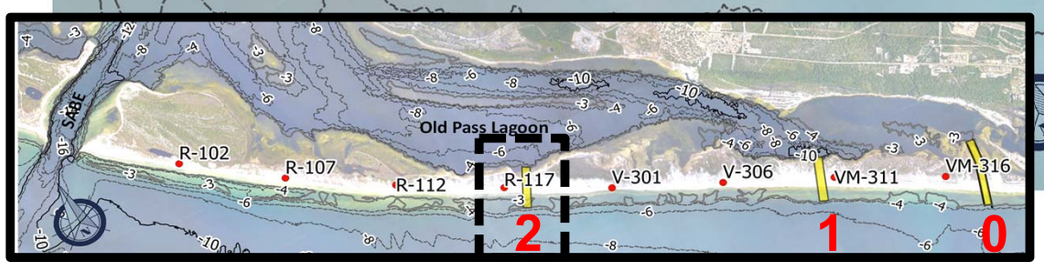
- Deeper Bay depths than Old Pass Location
- Narrow barrier island
- Shorter flow path from West Bay and St. Andrew Bay compared to other locations

Challenges

- Existing seagrass beds within limits of proposed channel
- Within Aquatic Preserve

Alternative Analysis: Alternative Locations





Location Map

Preliminary Analysis

- Historic Old Pass Location
- Alternative 1 Location
- **Alternative 2 Location**

Positives

- Deeper Bay depths than Old Pass Location
- Narrow barrier island
- Shorter flow path from the Bay

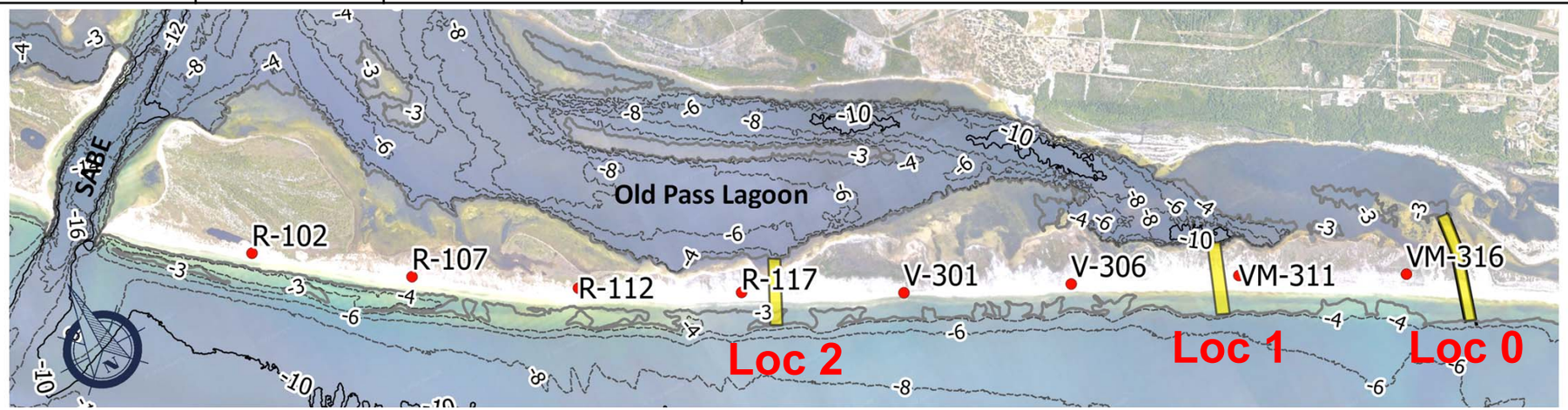
Challenges

- Existing seagrass beds within limits of proposed channel
- Within Aquatic Preserve
- Within Piping Plover Critical Habitat
- Within Gulf Sturgeon Critical Habitat
- Within Beach Mouse Critical habitat

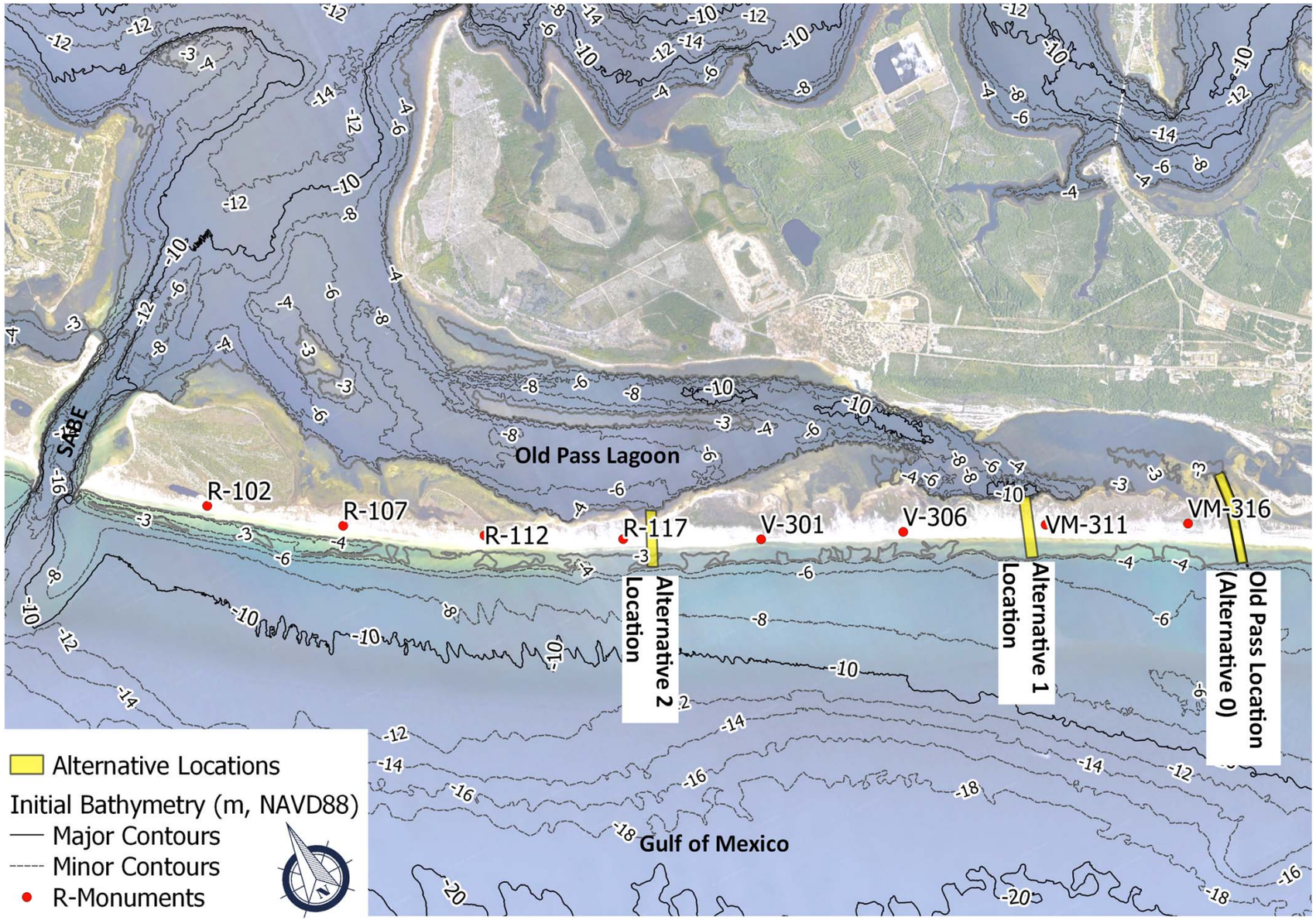
Alternative Analysis: Alternative Locations

