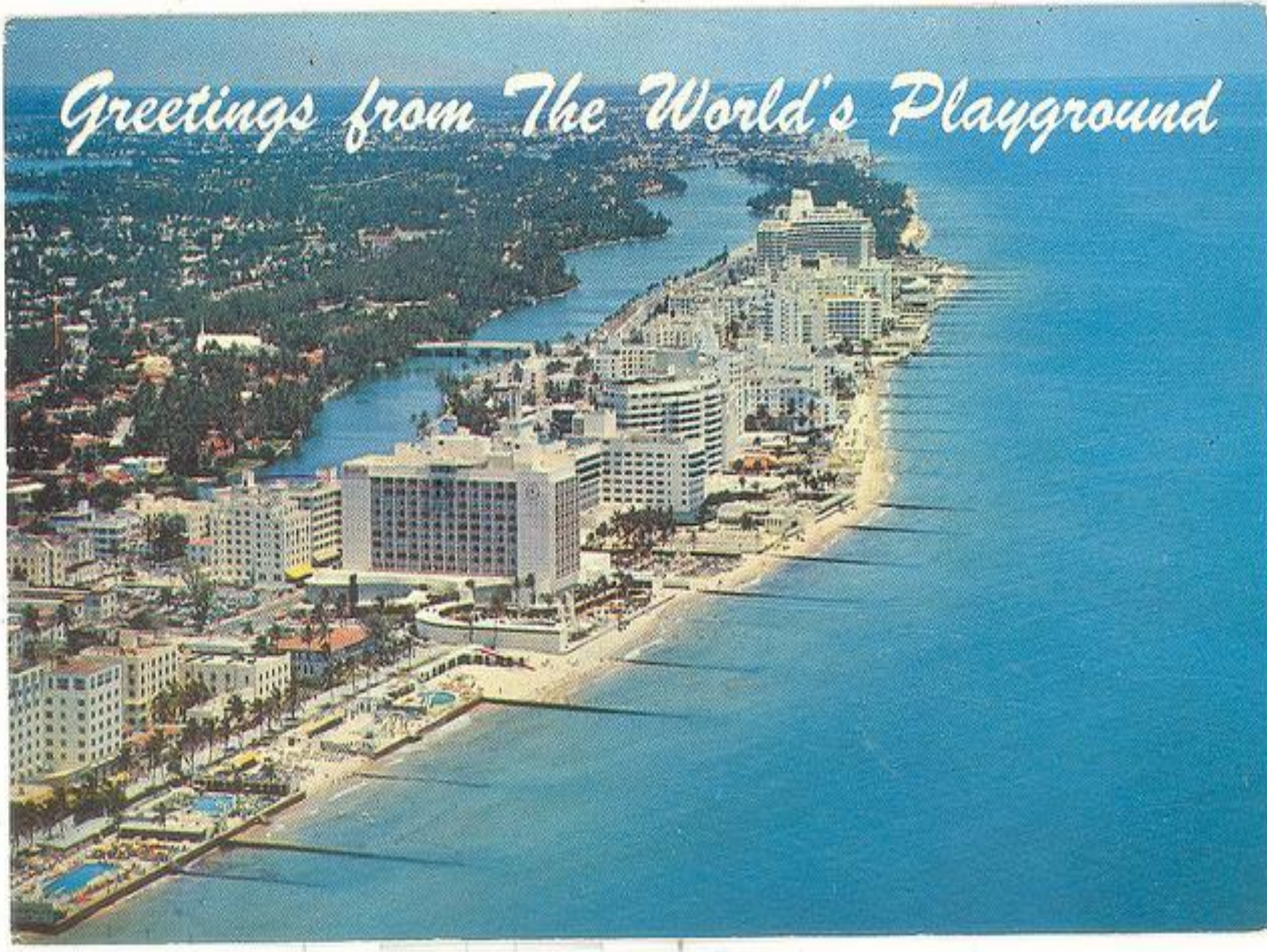
The Future of Beach Renourishment in Miami-Dade County

How and How Much ($$$)

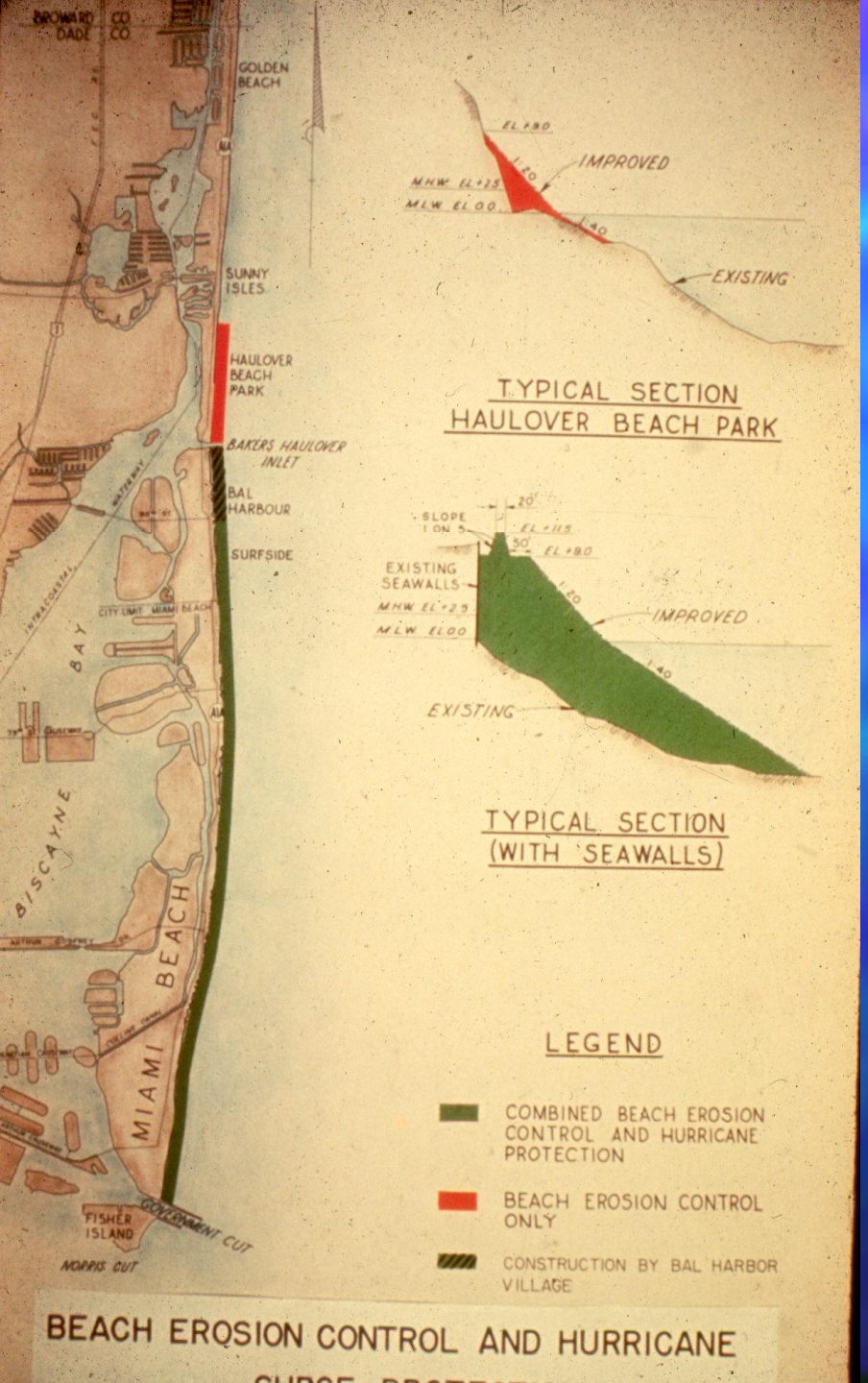
FSBPA 2015 Annual Meeting

September 25, 2015


Greetings from The World's Playground


DORAL

Dade County Beach Erosion Control and Hurricane Surge Protection Project



Initially 10.5 miles-Extended to 13 miles in 1988

Three Different Design Berms 225’ to 280’ from ECL

Initial Restoration: 17.8 million c.y.

