



Image <https://en.wikivoyage.org/wiki/Pensacola>

Responsible Sediment Management at Pensacola Pass, FL

Krista J. Egan, P.E., Albert E. Browder, Ph.D, P.E.,
& Sergio A. Pena, E.I.

Florida Shore & Beach Preservation
Association
National Conference on
Beach Preservation Technology
February 2023



Outline

- **Motivation**
- **Location / stakeholders**
- **History**
- **Dredging & disposal practices**
- **Coastal engineering analyses**
- **Recommendations**

Motivation & Goals

- Mitigate for inlet impacts
- Maintain adjacent shorelines
 - Beach recreation
 - Habitat (Perdido Key beach mouse, shorebirds, sea turtles)
 - Cultural resources
- Steward valuable sand resources
- Develop an Inlet Management Plan



Pensacola Pass
Escambia County, FL

— Beach nourishment projects



Pensacola Bay

Pensacola Beach

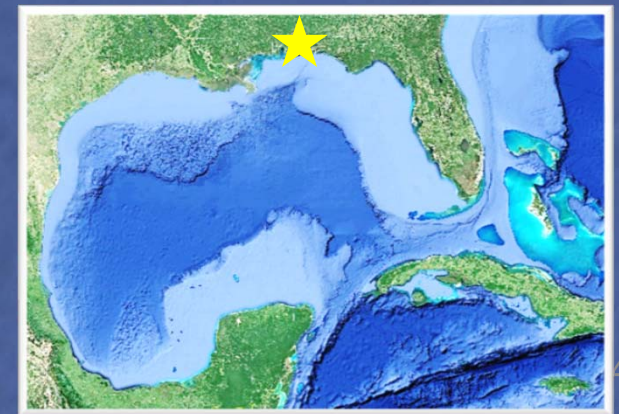
National Park Service

Perdido Key

Santa Rosa Island

Gulf of Mexico

AL / FL
State
Line



Pensacola Pass
Escambia County, FL

Naval Air Station Pensacola



Pensacola Bay

Gulf Intracoastal Waterway

groins

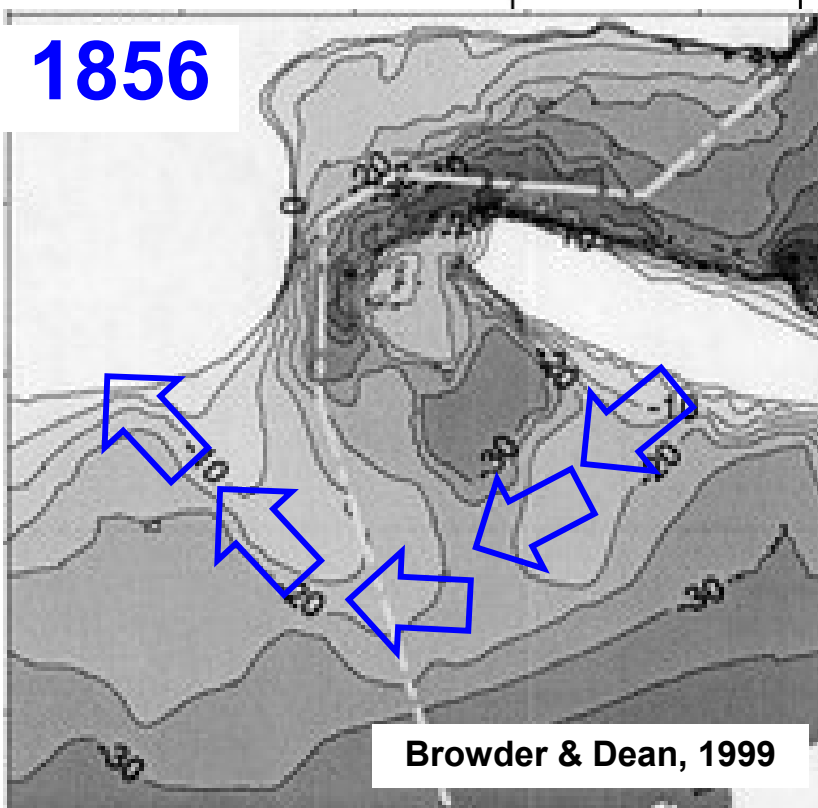
Entrance Channel

Perdido Key

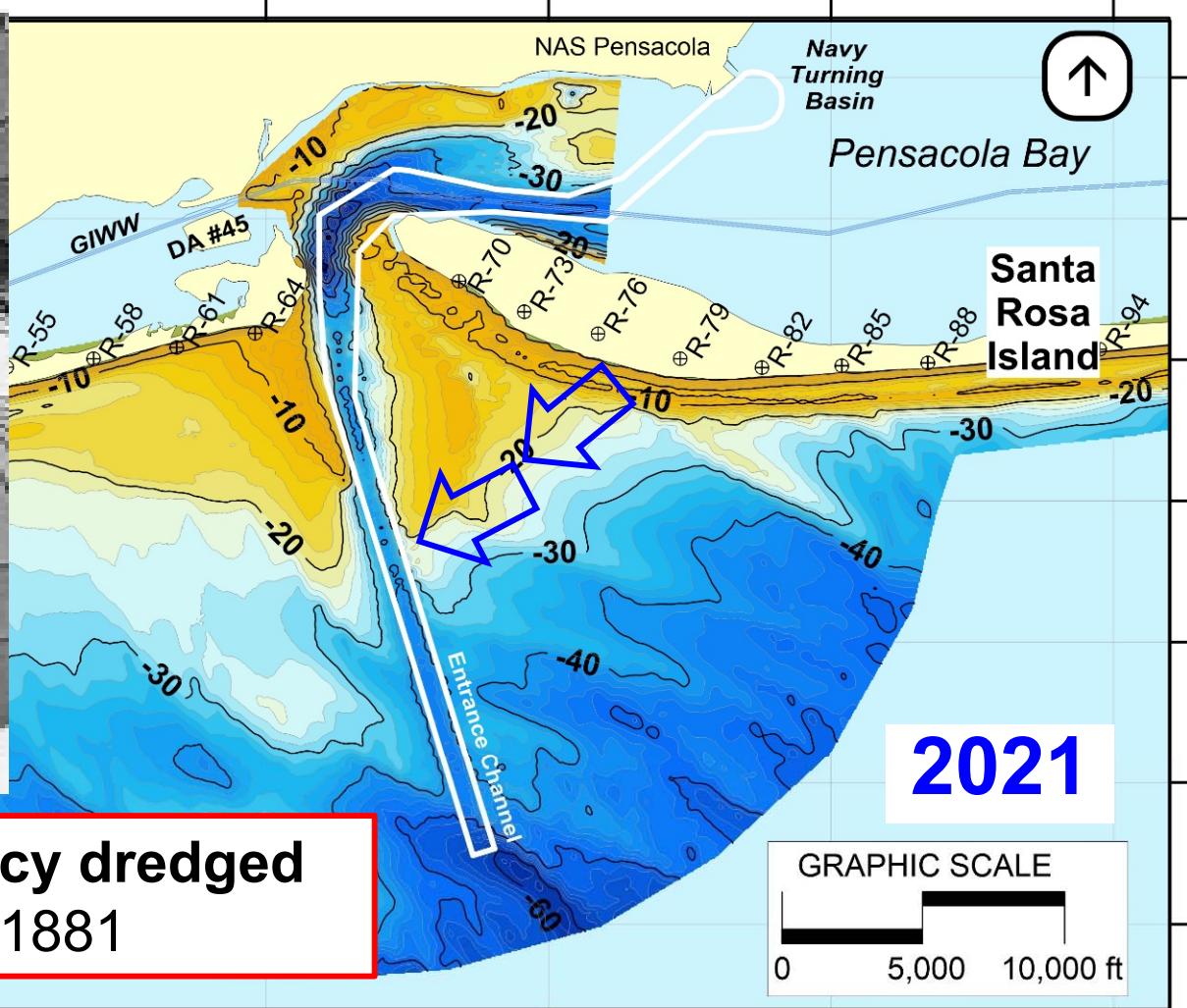
Santa Rosa Island

Gulf of Mexico

1856

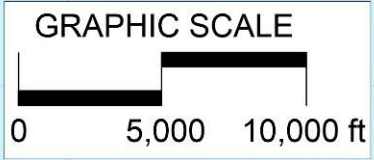


Browder & Dean, 1999



2021

**47.7 million cy dredged
since 1881**



470,000

1,060,000

1,070,000

1,080,000

1,090,000

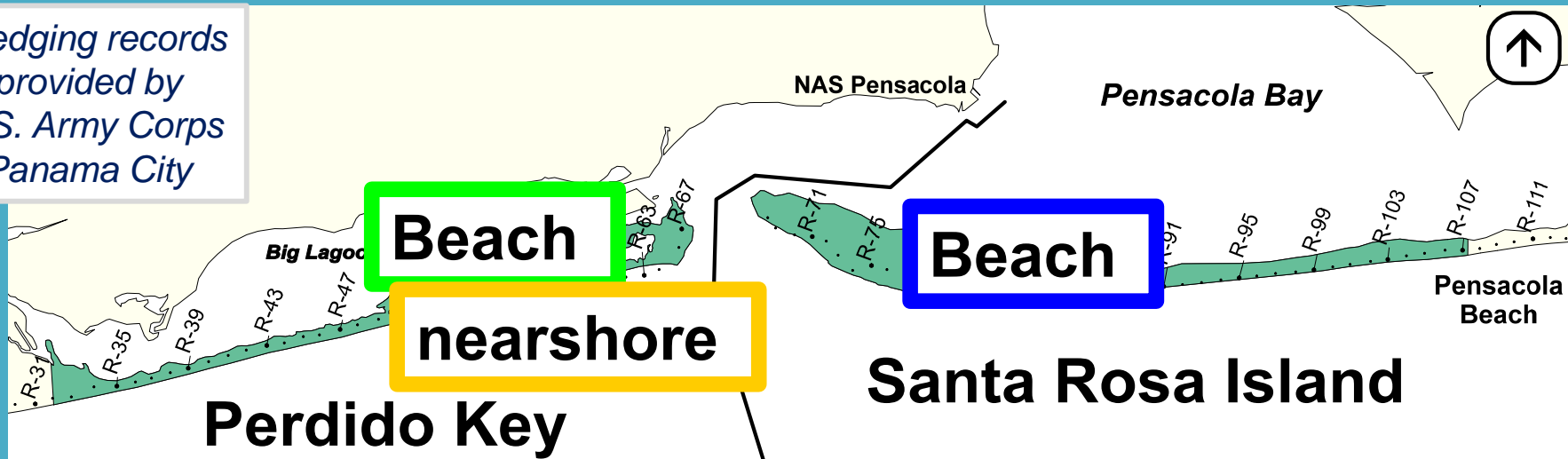
1,100,000

1,110,000

EASTING (FT, NAD83)