Alternative Summary

Alternative	Location (0, 1, 2)	Initial Dredge Volume (m^3)	Description
Alternative 0a	0	300,000	**100 m** wide excavated to **-3 m**, NAVD88
Alternative 1a	1	195,000	**100 m** wide excavated to **-3 m**, NAVD88
Alternative 1b	1	410,000	**100 m** wide excavated to **-5 m**, NAVD88
Alternative 1c	1	390,000	**200 m** wide excavated to **-3 m**, NAVD88
Alternative 1d	1	820,000	**200 m** wide excavated to **-5 m**, NAVD88
Alternative 1f	1	210,000	**100 m** wide excavated to **-3 m**, NAVD88 angled at 15°
Alternative 2a	2	337,500	**100 m** wide excavated to **-3 m**, NAVD88
Alternative 2b	2	562,500	**100 m** wide excavated to **-5 m**, NAVD88



Alternative Analysis: Alternative Locations



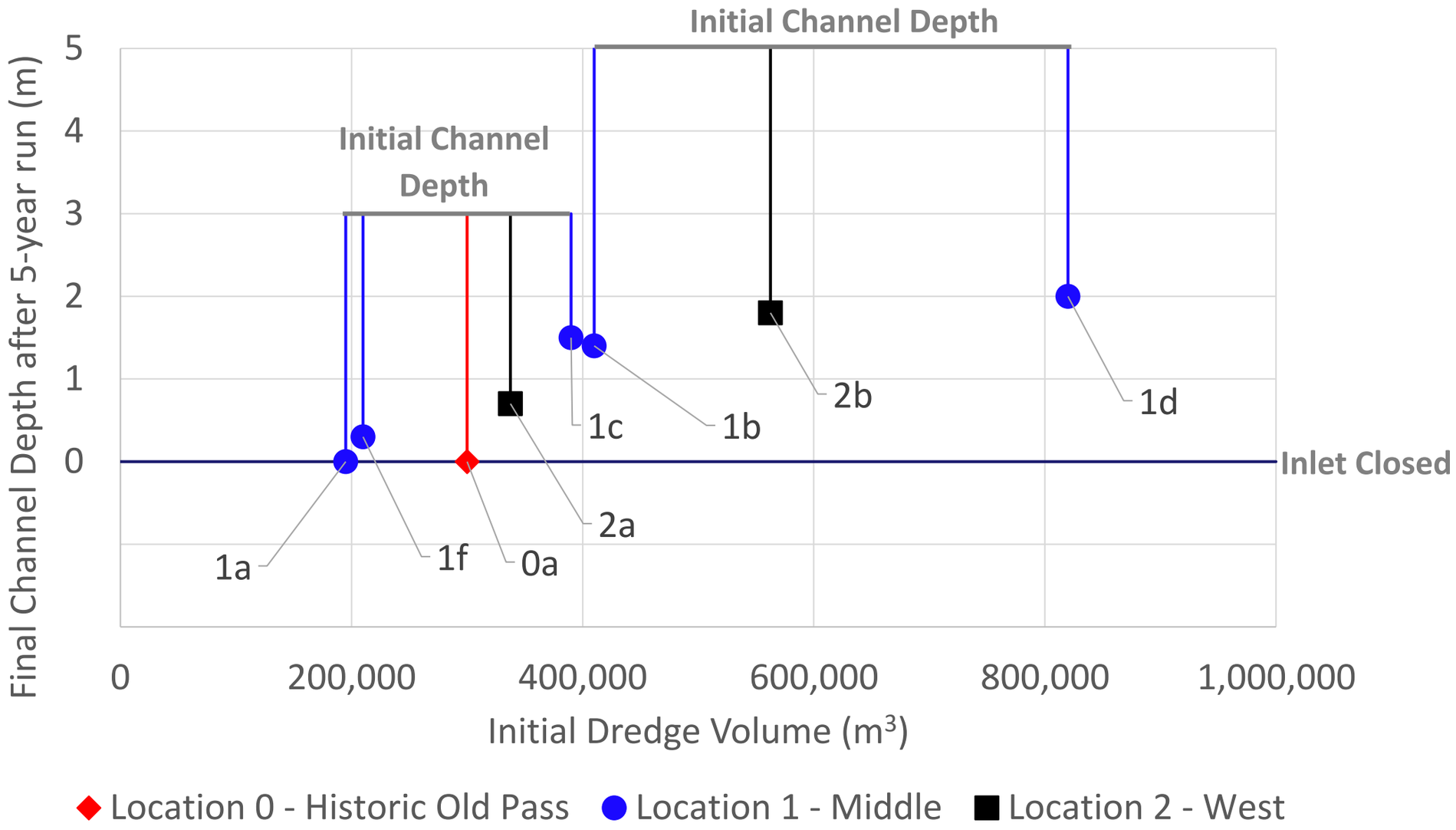
Model Setup

- 5-year runs
- Average annual wave climate (12 wave cases)
- Repeated mean tide
- Initial Bathymetry sources:
  - Post-Sally Lidar (2018)
  - USACE channel survey (2021)

Alternative Analysis

- Infilled volume within the limits of the channel
- Change in cross-sectional area
- Channel depth at the end of the simulation

Alternative Analysis: Preliminary Results



Alternative Analysis: Preliminary Results

- Re-opening East Pass at the 2001 location with no modifications to the cut can be expected to remain open under average annual wave conditions for approximately 3-years
- The Alternative 1 and Alternative 2 locations support additional channel stability
- The depth at the end of the 5-year simulation increases linearly as the initial dredge volume increases
- Increasing the cross-sectional area of the cut increases the dredge interval to 5-6 years