$52 million

Initial Project Construction

Initial Construction Parameters:

Fill Quantities:

Phase I (Govt Cut-Haulover:	**16,512,000 c.y.**
Phase II (Sunny Isles Beach);	**1,320,000 c.y.**
Total	**17,832,000 c.y.**

13.05 miles nourished

Phase I Cost: $48.4 million **Phase II Cost: $12.0 million**

Total Cost: $60.4 million


LONG ISLAND
BISCAYNE
DERM

Assessing Project Performance

Post-Construction Nourishment Quantities:

Large Nourishment Events:	**2,915,000 cy**
Maintenance (beach placement):	**417,000 cy**
Total	**3,332,000 cy**

- **Nourishment Quantity is approximately 19% of the initial construction quantity.**

***Only 8.03 of the 13 miles of restored beach has ever needed nourishment.**

Assessing Project Performance: Predicted versus Actual

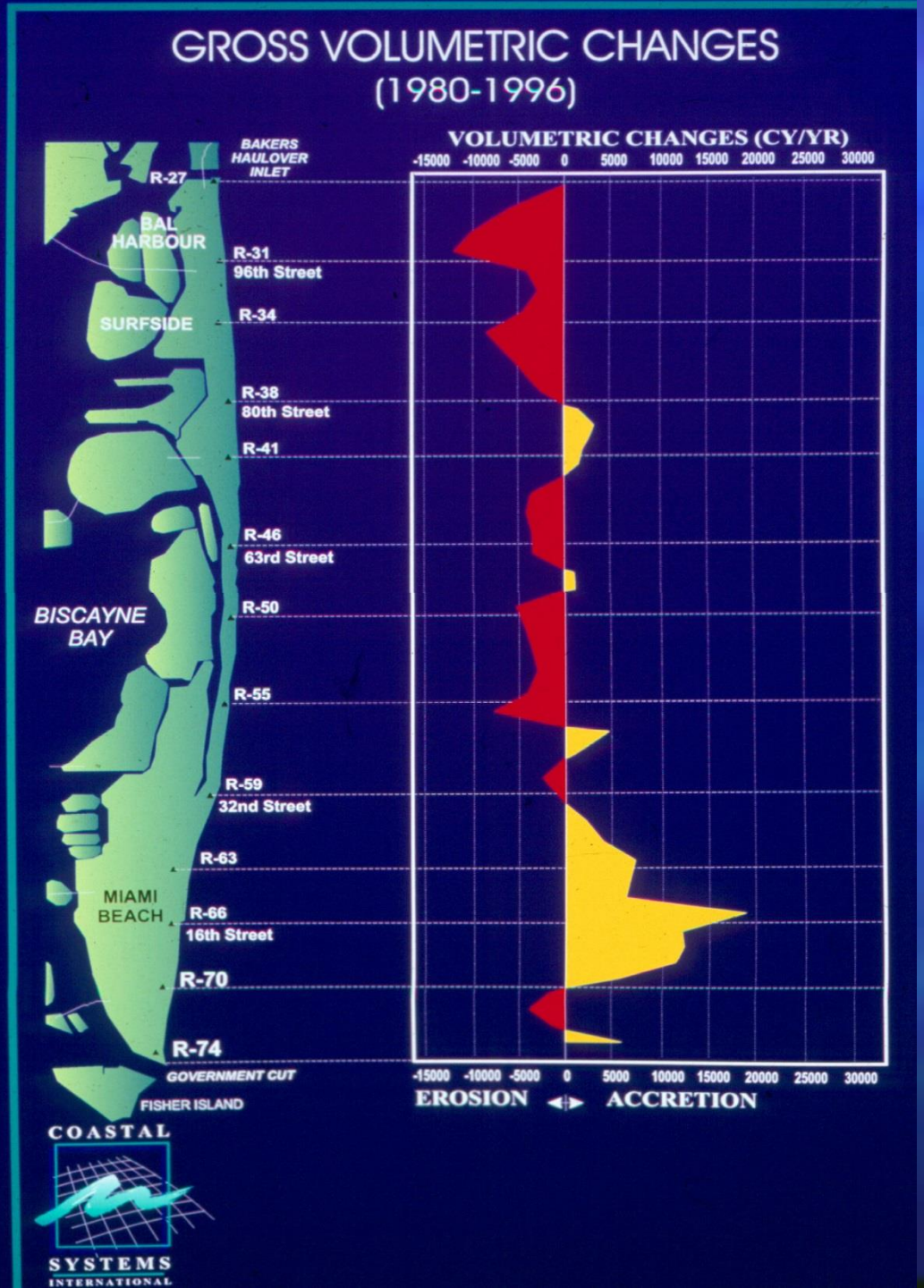
	Predicted(GDM)	Actual	% Difference
Cost	$75 million	$60.4 million	-19.5%
Maintenance Quantity	4,853,000 c.y.	3,332,000 c.y.	-32.5%
Maintenance Interval	10 years	11 years	-9.0%

Key Project Management Challenges for the Future

Sand Management

Optimizing Sand Distribution along the project

Identifying Sources of Future Nourishment Materials



Improving Sediment Distribution

Identify trends and hotspots

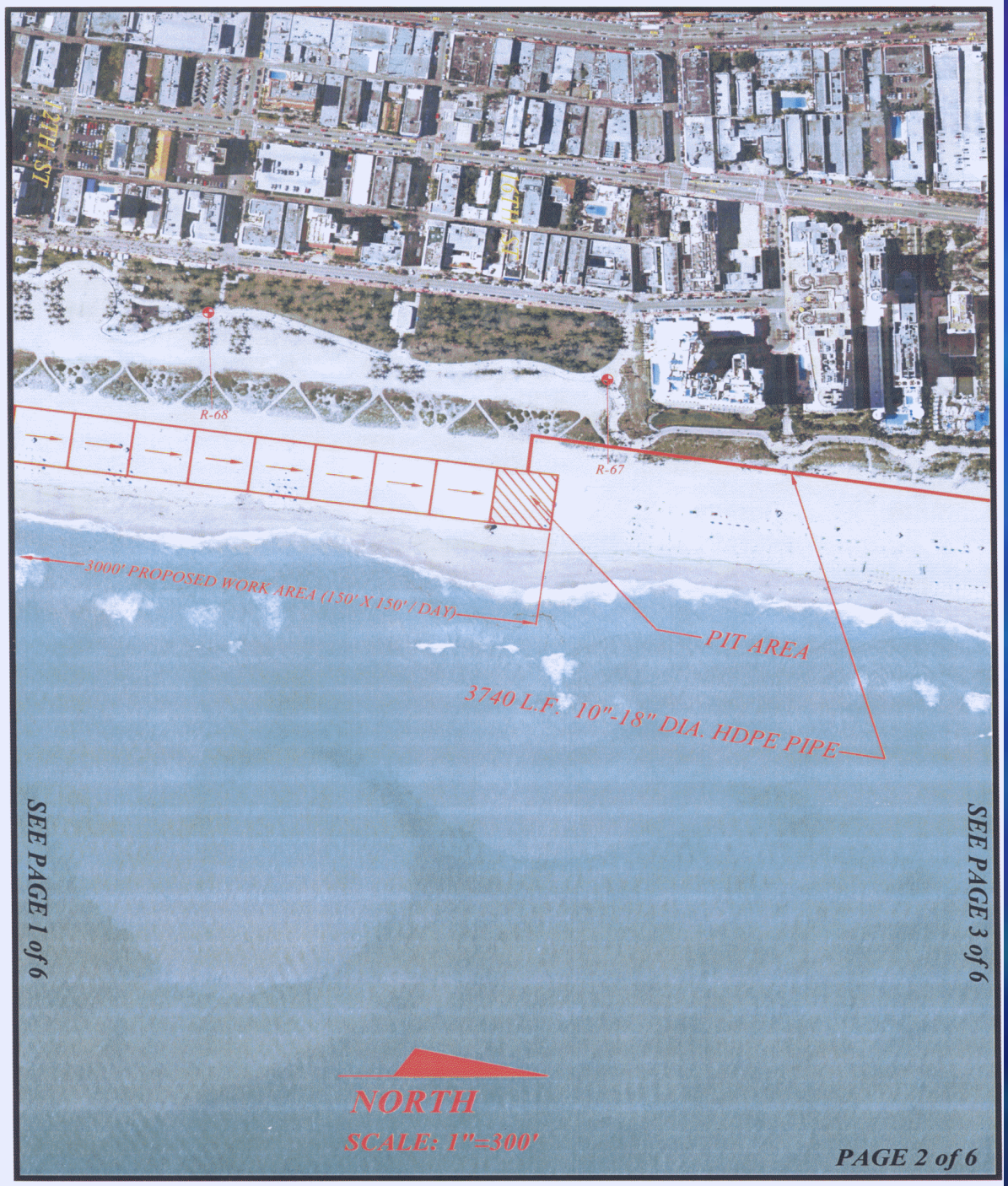
Regional Studies:

- 1996 Sediment Budget
- Hotspot Analyses
- ACOE Section 227
- Countywide Analysis

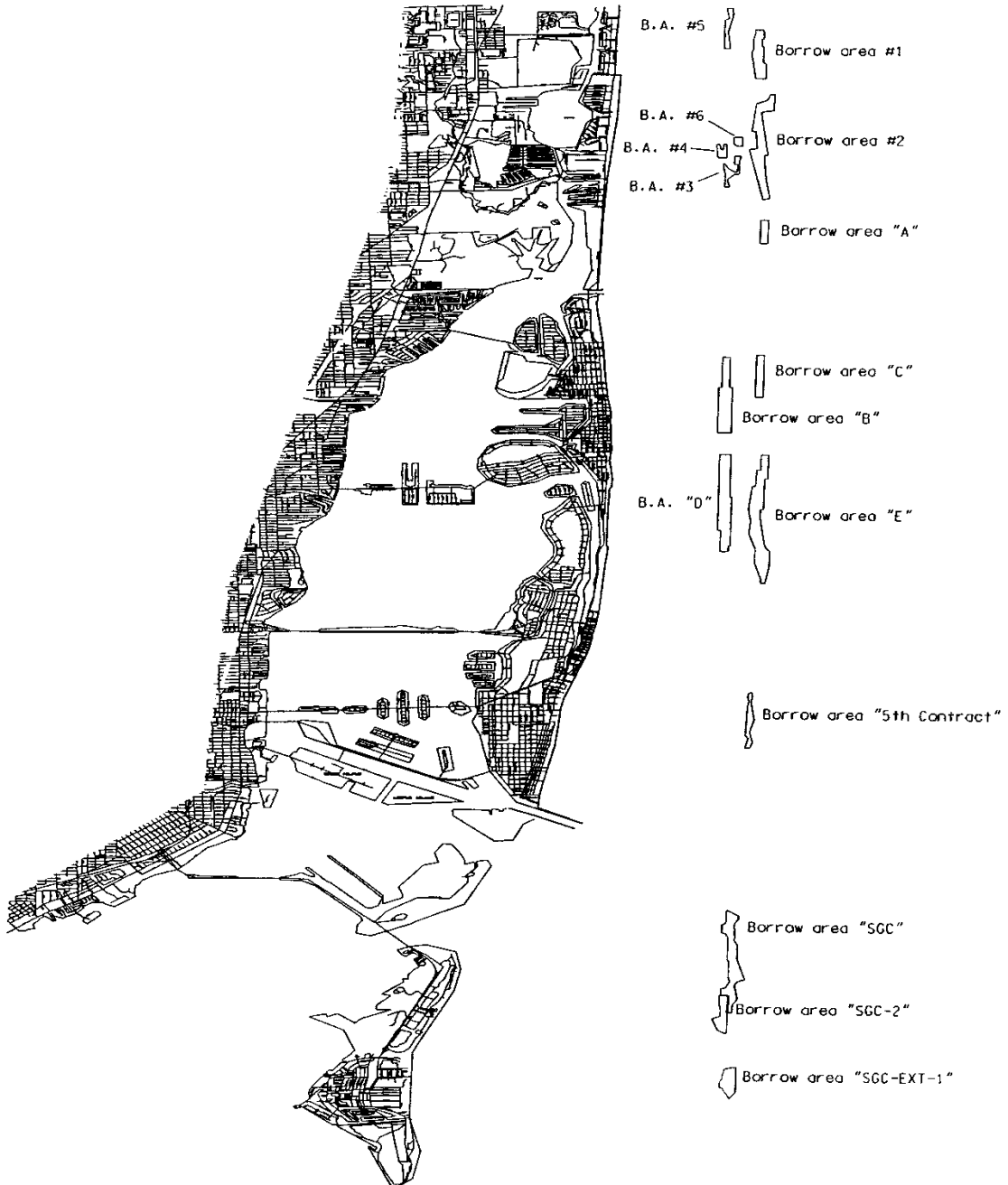
Implement Findings

Sand Relocation from Accretional to Erosional Areas of the Project

Sand Backpassing From Accretional Areas in South Miami Beach- 2011



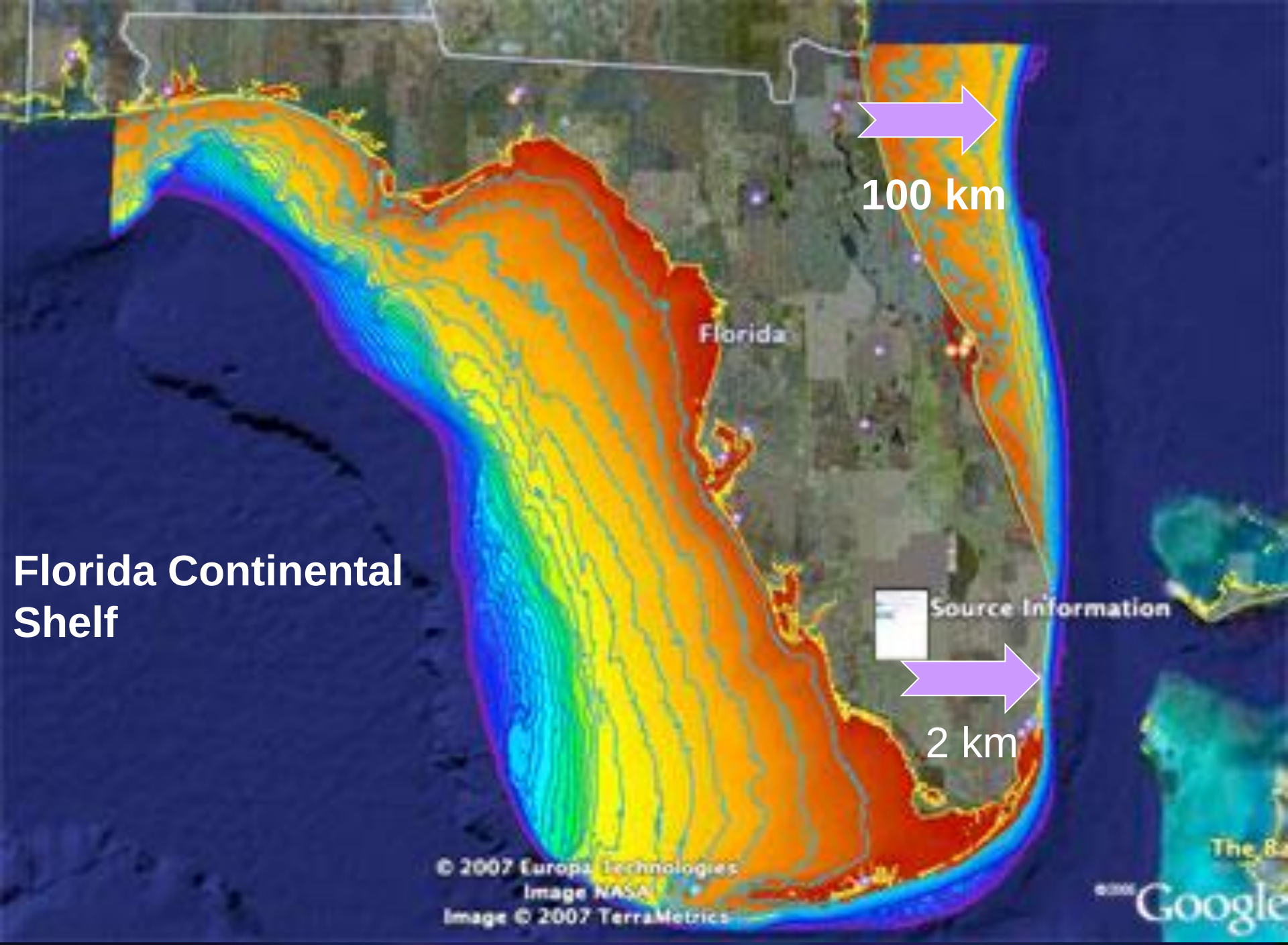

32nd Street "Hot Spot" and South Miami Beach. 11/1996


B.A. #5
Borrow area #1
B.A. #6
B.A. #4
B.A. #3
Borrow area #2
Borrow area "A"
Borrow area "C"
Borrow area "B"
B.A. "D"
Borrow area "E"
Borrow area "5th Contract"
Borrow area "SGC"
Borrow area "SGC-2"
Borrow area "SGC-EXT-1"

Why Is Miami-Dade County Running Out of Sand?