Dredging records
provided by
U.S. Army Corps
Panama City



Perdido Key

Santa Rosa Island

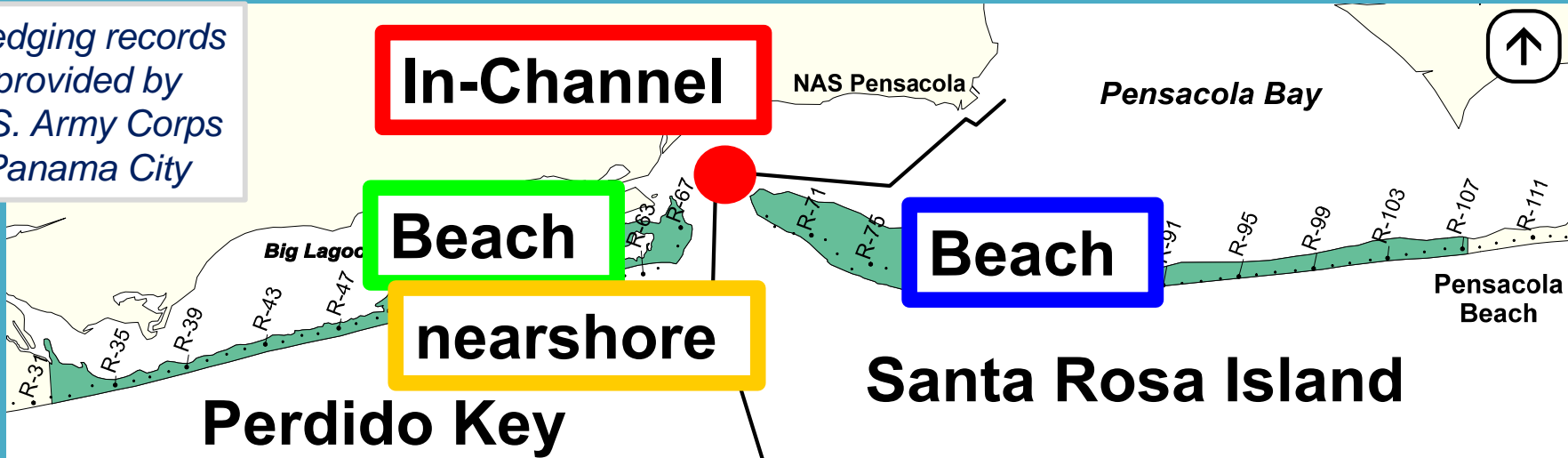
*Pensacola Pass
Entrance Channel*



offshore

**Historical
Disposal**

Dredging records
provided by
U.S. Army Corps
Panama City

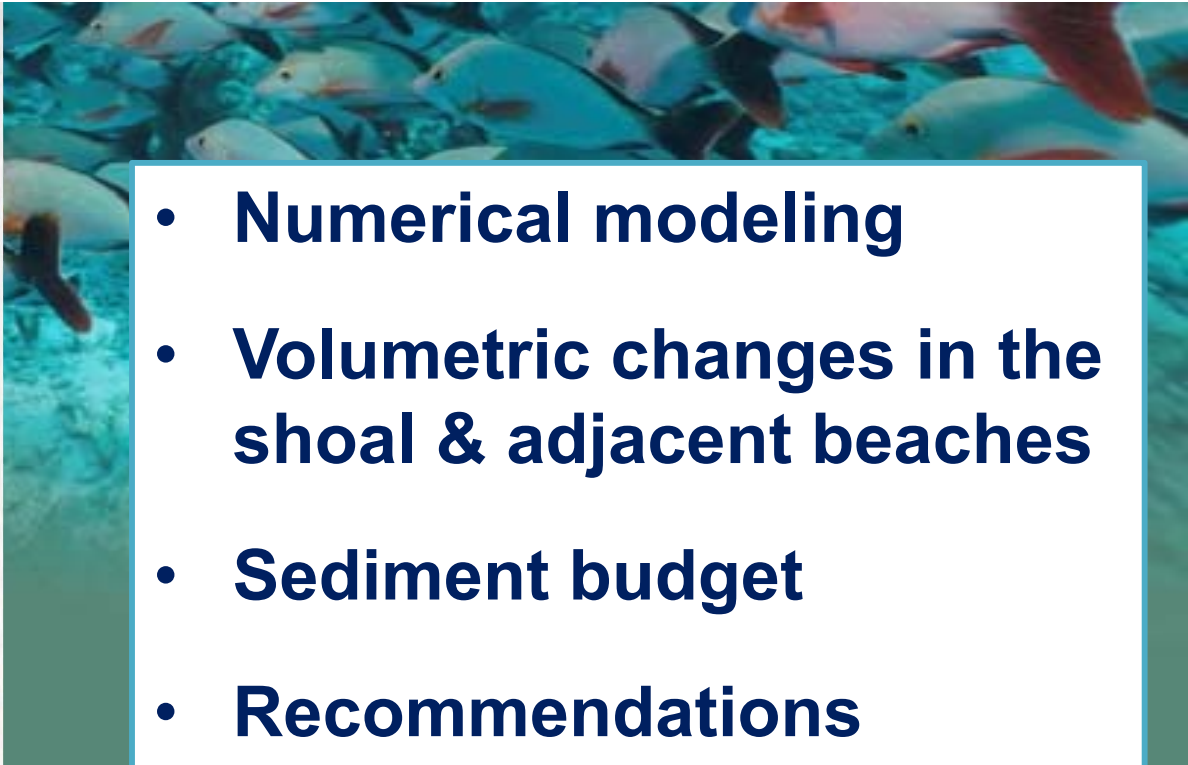


Gulf of Mexico

offshore

Contemporary Disposal