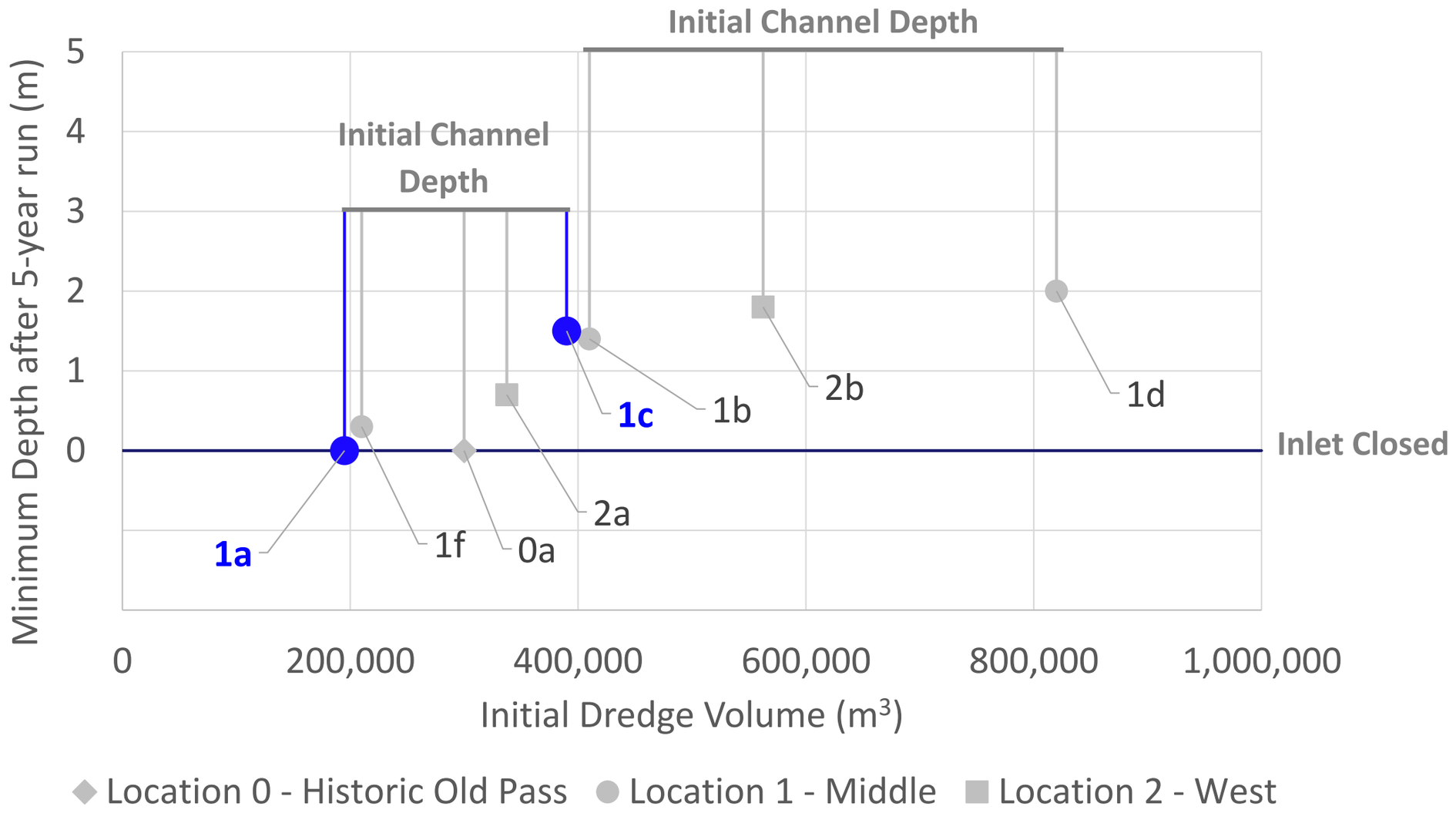
Alternative Analysis: Cost Analysis

Assumptions:

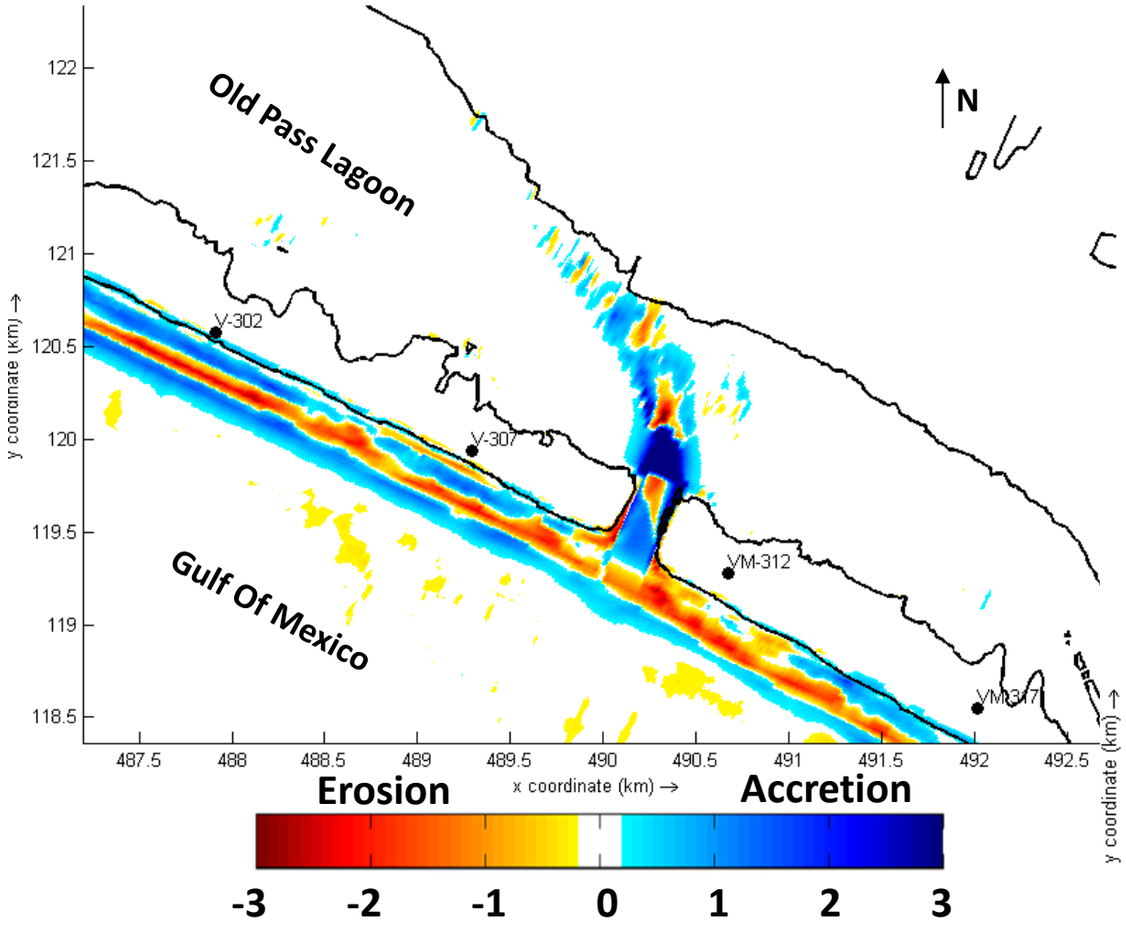
- Mob/demob cost of $500,000
- Dredge cost: $12/cy
- Monitoring cost: $125,000/yr
- Dredge interval and maintenance volume were determined based on Delft3D modeling results