Long History/ Large Quantity of Sand

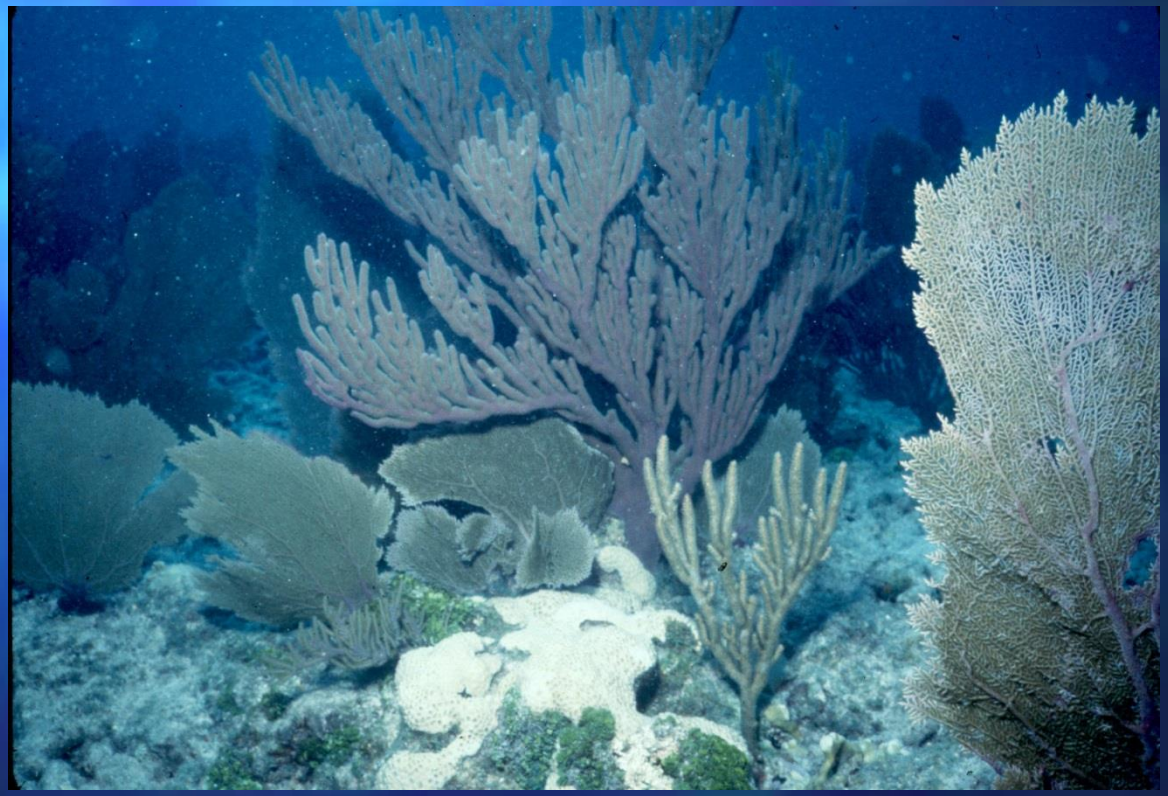
Other Factors

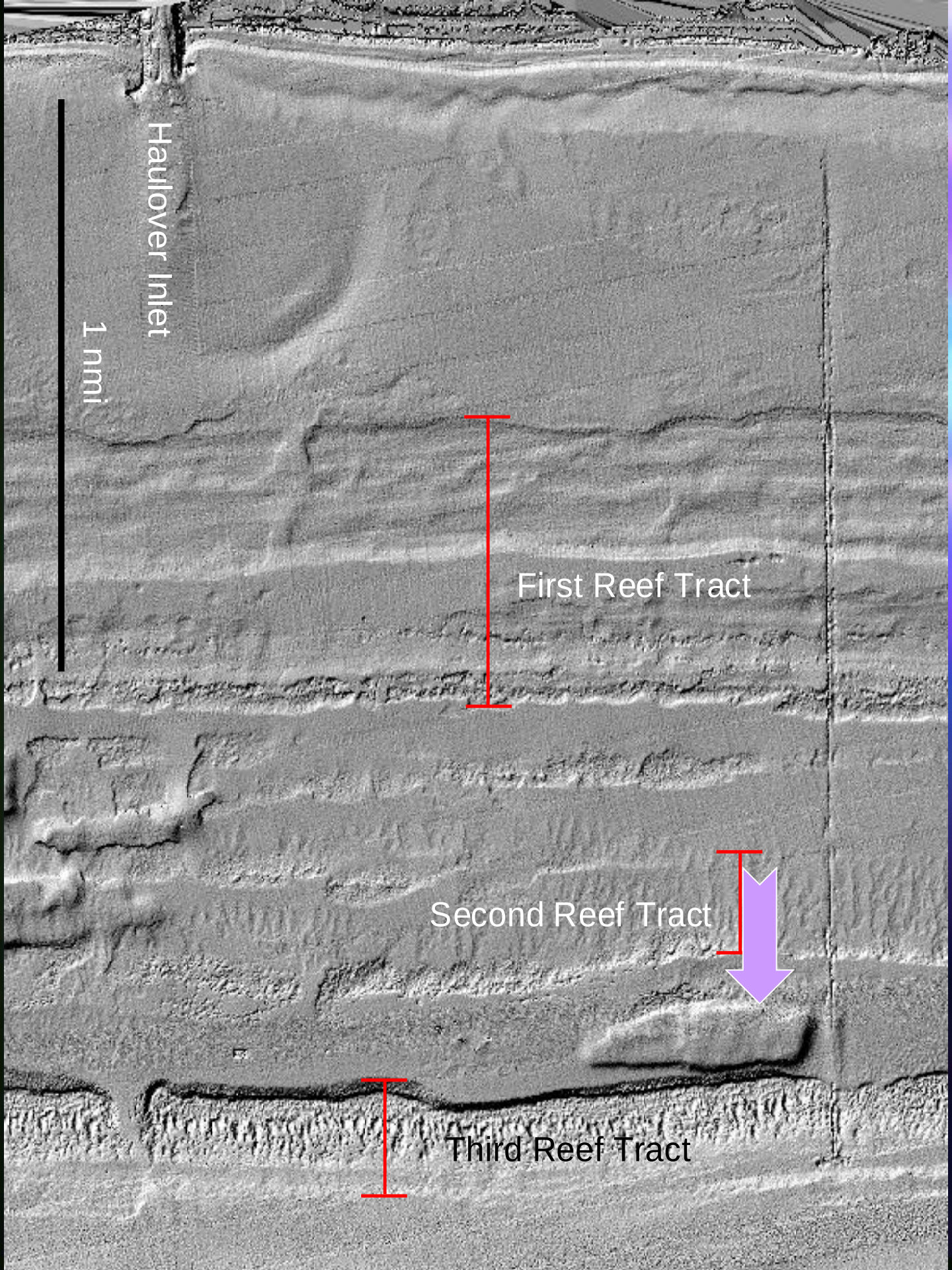


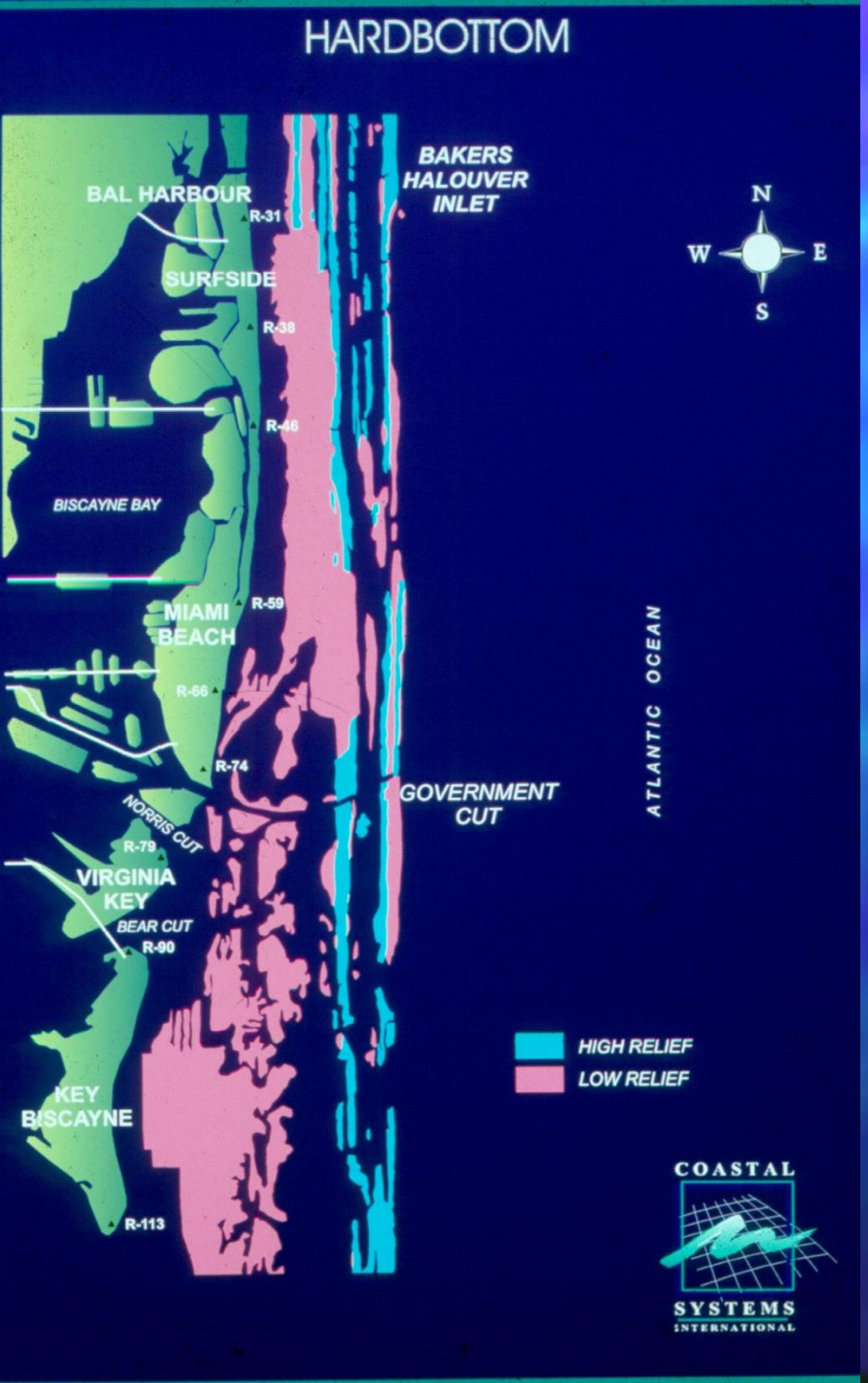
Florida Continental Shelf

Factors Limiting Sand Source Availability for Southeast Florida Nourishment Projects

Resource Protection Factors



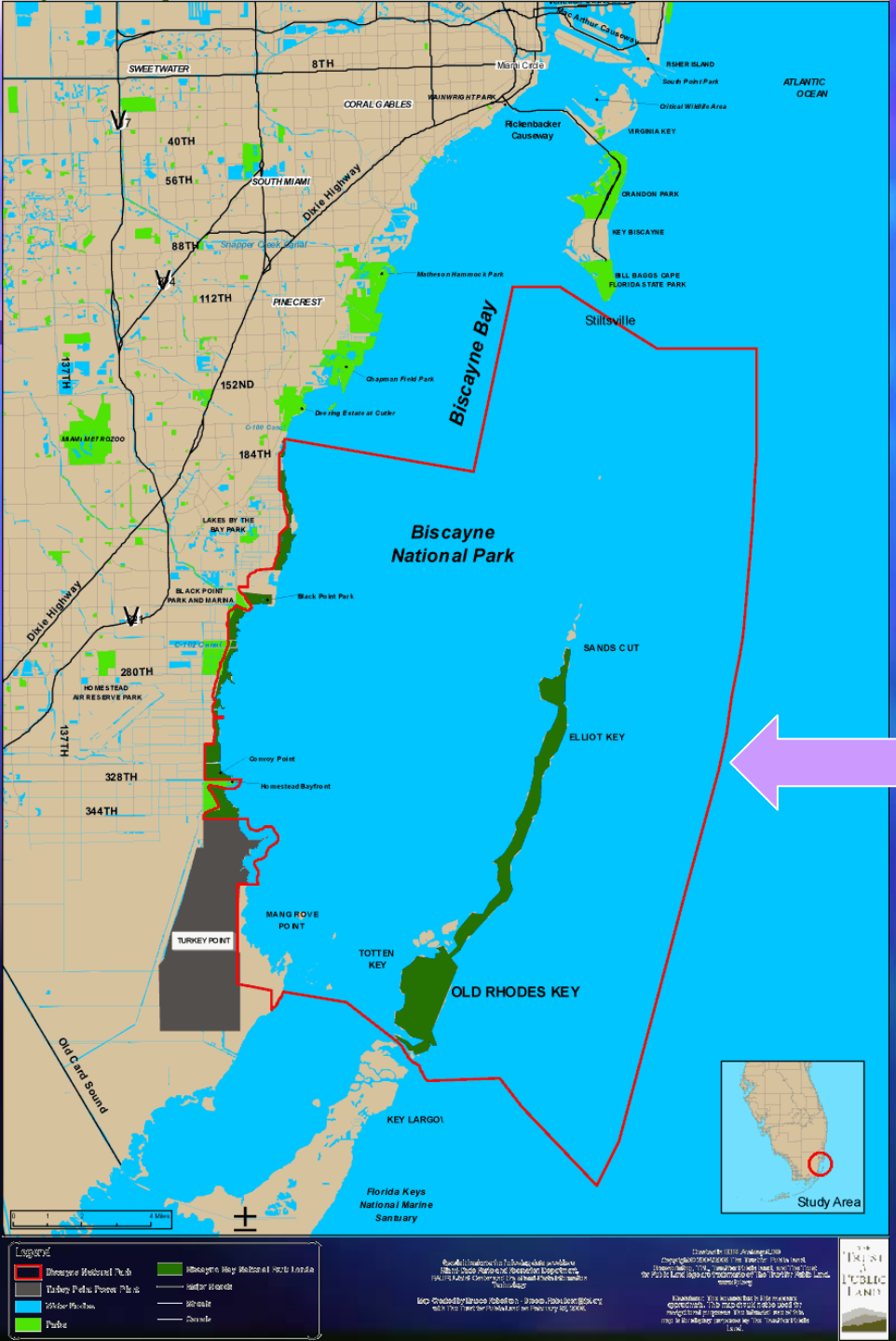

Haulover Inlet
1 nmi
First Reef Tract
Second Reef Tract
Third Reef Tract



Limitations on S. Fla. Sand Source Development

Resource Protection Buffers

Offshore Sands Biologically Produced- Non-Renewable



Other Factors

Much of Dade's Offshore Areas Are Protected

Biscayne National Park

Florida Keys National Marine Sanctuary

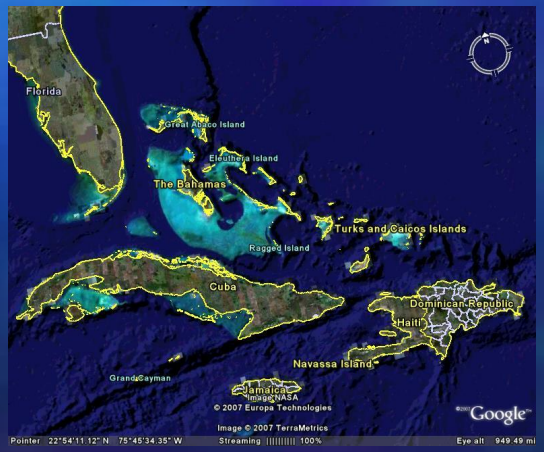
The Need to Identify Alternative Sand Sources- First Steps