*Pensacola Pass
Entrance Channel*

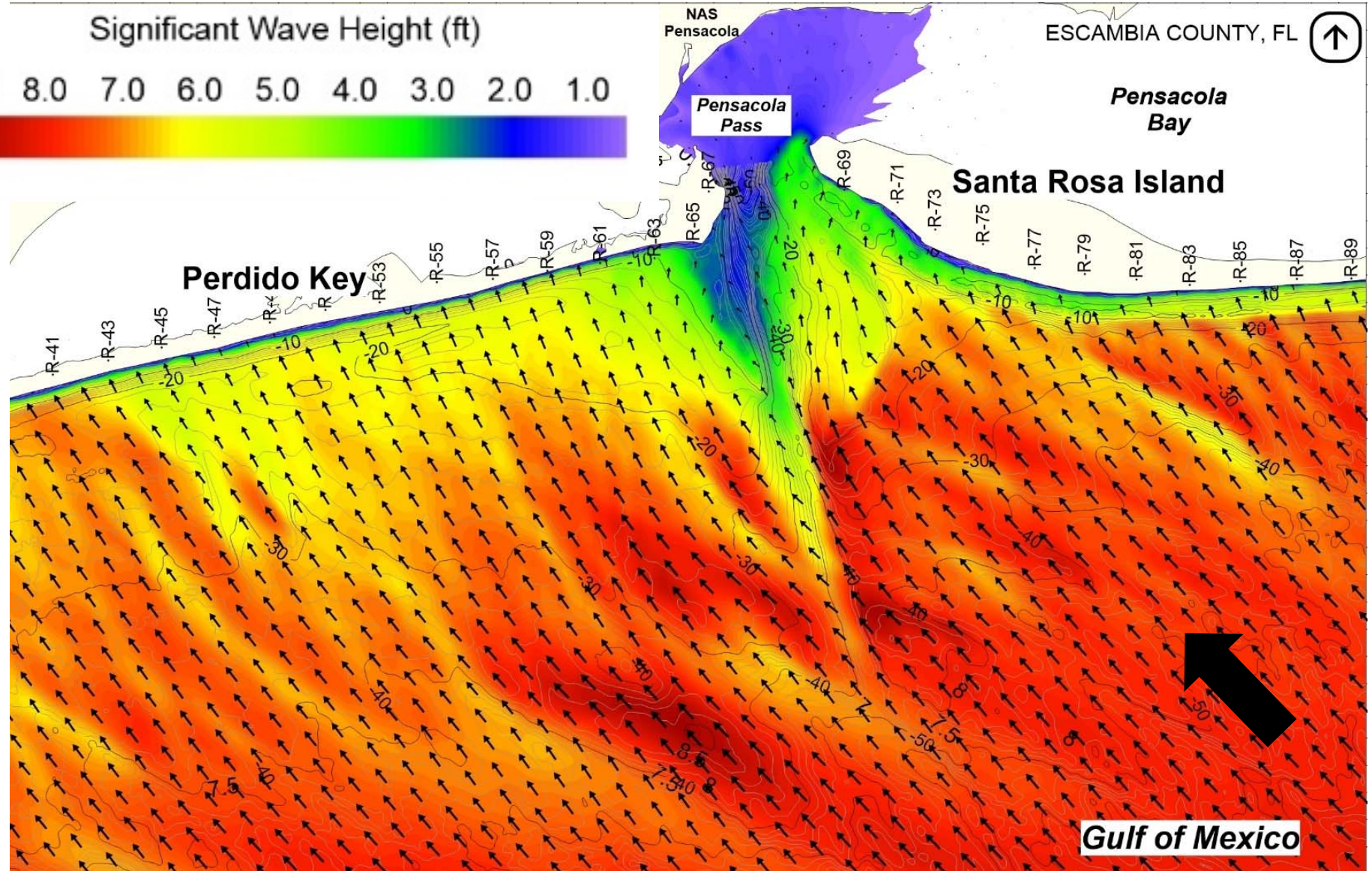


- **Numerical modeling**
- **Volumetric changes in the shoal & adjacent beaches**
- **Sediment budget**
- **Recommendations**

Coastal Engineering Analyses

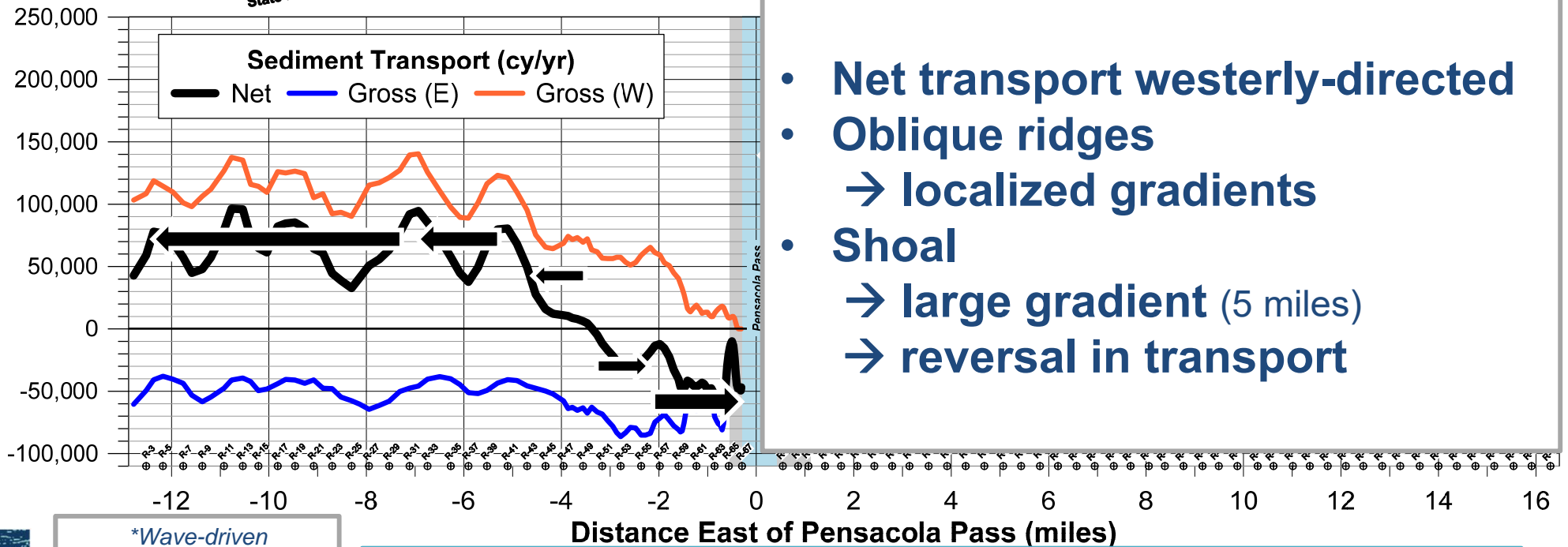
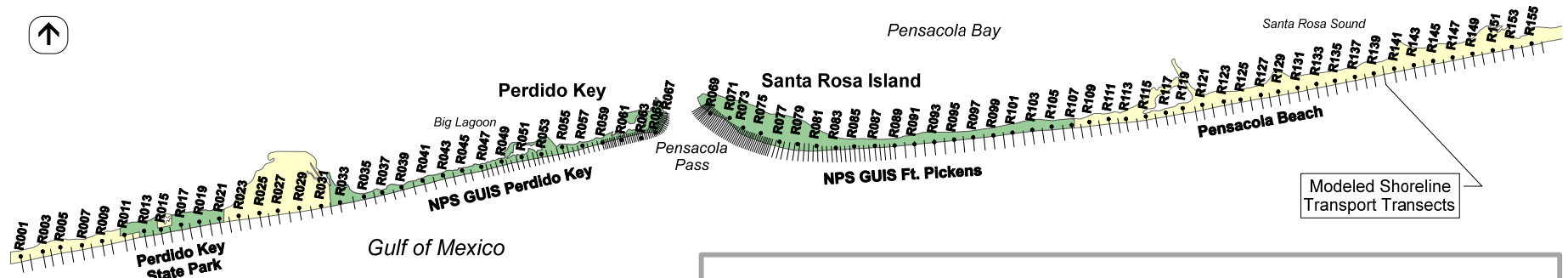
Significant Wave Height (ft)