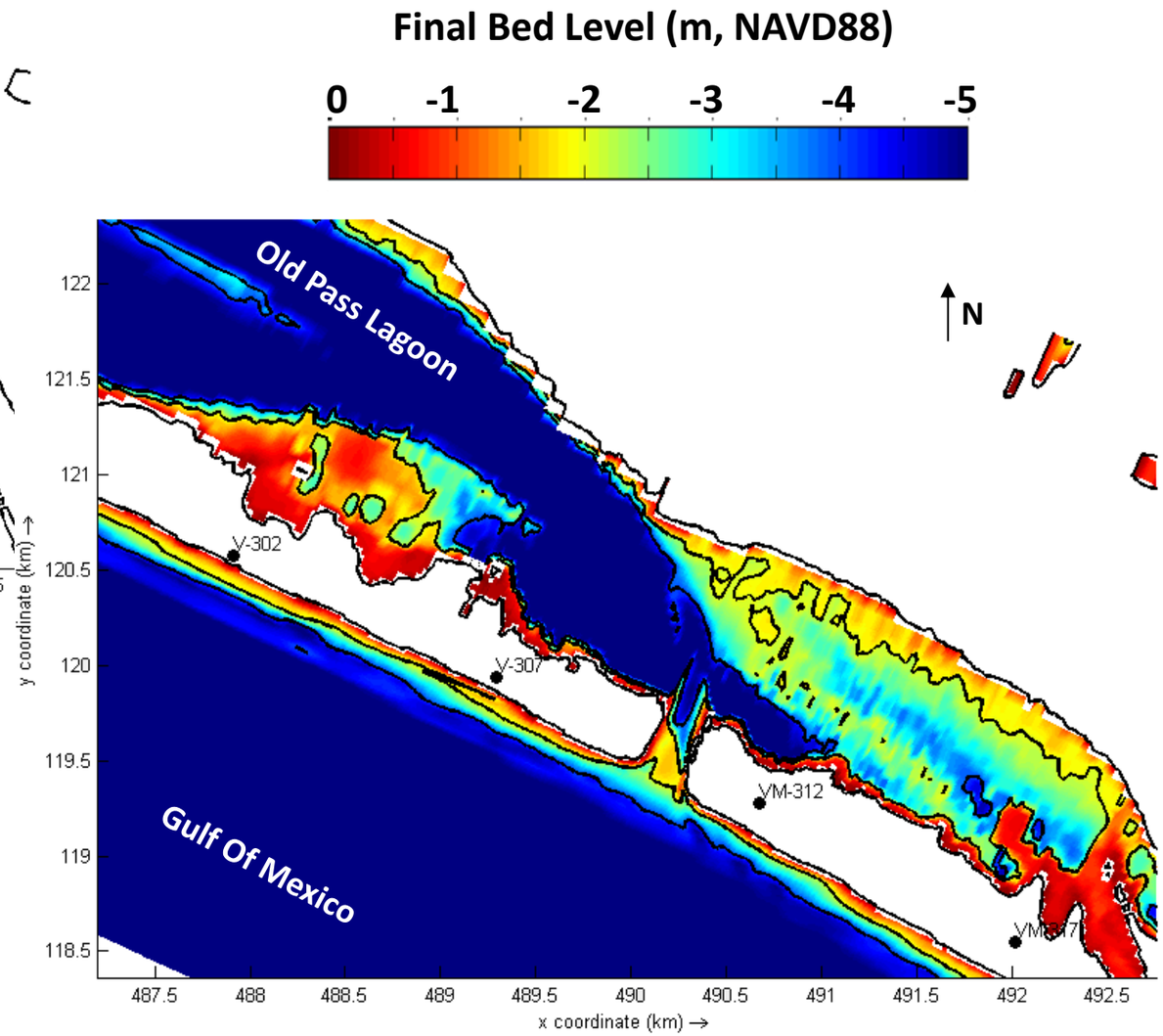
Alternative	Dredging Frequency	Initial Cost	Maintenance Cost	Annualized Cost (50-yr)
1a (100x3)	3	$4,273,542	$1,833,768	$975,549
1b (100x5)	5	$7,749,421	$4,242,162	$1,362,089
1c (200x3)	6	$7,426,083	$2,641,280	$979,617
1d (200x5)	6	$14,377,842	$5,734,679	$1,860,997
0a (100x3)	3	$5,971,064	$1,800,900	$1,072,997
2a (100x3)	4	$6,577,322	$2,220,344	$1,053,744

Alternative Analysis: Preferred Alternative



Alternative Analysis: Preferred Alternative





Project Goals

County Objectives:

- ☑ *a) The inlet will be hydraulically stable under normal conditions; and,*
- ☑ *b) The inlet will balance the sediment budget such that beach restoration and nourishment of the adjacent beaches, or other forms of shoreline stabilization, including jetties, are not required.*
- ☐ **c) Restore and enhance water quality within St. Andrew Bay.**
- d) Not result in significant adverse impacts to endangered species.
- e) Provide a Public Benefit(s).
- f) Not have an adverse impact on the existing St. Andrew Bay Entrance Channel.
- g) Qualify for the necessary regulatory permits from the Florida Department of Environmental Protection and the U.S. Army Corps of Engineers.

Water Quality Analysis: Modeling Approach

Modeling Approach

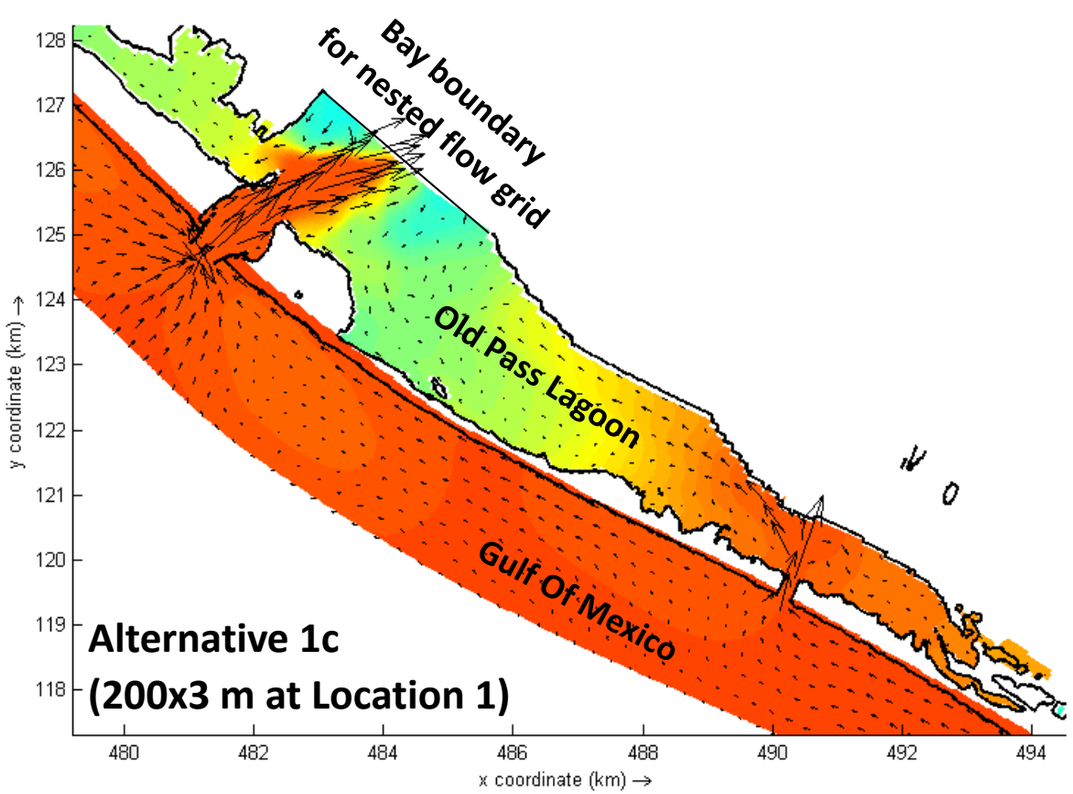
- Compare changes in Salinity in Old Pass Lagoon with and without the new proposed pass (Alternative 1c)
- Compare changes in the flushing capacity of the waterbody using the injection of a conservative tracer with and without the new proposed pass (Alternative 1c)