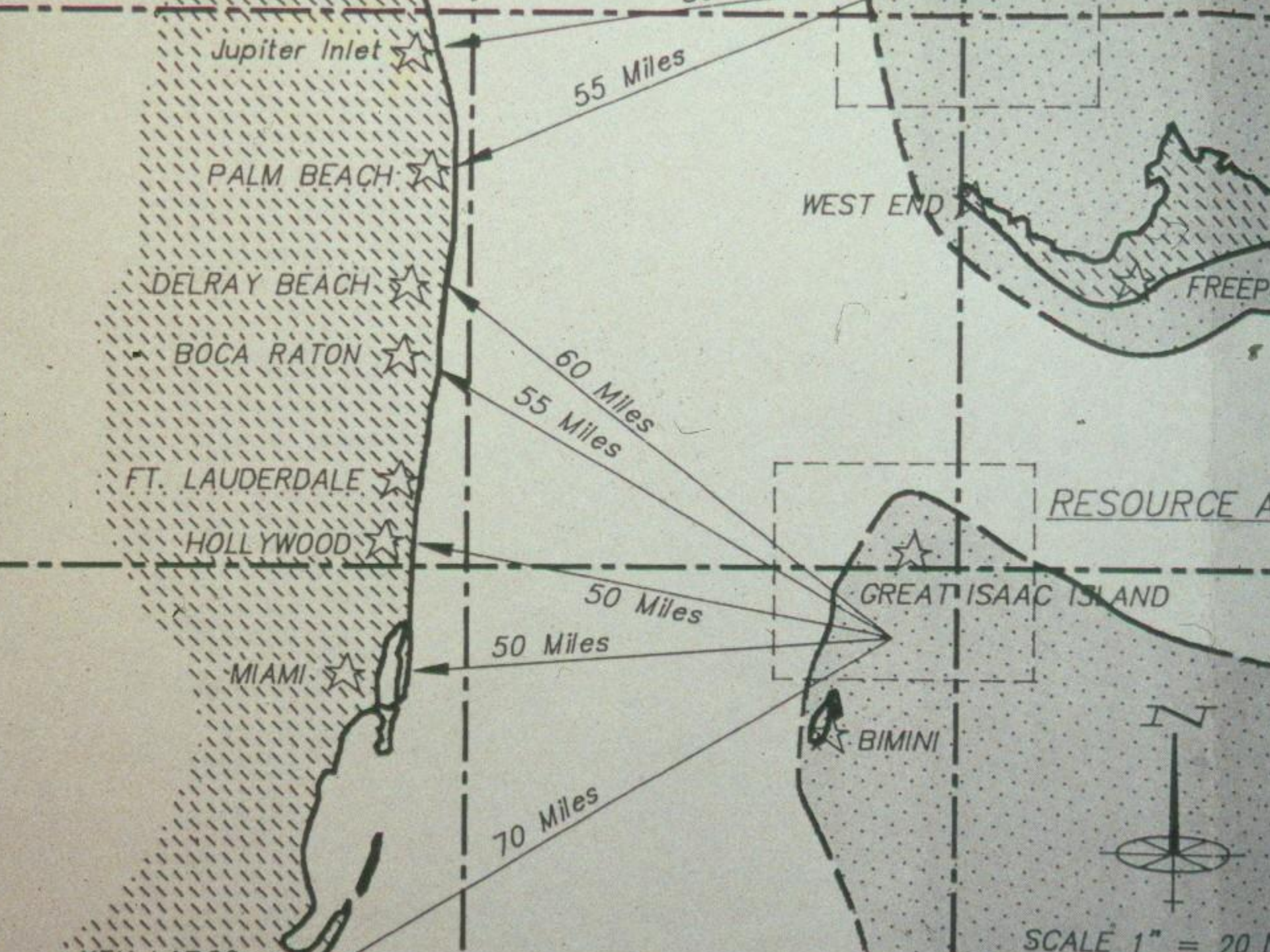
Investigations of Bahamian and other Caribbean Sand Sources

1987- Miami-Dade DM Investigates Bahamian Aragonite

1996-97- USACE/ DEP/ DERM Workshops

Convene Meetings with Agencies and Industry to Evaluate the Feasibility of Non-Domestic Sand Sources.




Jupiter Inlet
55 Miles
PALM BEACH
WEST END
DELRAY BEACH
FREEP
BOCA RATON
60 Miles
55 Miles
FT. LAUDERDALE
RESOURCE A
HOLLYWOOD
50 Miles
GREAT ISAAC ISLAND
50 Miles
MIAMI
BIMINI
70 Miles
N
SCALE 1" = 20

From PL 99-662, Section 935 100 Stat. 4197- 1986

" …in any case in which the use of fill material for…beach nourishment is authorized,…the Secretary is authorized to acquire…from non-domestic sources…if such materials are not available from domestic sources for environmental or economic reasons."

Miami-Dade County Sustainability Of Renourishment Project

Sand Specification

Tiered Solicitation

- Upland Domestic
- Any Domestic
- Any Source (Including Non-domestic)

Miami-Dade County Sustainability of Renourishment

Investigation of Potential Domestic Sand Sources

2003- ACOE Upland Sand Source

* Utilized Miami-Dade Sand Specification
* Water-based Delivery to Beach
* Cost Prohibitive

2006- Investigations of Any Domestic Sources

* General Solicitation for any Domestic Source- Sand Spec
* Offshore Sources in Federal Waters