9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0



ESCAMBIA COUNTY, FL





- Net transport westerly-directed
- Oblique ridges
→ localized gradients
- Shoal
→ large gradient (5 miles)
→ reversal in transport



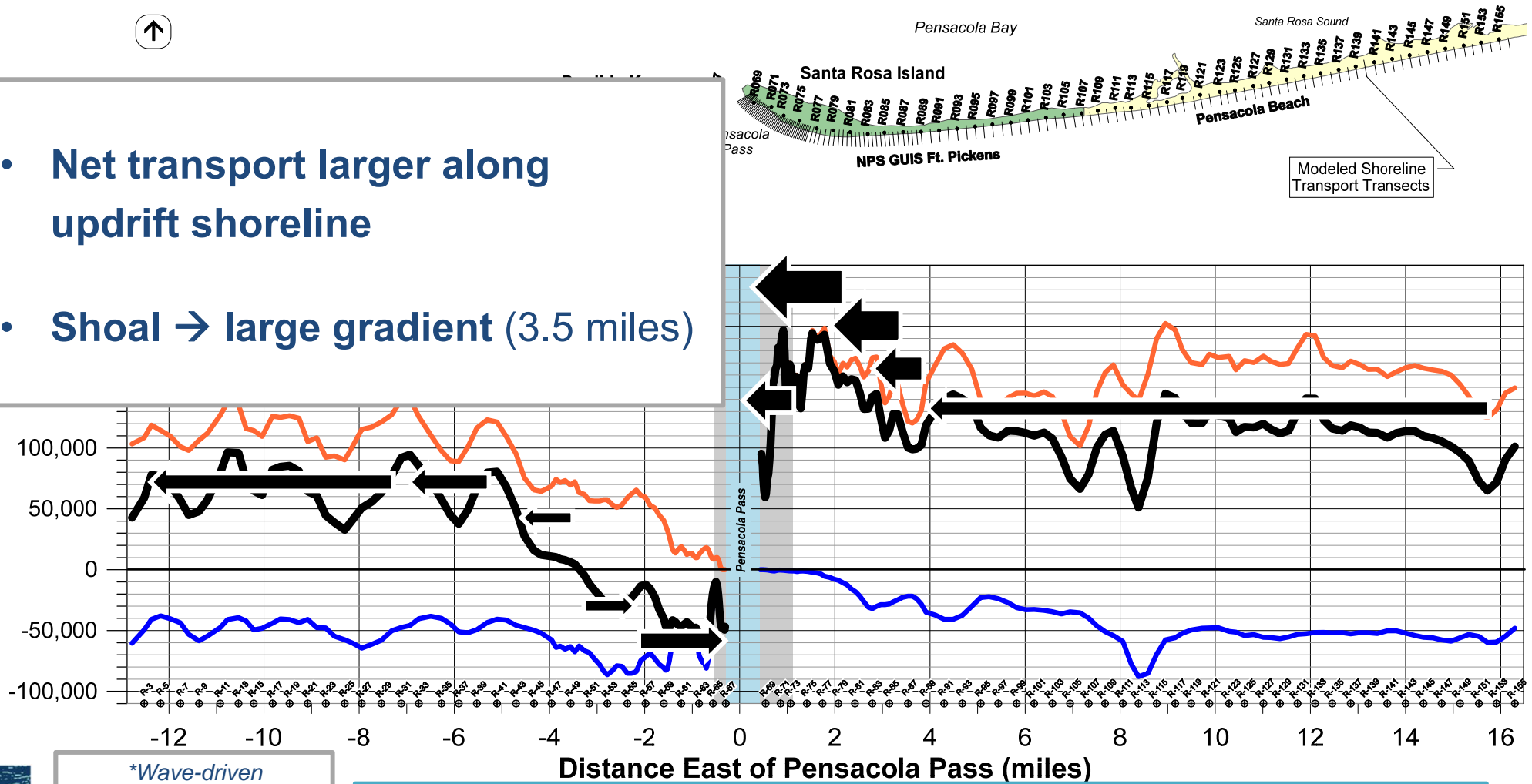
*Wave-driven
alongshore transport

**Average annual
conditions

Sediment Transport Modeling



- Net transport larger along updrift shoreline
- Shoal → large gradient (3.5 miles)