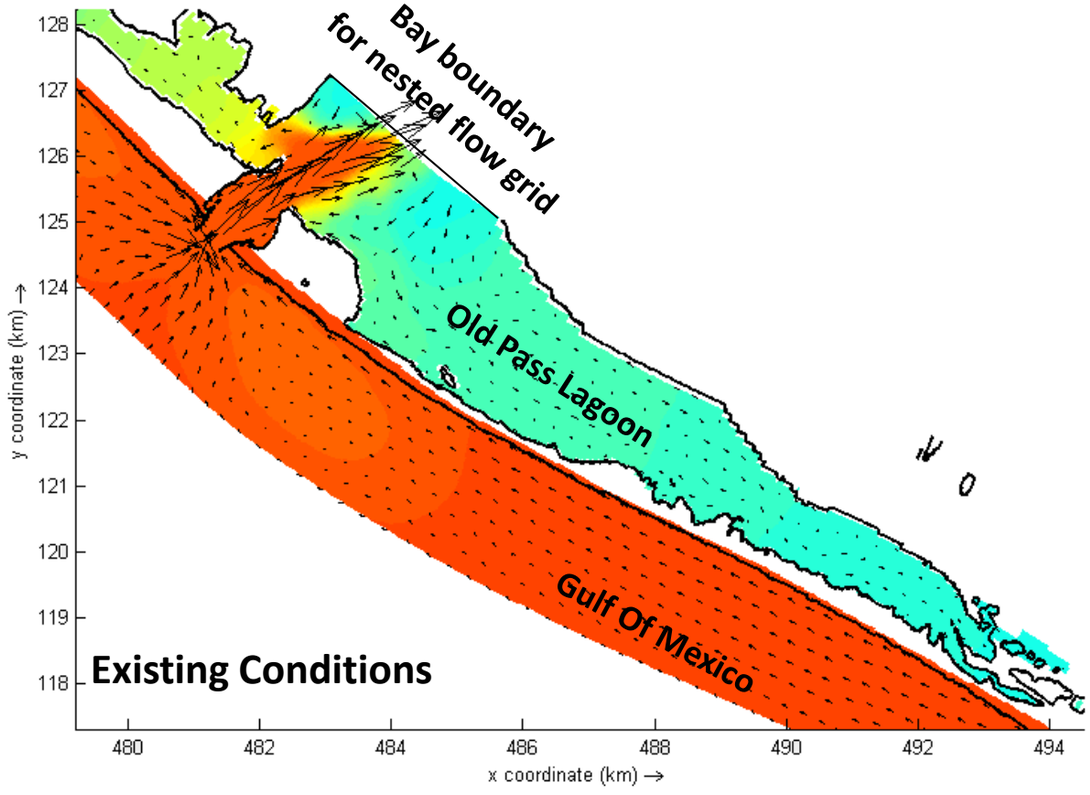
Model Setup

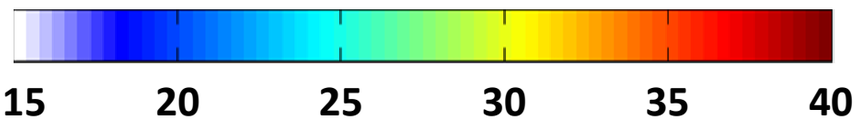
- 1-month simulation using measured water levels at PCB gauge
- Exclude the effects of waves or morphology changes
- Initial Bathymetry utilized most recent available data: Post-Sally Lidar (2018) and USACE channel survey (2021)

Water Quality Analysis: Results

Comparison of Salinity at the Surface during Peak Flood



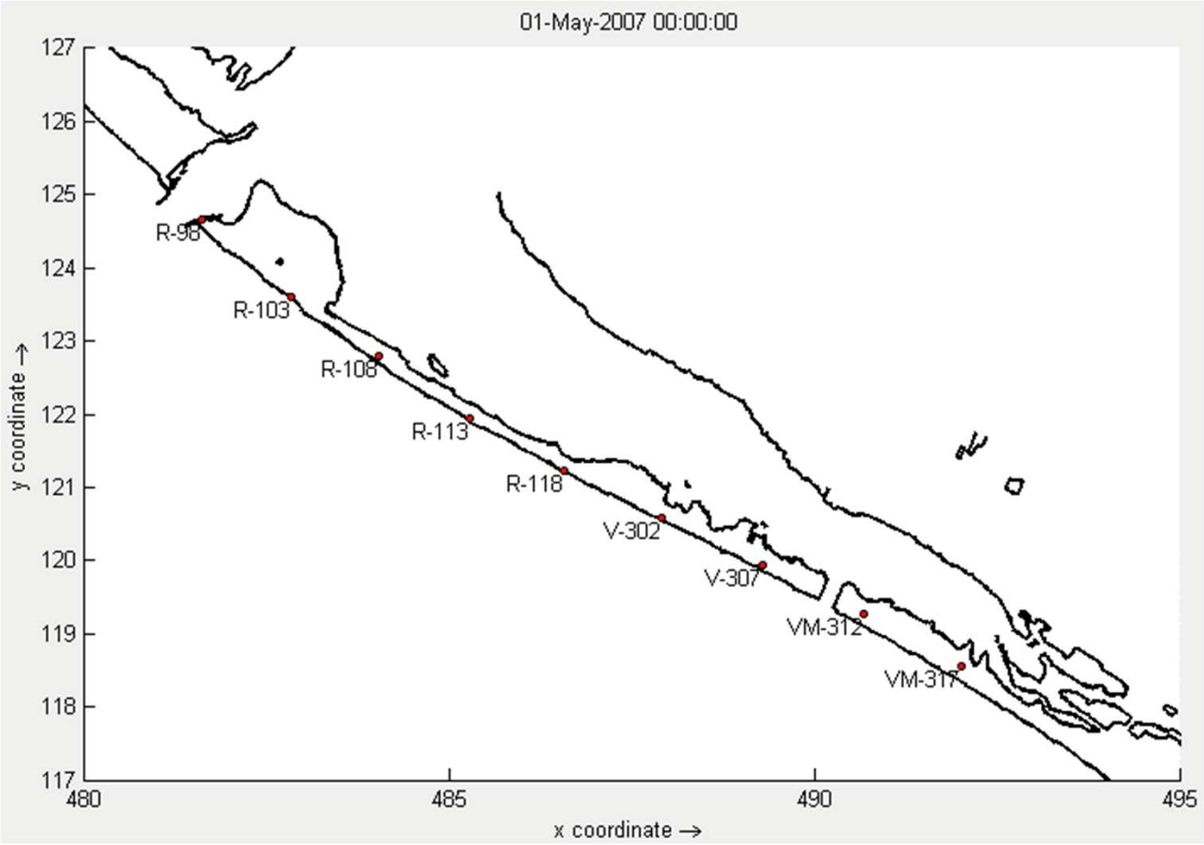




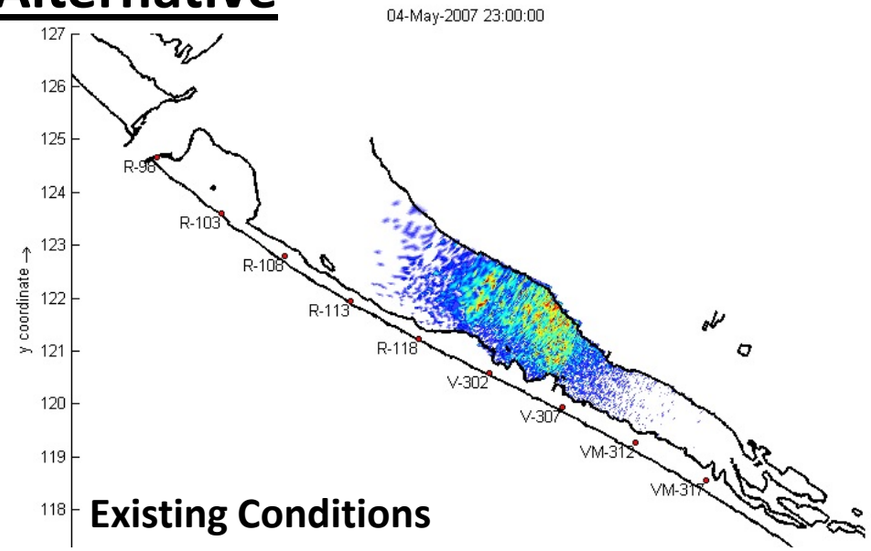
Salinity at Surface (Sigma Layer 1, ppt)