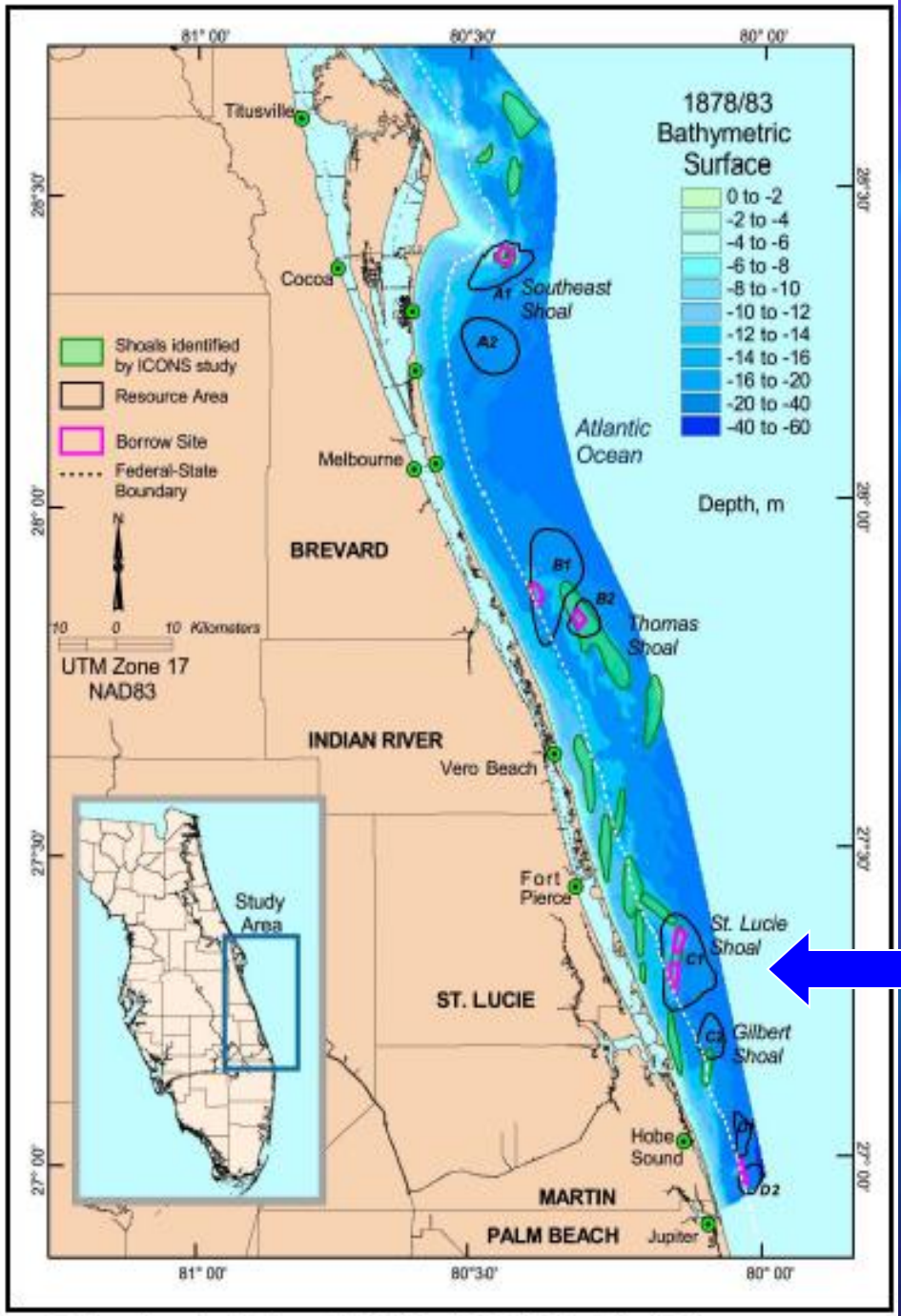


Figure 3-17. Nearshore bathymetry (1878/83) with ICONS shoals identified.

BOEM Sites

NEPA Evaluation of BOEM Sources in Federal Waters

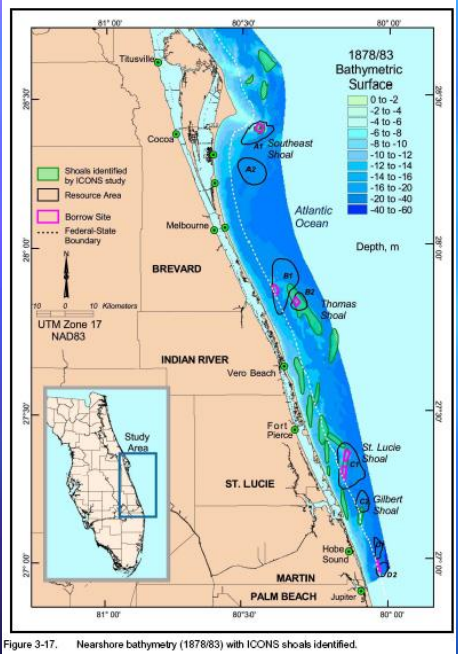


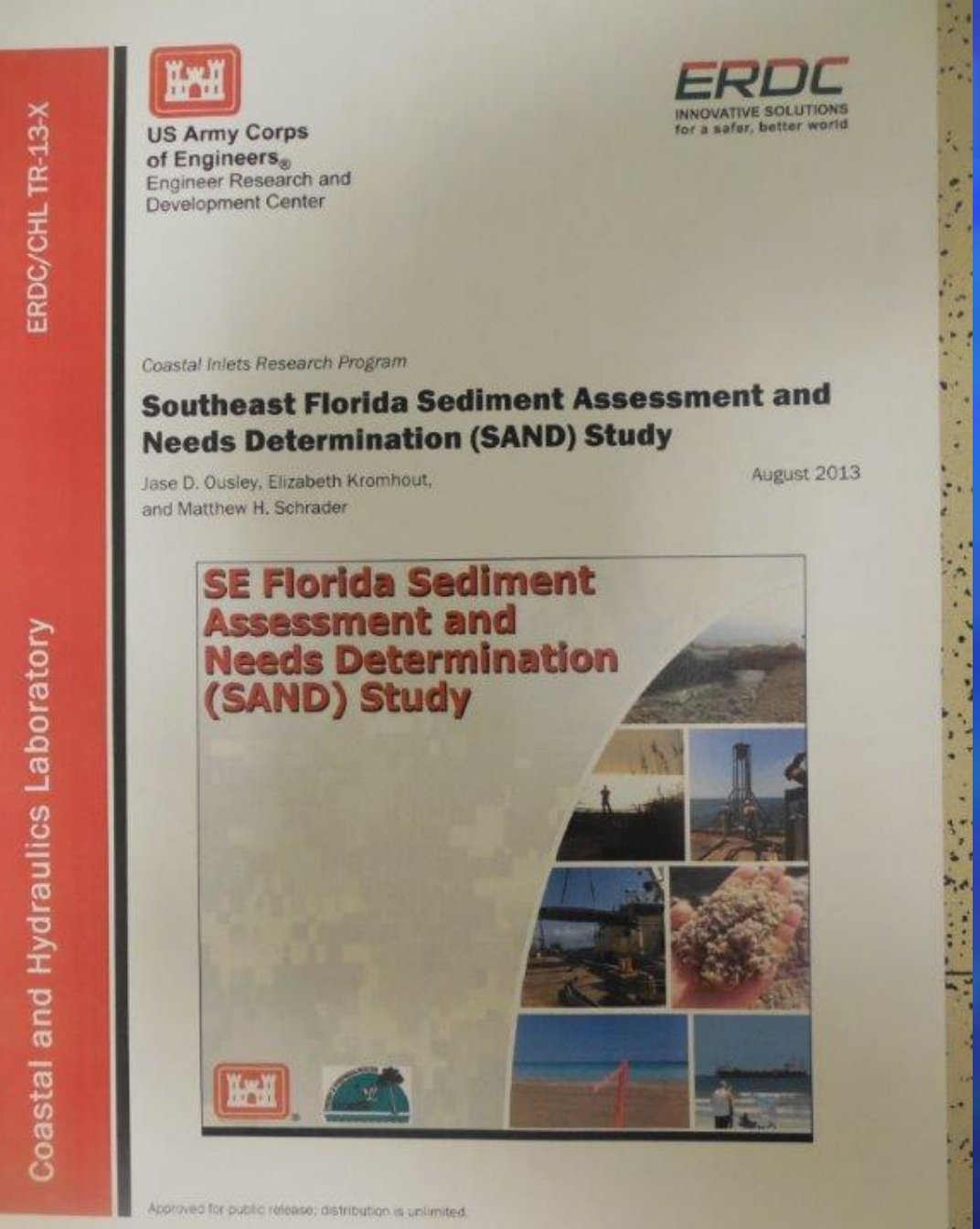
Figure 3-17. Nearshore bathymetry (1878/83) with ICONS shoals identified.

May 2006- Scoping Meetings In Miami-Dade, Martin, and St. Lucie Counties for NEPA

Extremely Strong Public and Political Opposition

- **Opposed Dade "Taking" Our Sand**
- **Environmental and Other Reasons**
- **Florida Legislature Amended Ch. 161 To Require Notice From Projects Proposing Sand Sources Off of Other Counties**

Back to The Drawing Board



ACOE SAND Study

Inventory known Sand Sources from St. Lucie through Miami Dade

Eliminate Potential Miami-Dade Sources Based on Various Criteria

Compare Projected Need for the Region over 50 Years with Known Sources

ACOE SAND Study Findings

In Comparing Regional Renourishment Needs versus Identified Sand Sources, There is a Surplus of Approximately 100,000,000 Cubic Yards.

Miami-Dade County's Projected Need for the Remainder of the Federal Project Life is Estimated at 3,625,620 Cubic Yards.

Seven Sand Sources Were Identified In the Study, including Two Accretional Areas, Three Upland Areas, and Two Offshore Borrow Sites in Federal Waters.