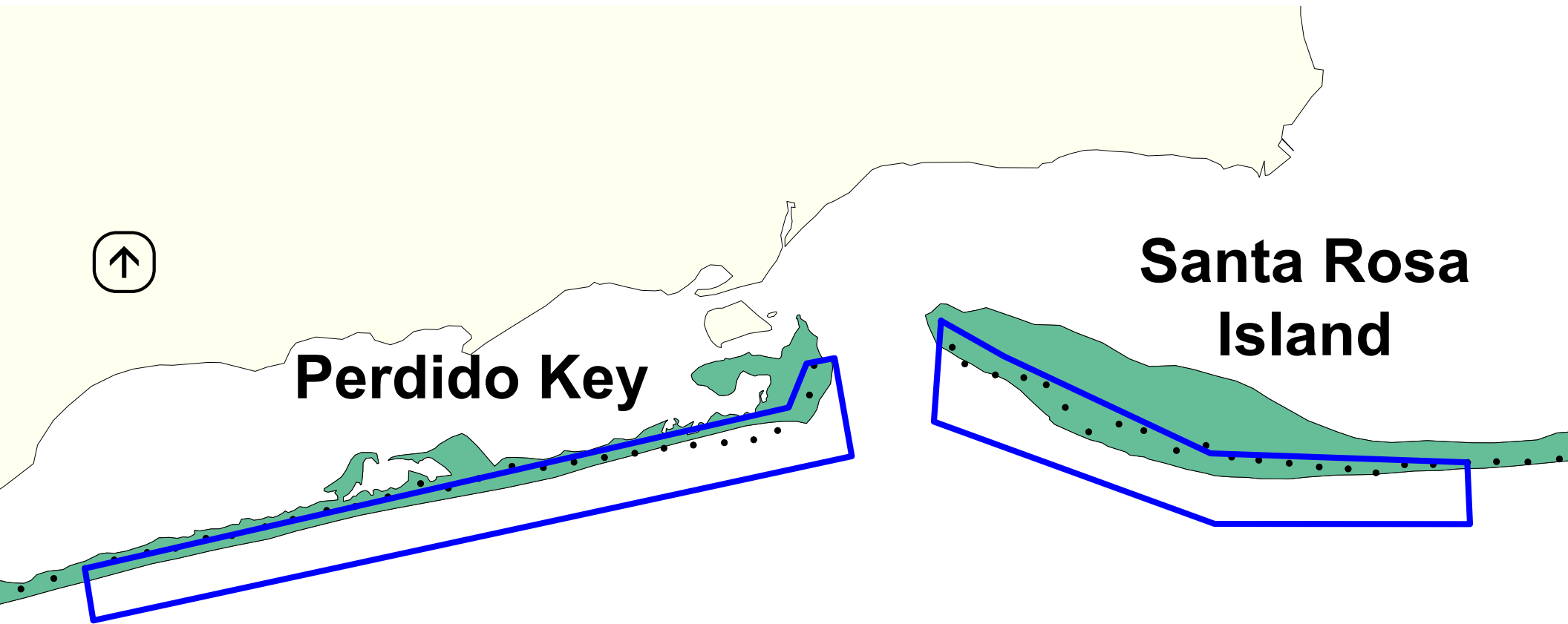


*Wave-driven
alongshore transport

**Average annual
conditions

Sediment Transport Modeling



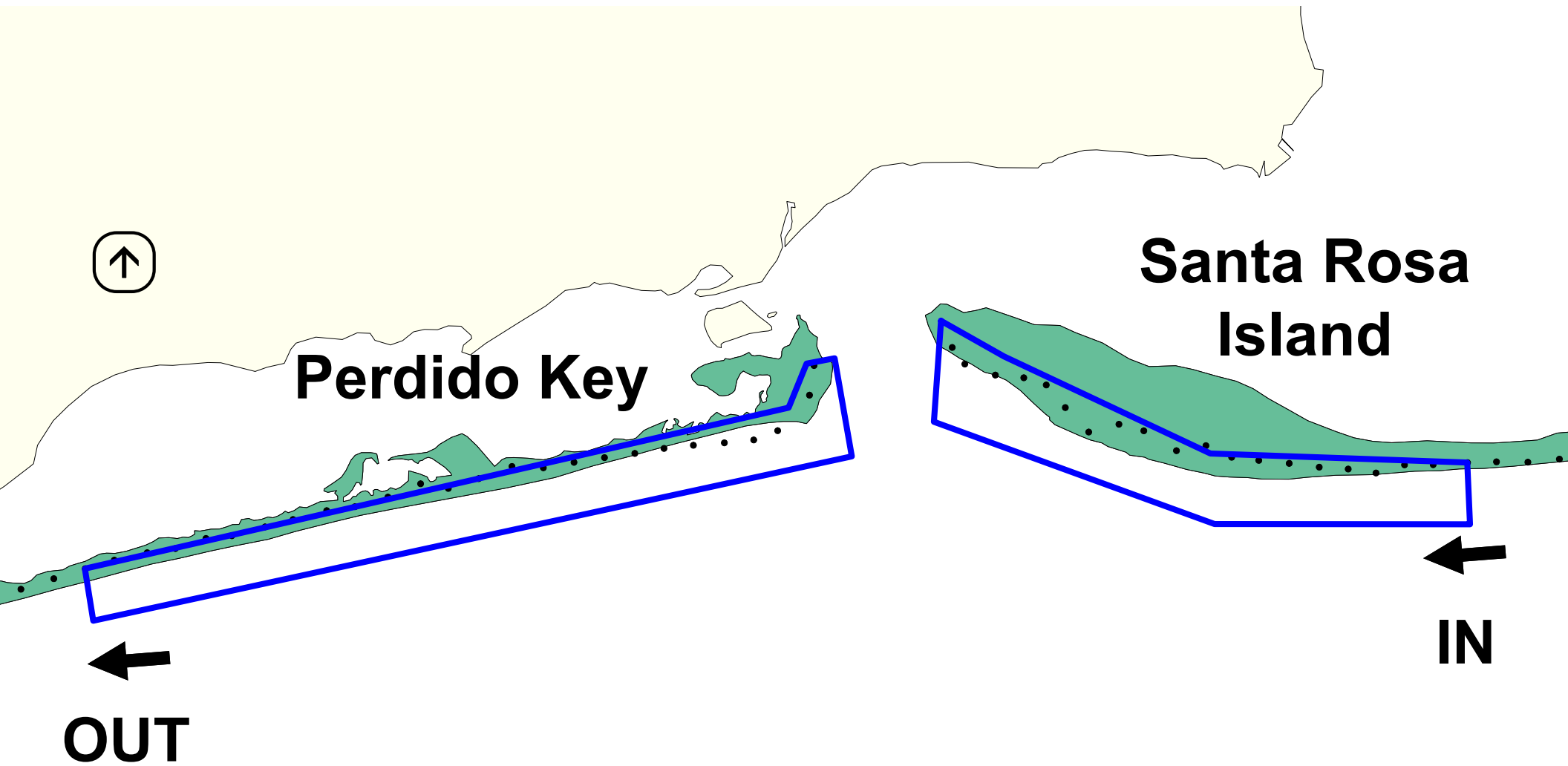


Perdido Key

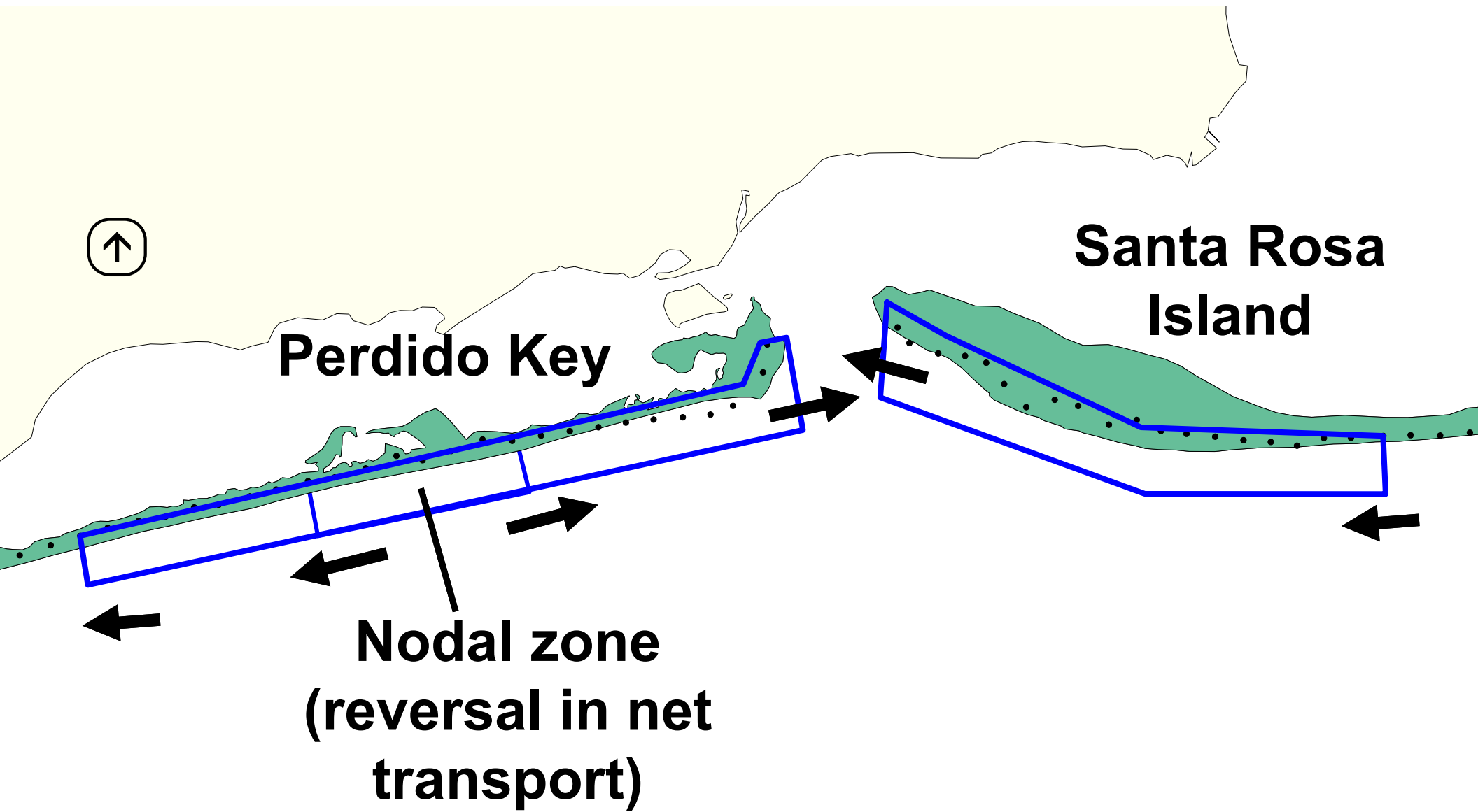
Santa Rosa Island

**Downdrift
impact
5 miles**

**Updrift
impact