Water Quality Analysis: Results

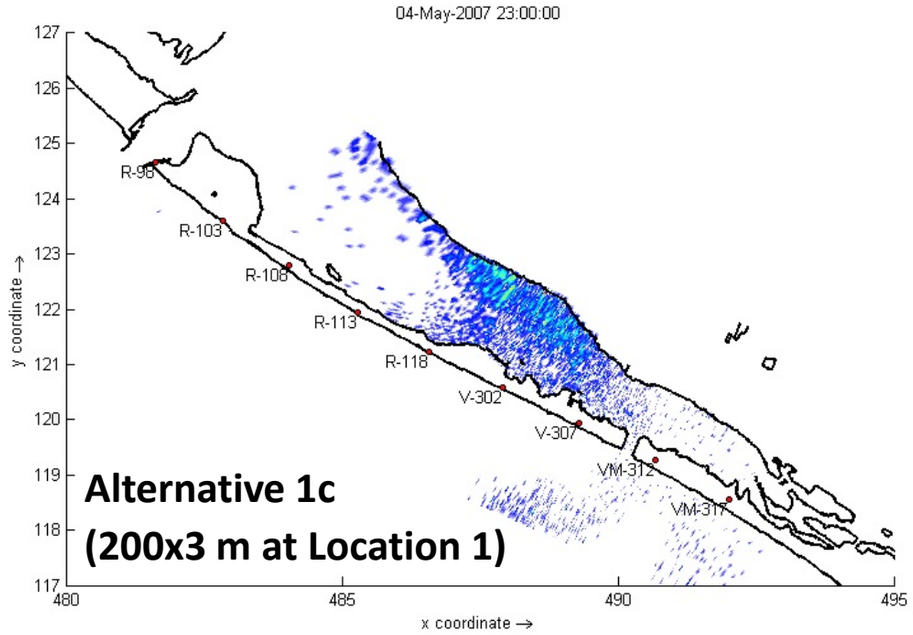
Particle Tracking for Preferred Alternative



Number of Particles (10,000 total)



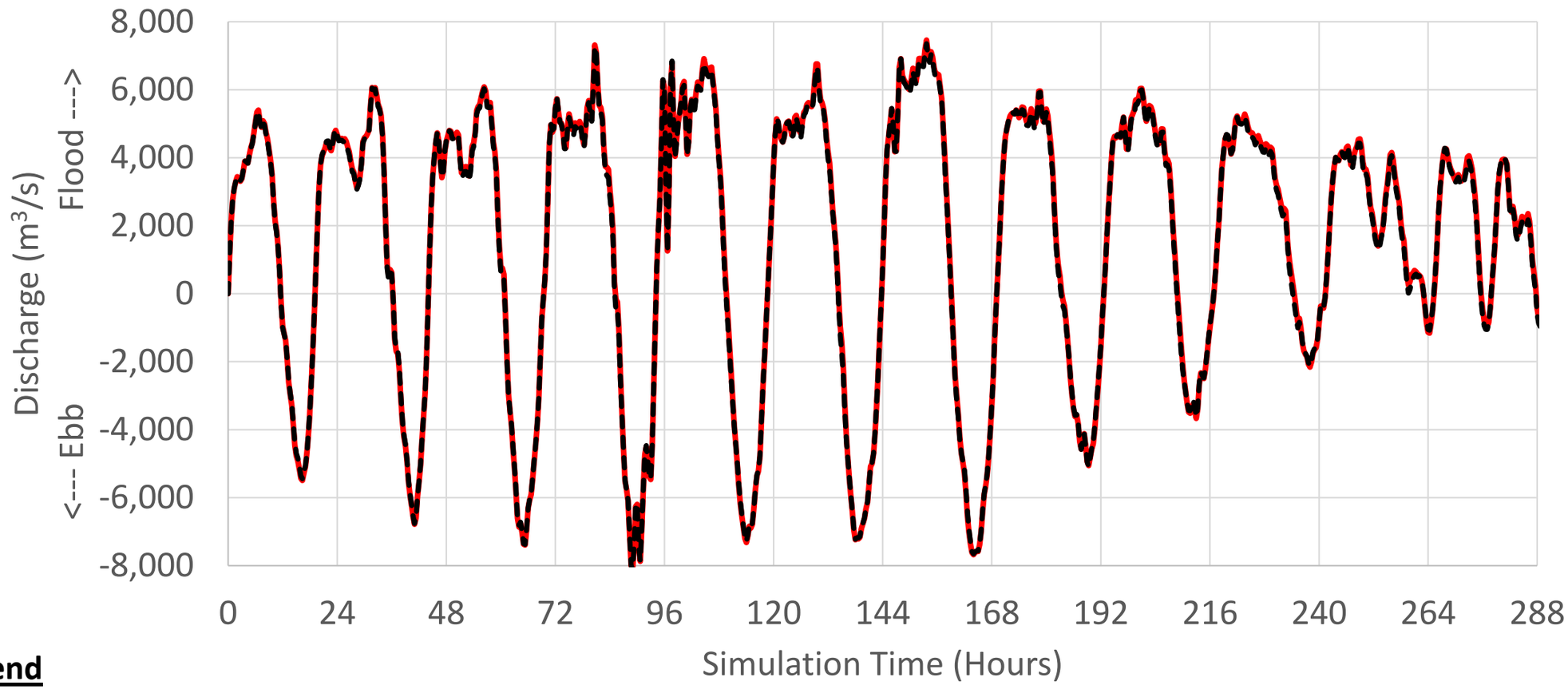
Existing Conditions



Alternative 1c
(200x3 m at Location 1)

Effects on SABE

Simulated Discharge through SABE



Legend

Black: Existing Conditions (No new pass)

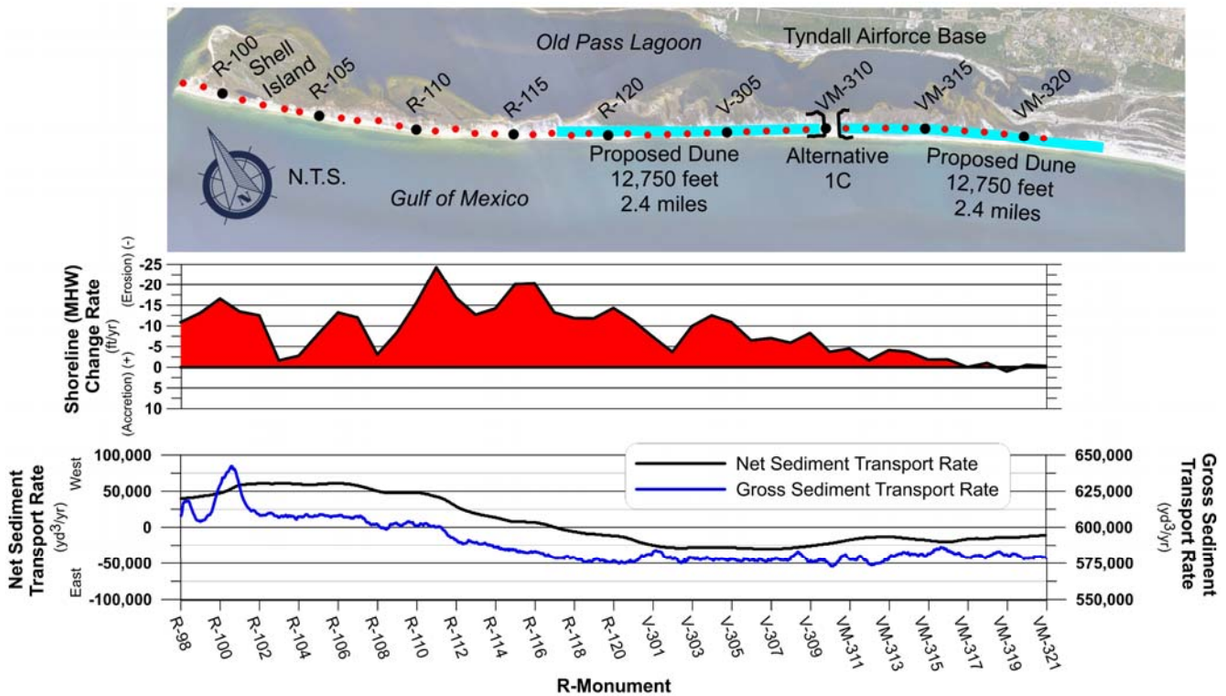
Red: Alternative 1c (200x3 m pass at Location 1)

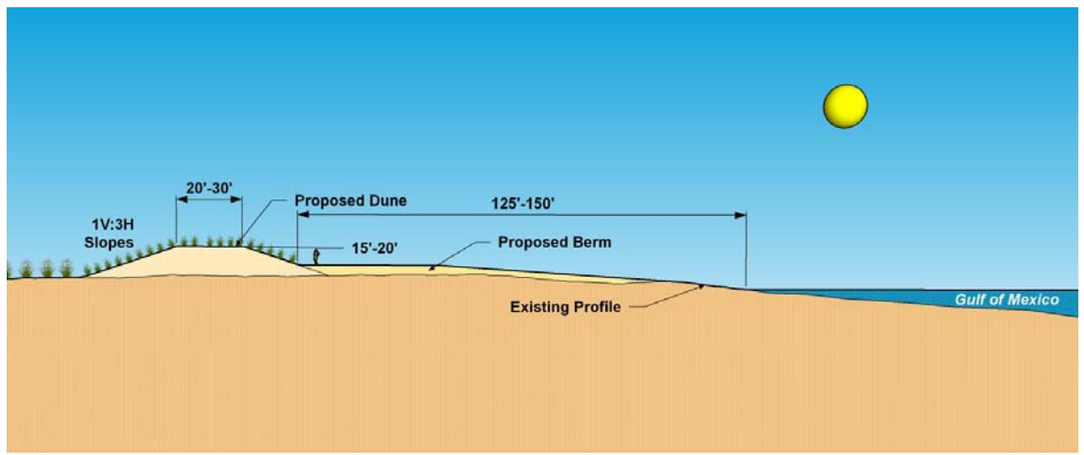
Potential Disposal Sites

- Initial disposal of beach quality sand is dune construction.
- Future maintenance dredging disposal may be dune and/or beach.

  Per Section 161.142, Florida Statutes (FS), "*It is in the public interest to …. ensure that beach quality sand is placed on adjacent eroding beaches*."

- Plant with native dune vegetation.





Permit Feasibility

62B-41.005 Policy and Eligibility Criteria for Coastal Construction Permits

(11) In addition to the other requirements of this chapter, opening of previously existing inlets that have been recently closed due to human activity, alteration or maintenance of natural inlets, intermittent inlets and flushing outlets and stabilization of natural shorelines of existing unstabilized altered inlets will be approved upon a showing that:

(a) All impacts are avoided or minimized to the greatest extent practicable, including consideration of less impactive alternatives; and,

(b) After avoidance and minimization, any adverse impacts that are reasonably likely to occur will be offset by a proposed mitigation plan. When evaluating the mitigation plan, the Department will consider the benefits of the long- term sand management plan and the overall public benefit of the inlet activity including:

1. Meeting a recognized public need contained in the approved local comprehensive plan of the local government with jurisdiction over the inlet;
2. Conservation and enhancement of the supply of sand to adjacent beaches;
3. Preservation or enhancement of the natural functioning of the inlet system;
4. Protection and enhancement of the marine and beach habitat; and,
5. Being consistent with the statewide strategic beach management plan, where applicable.

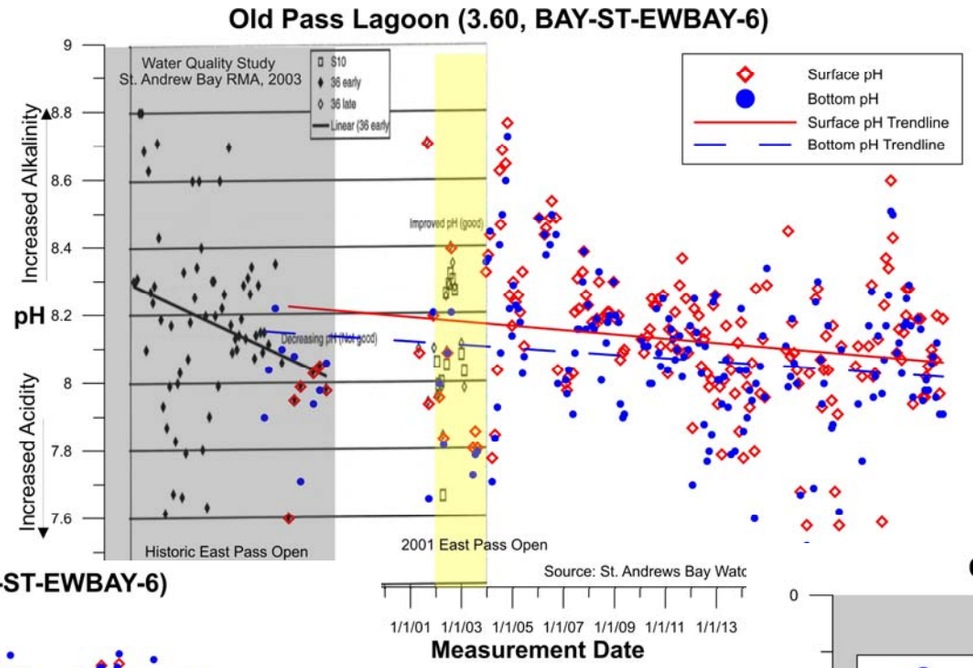
(c) For the purposes of subsection 62B-41.005(11), F.A.C., previously existing inlets that have been recently closed due to human activity are areas of the coastal system that continue to exhibit geomorphic features of an inlet such as an ebb or tidal shoal, at the time an application for permit is submitted to the Department.

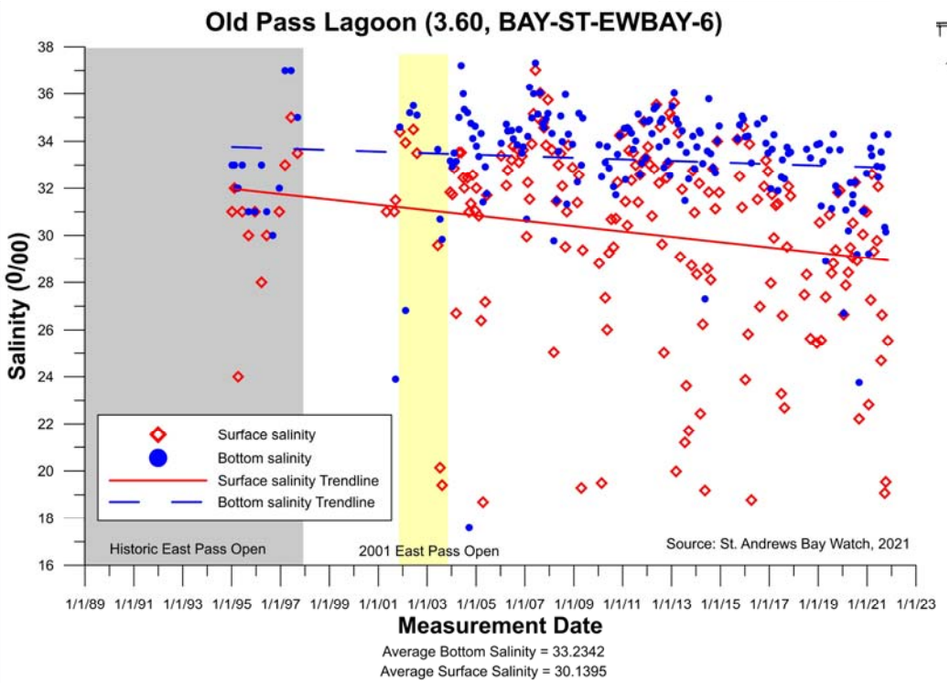
(12) Creation of new inlets have the potential to significantly impact the surrounding coastal system by interrupting or altering the natural drift of beach compatible sand resources, which often results in these sand resources being deposited in nearshore areas, in the inlet channel, or in the inland waterway adjacent to the inlet, instead of providing natural nourishment to the adjacent beaches. There is also a growing demand for beach compatible sand and a limited supply of such sand resources. Therefore, in addition to the criteria in subsection 62B-41.005(11) F.A.C., for projects proposing the **creation of new inlets the applicant must also demonstrate that:**