3.5 miles**



Transport IN greater than OUT

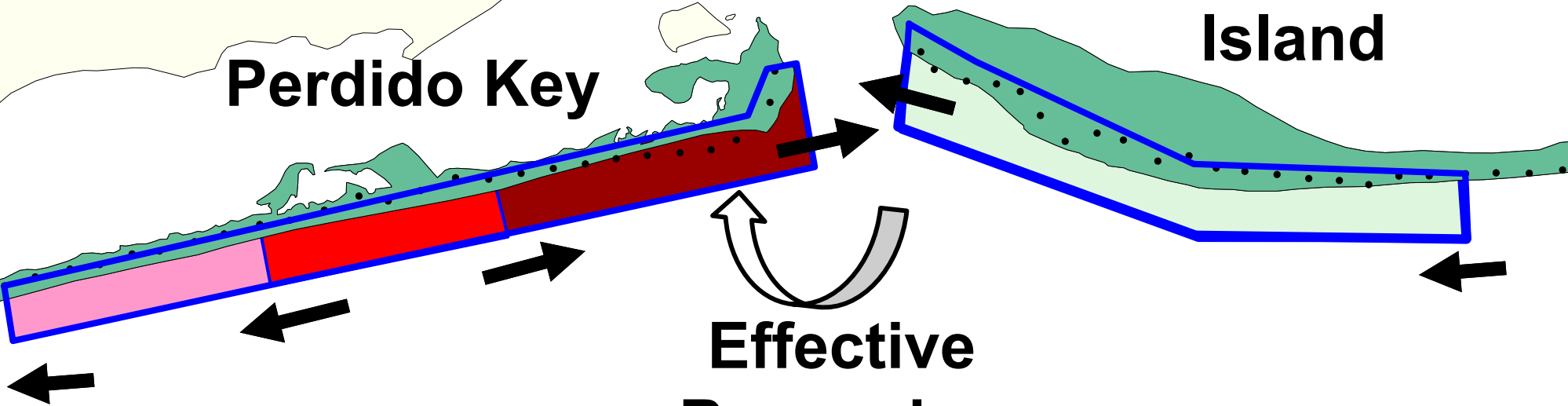


Beach Volume Changes



Perdido Key

Santa Rosa Island



**Downdrift
impact
-150**

**Effective
Bypassing
20**

**Updrift
impact
+10**



Values in thousands of cubic yards per year

Shoal Volume Changes



Perdido Key