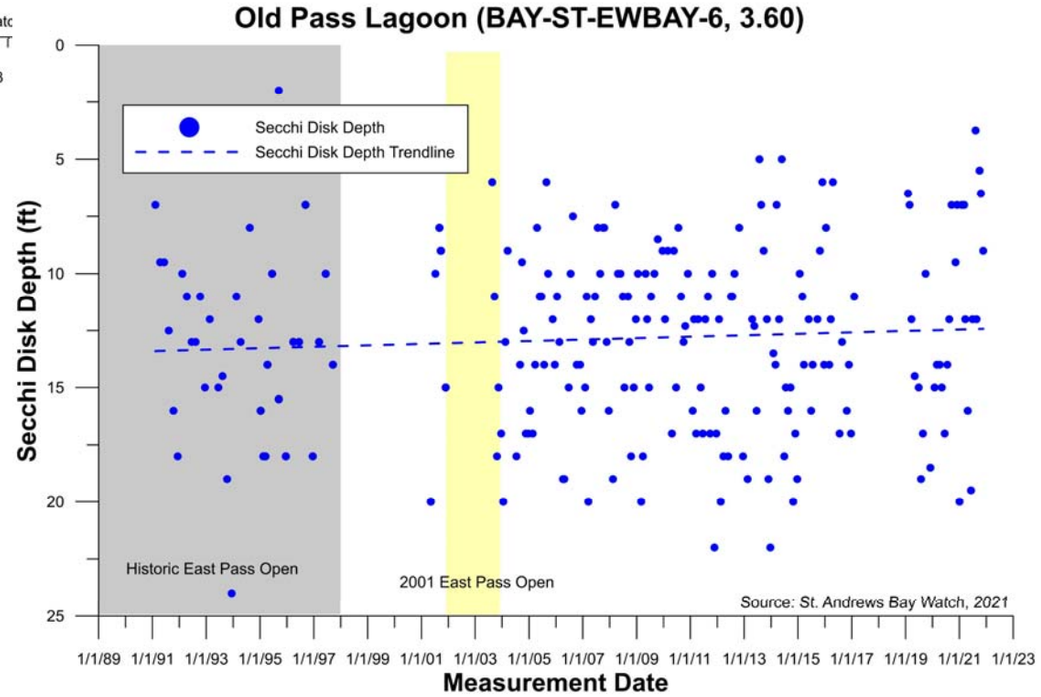
(a) **The inlet will be hydraulically stable under normal conditions**; and,

(b) The inlet will balance the sediment budget such that beach restoration and nourishment of the adjacent beaches, or other forms of **shoreline stabilization, including jetties, are not required**.

Water Quality

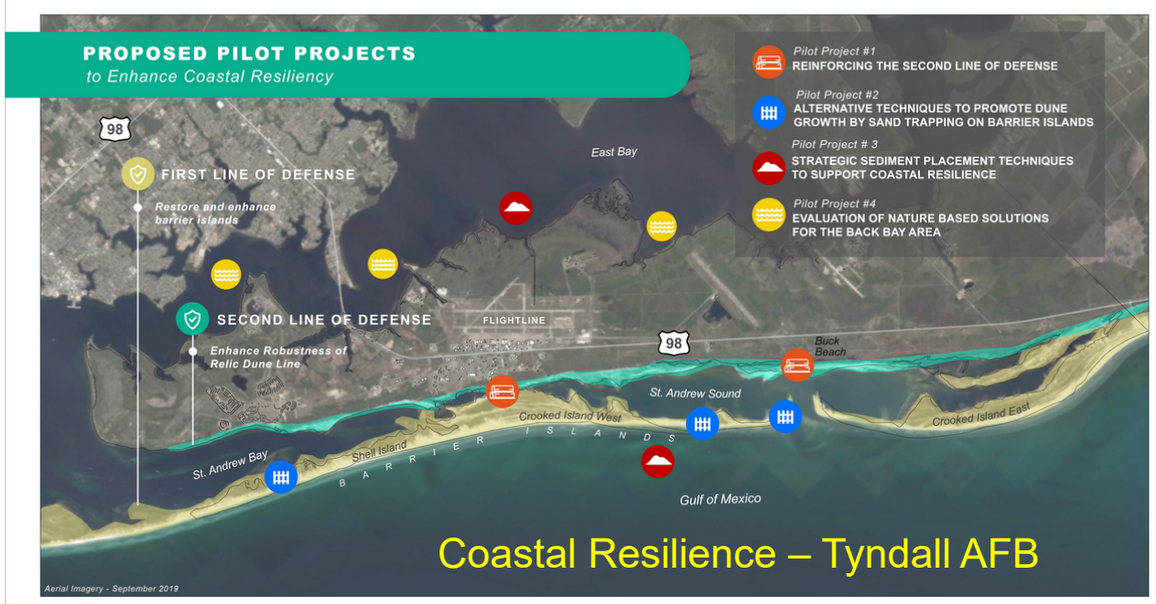






Potential Environmental Benefits

- Increased exchange of Gulf and bay waters.
- Enhanced pH, water clarity and salinity.
- Juvenile and larvae transport through the pass.
- Dune construction will shade sea turtle nesting area from urban lights.
- Dune construction will enhance storm protection to Tyndall AFB.
- Beach mouse boundary.
- Mitigate for beach erosion.



Coastal Barrier Resources Act (CBRA, 1982)

… Federal Government have historically subsidized and encouraged development on coastal barriers, resulting in the loss of natural resources, threats to human life, health, and property, and the expenditure of millions of tax dollars each year. CBRA seeks to minimize these effects by restricting federal funding and financial assistance affecting the CBRS.

> *(3) The term "financial assistance" means any form of loan, grant, guaranty, insurance, payment, rebate, subsidy, or any other form of direct or indirect Federal assistance other than–*
>
> > *(D) assistance for environmental studies, planning, and assessments that are required incident to the issuance of permits or other authorizations under Federal law …*

Federal funds can be provided for certain exempted activities including:

- *Improvements to existing, but not construction of new, navigation channels:*

CBRA does not prohibit the expenditure of private, state, or local funds within the CBRS. Additionally, it does not prevent federal agencies from issuing permits or conducting environmental studies. Areas within the CBRS may be developed, provided that private developers or other non-federal parties bear the full cost and risk.

Source: https://www.fws.gov/program/coastal-barrier-resources-act

Conclusions

- ☑ ***a) The inlet will be hydraulically stable under normal conditions; and,***
- ☑ ***b) The inlet will balance the sediment budget such that beach restoration and nourishment of the adjacent beaches, or other forms of shoreline stabilization, including jetties, are not required.***
- ☑ **c) Restore and enhance water quality within St. Andrew Bay.**
- ☐ d) Not result in significant adverse impacts to endangered species (EA/EIS).
- ☑ e) Provide a Public Benefit(s).
- ☑ f) Not have an adverse impact on the existing St. Andrew Bay Entrance Channel.
- ☐ g) Qualify for the necessary regulatory permits from the Florida Department of Environmental Protection and the U.S. Army Corps of Engineers (EA/EIS).

Discussion

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