Santa Rosa Island

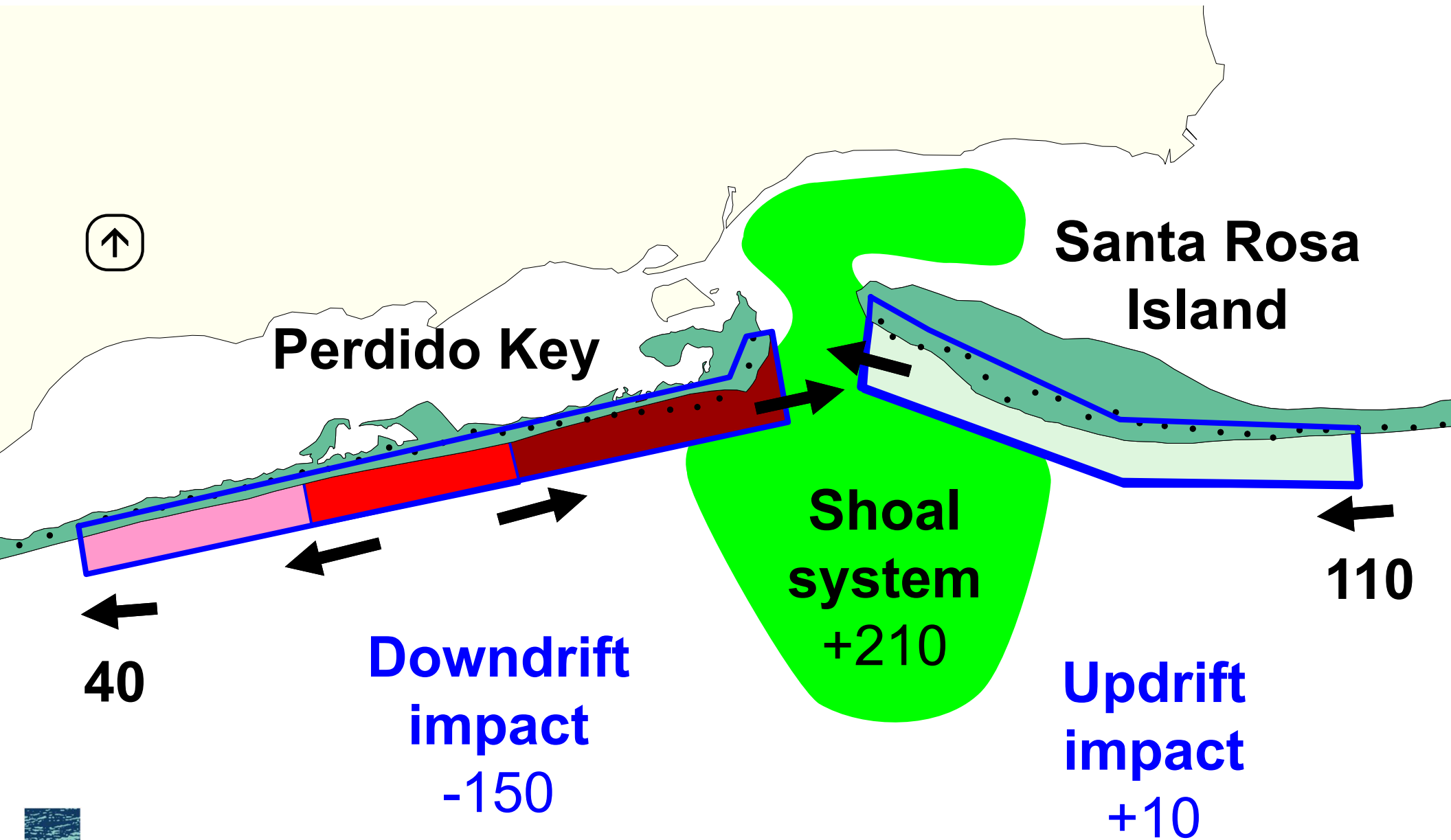
**Shoal system
+210**

**Downdrift
impact
-150**

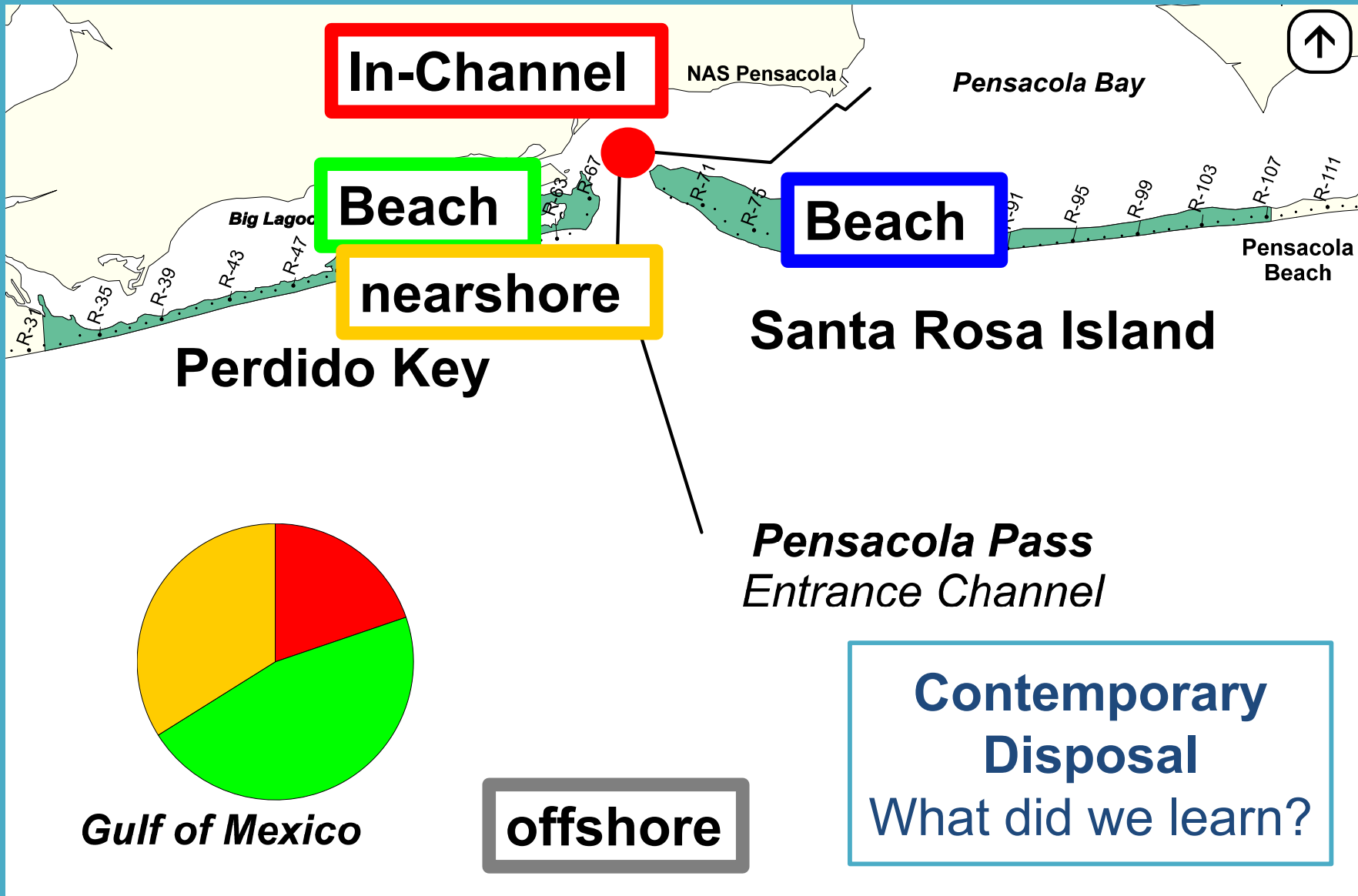
**Updrift
impact
+10**

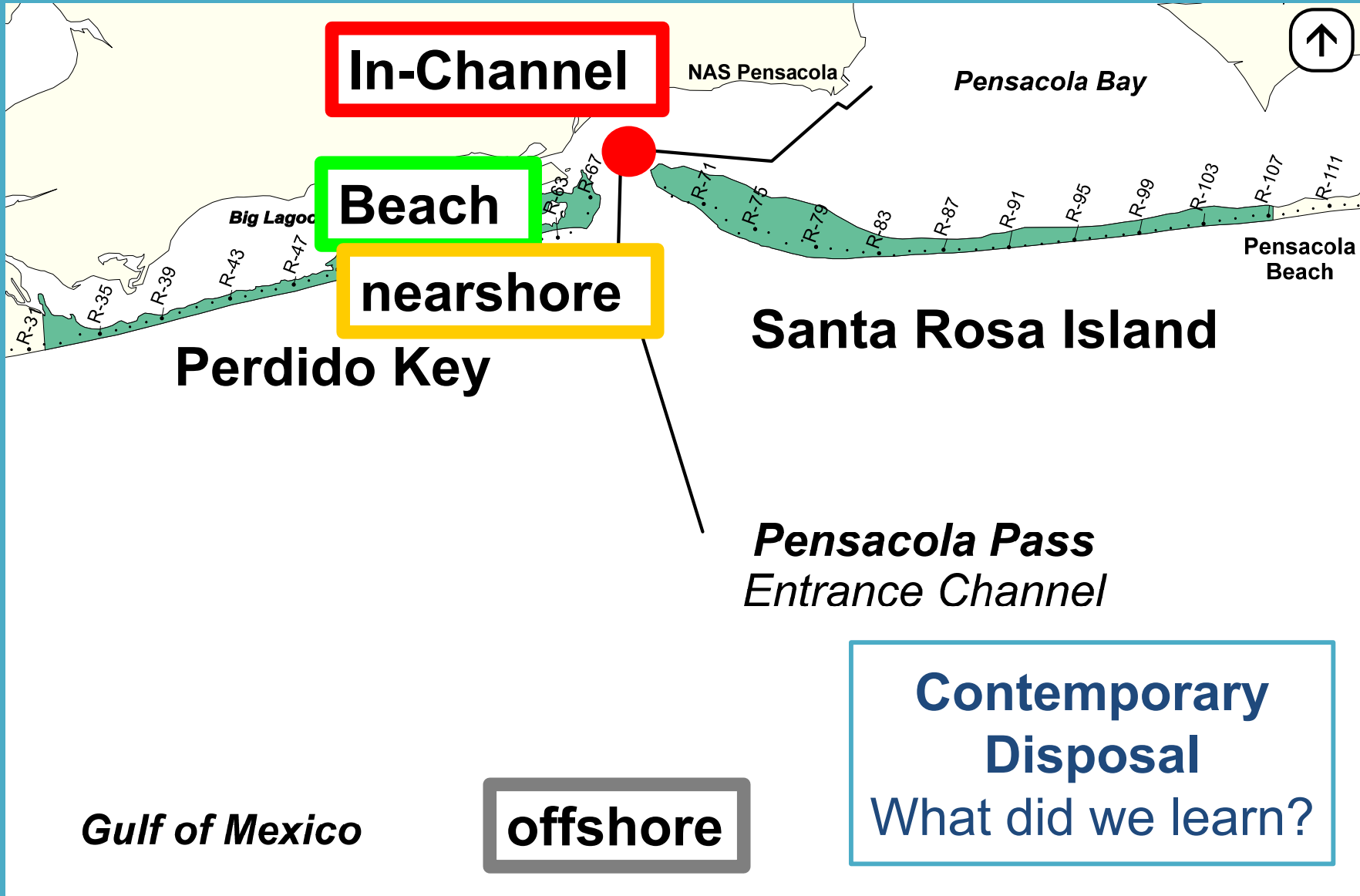


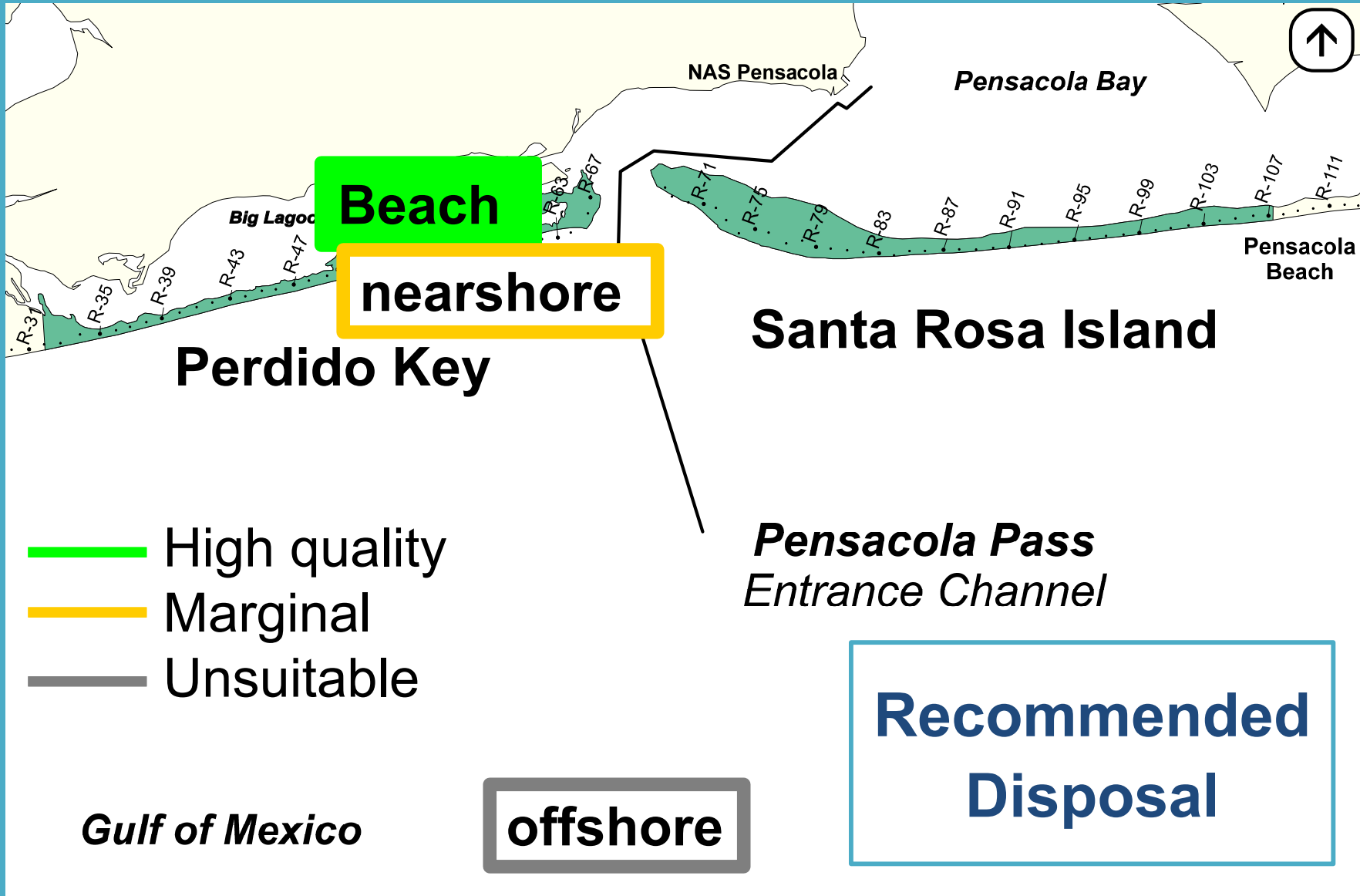
Values in thousands of cubic yards per year

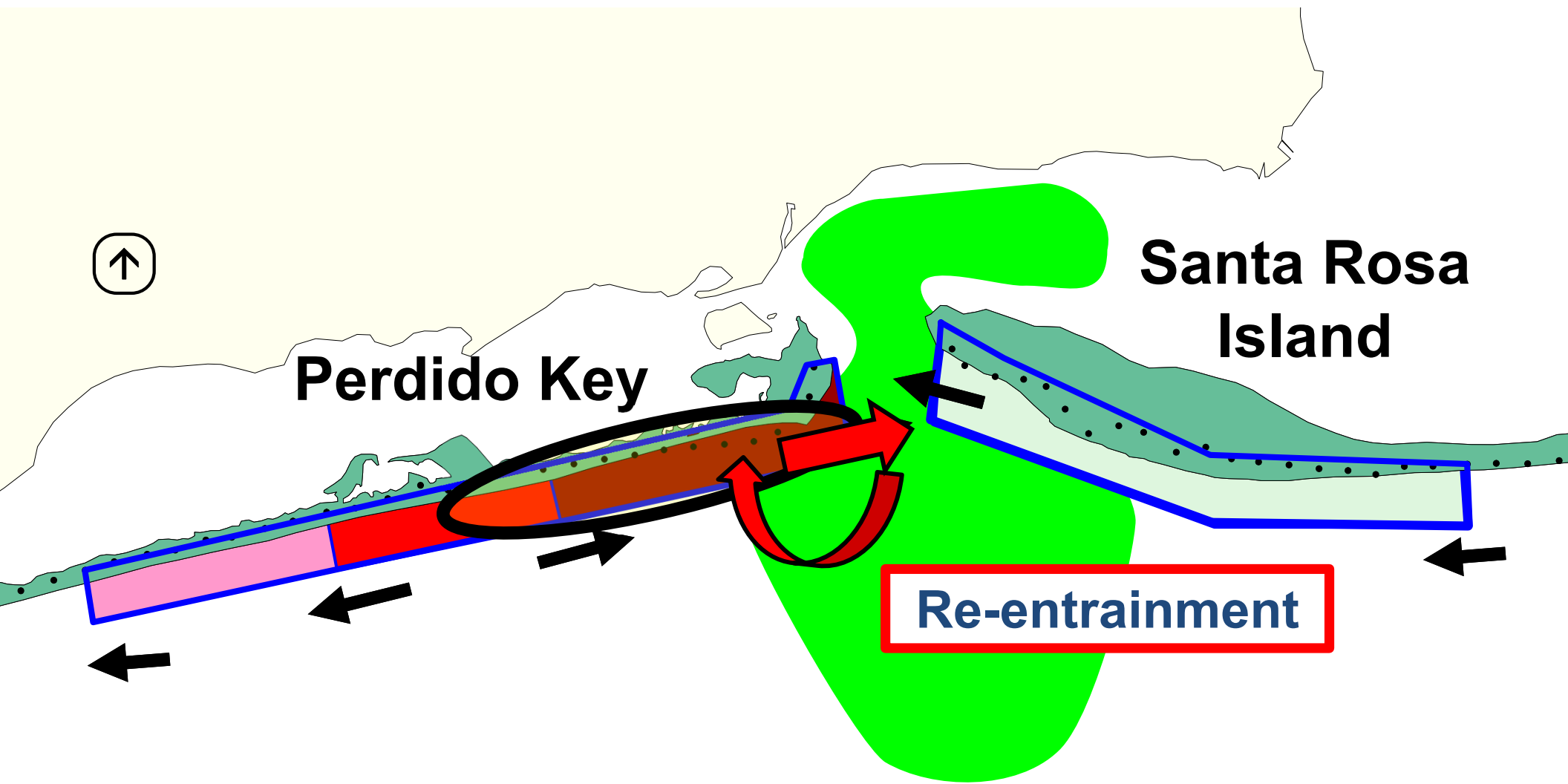


Values in thousands of cubic yards per year

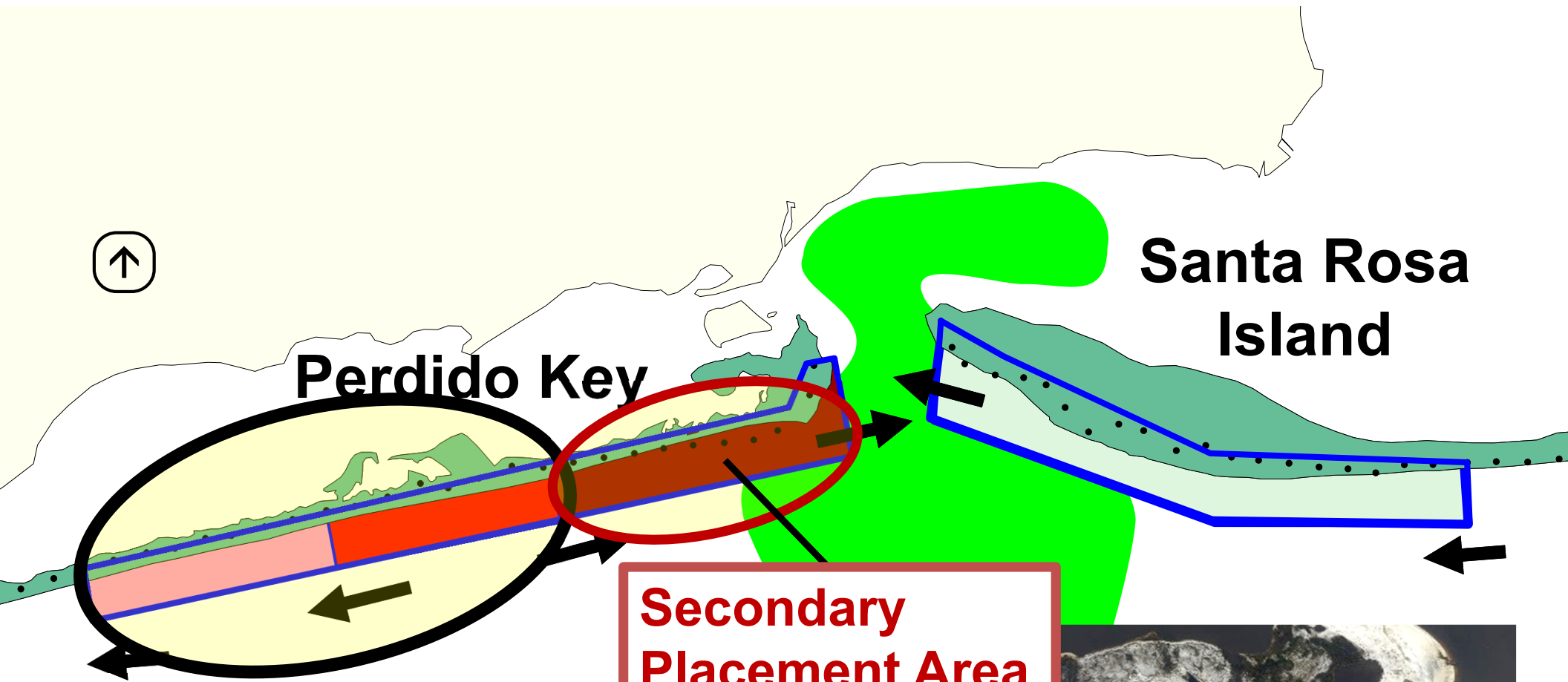








Location of Sand Placement



SHIFT Primary Placement Area



9/18/20 Post-Sally, credit: NOAA



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*Thank you
FDEP & Escambia County
(provided funding for the study)*