SAND SOURCE RESULTS DADE COUNTY BEC&HP PROJECT

EXISTING DADE ACCRETION SOURCES

1. Baker's Haulover Ebb Shoal
2. Lummus Park (South Beach)

UPLAND SOURCES

3. Ortona Sand Mine
4. Witherspoon Sand Mine
5. Atlantic Civil, Inc. (ACI)

OFFSHORE SOURCES

6. Offshore Martin County
7. Offshore St. Lucie County

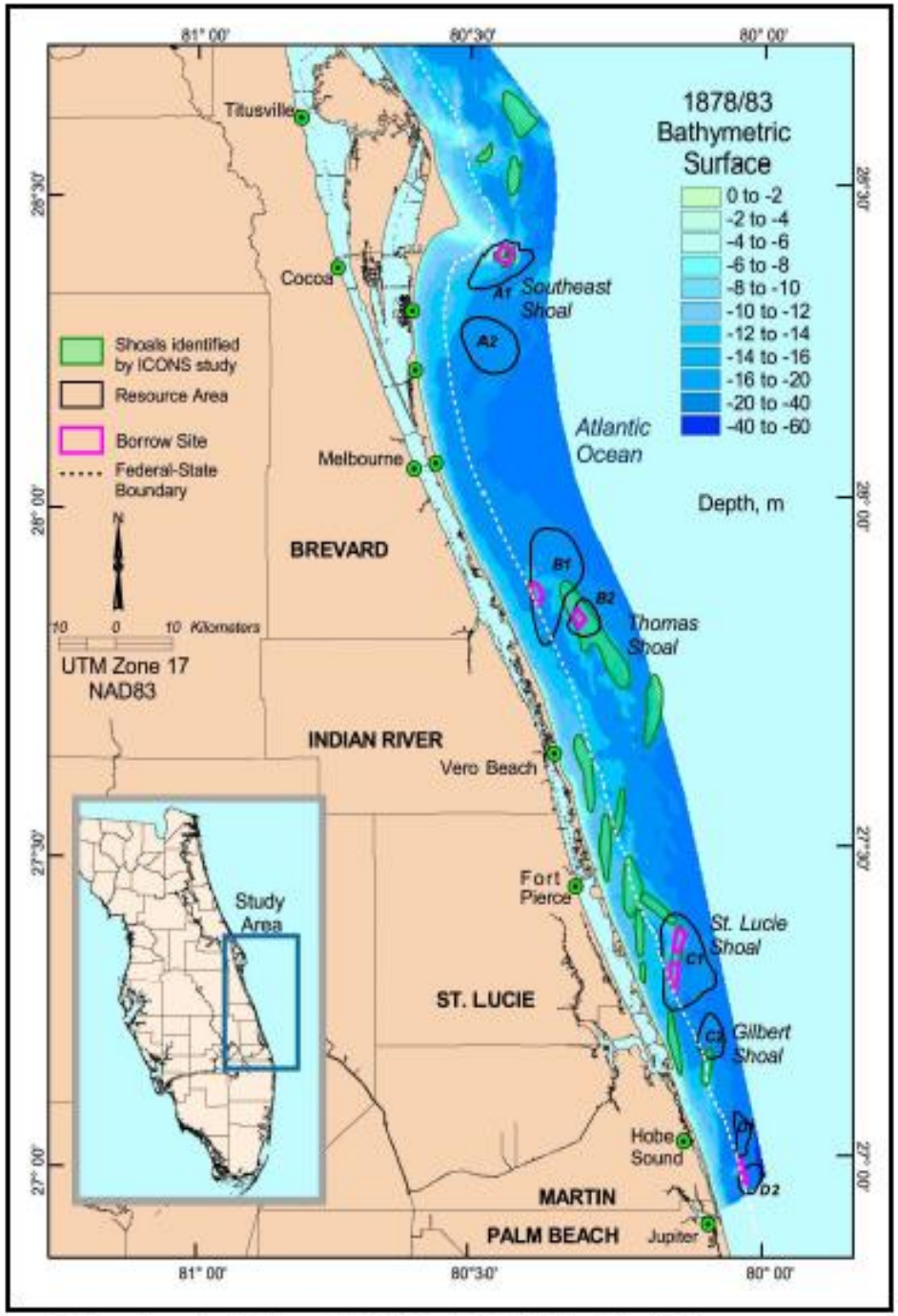
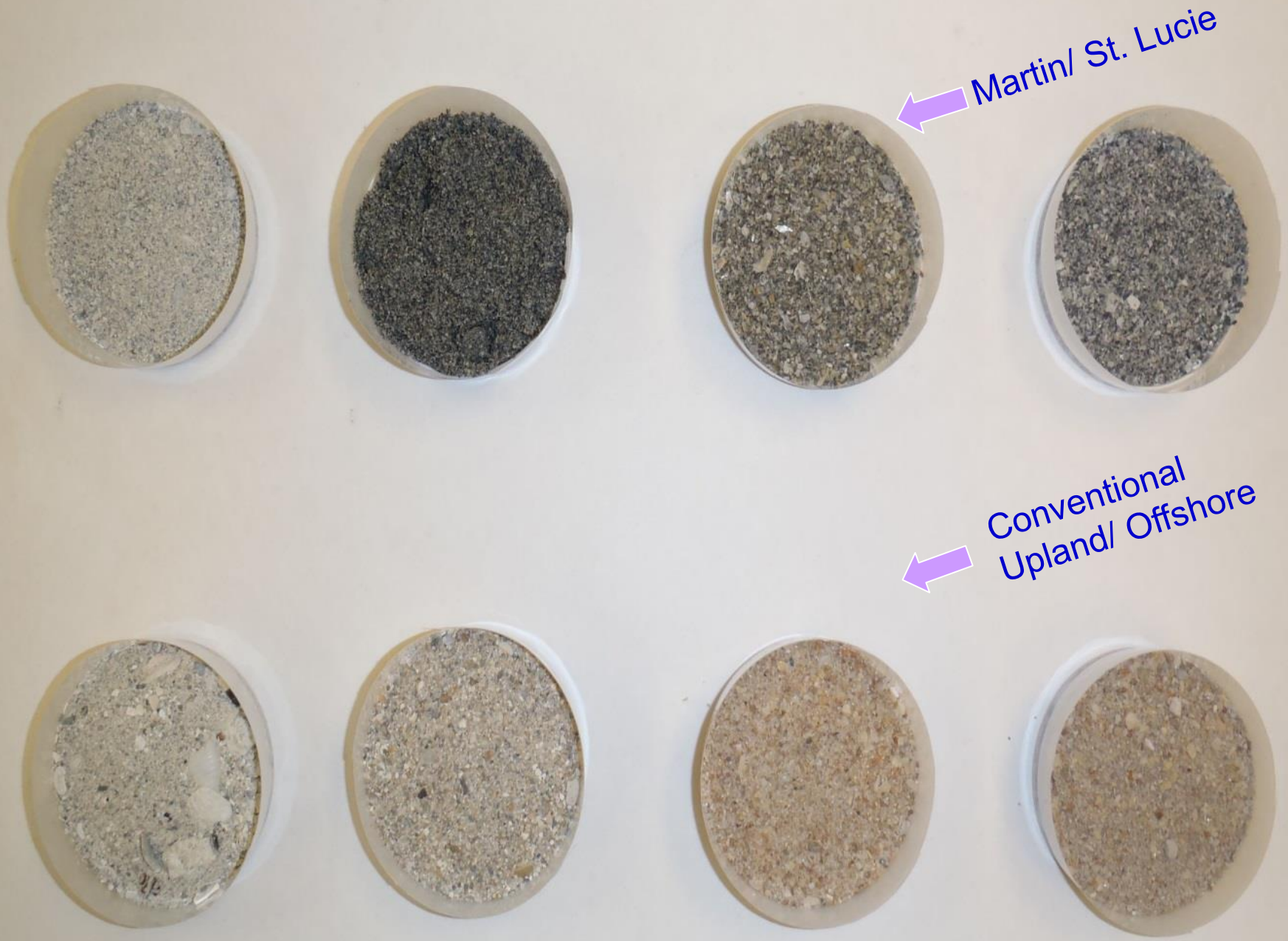


Figure 3-17. Nearshore bathymetry (1878/83) with ICONS shoals identified.

Probable Obstacles to the Use of St. Lucie Martin County Sites

1) **Color**


Martin/ St. Lucie
Conventional
Upland/ Offshore

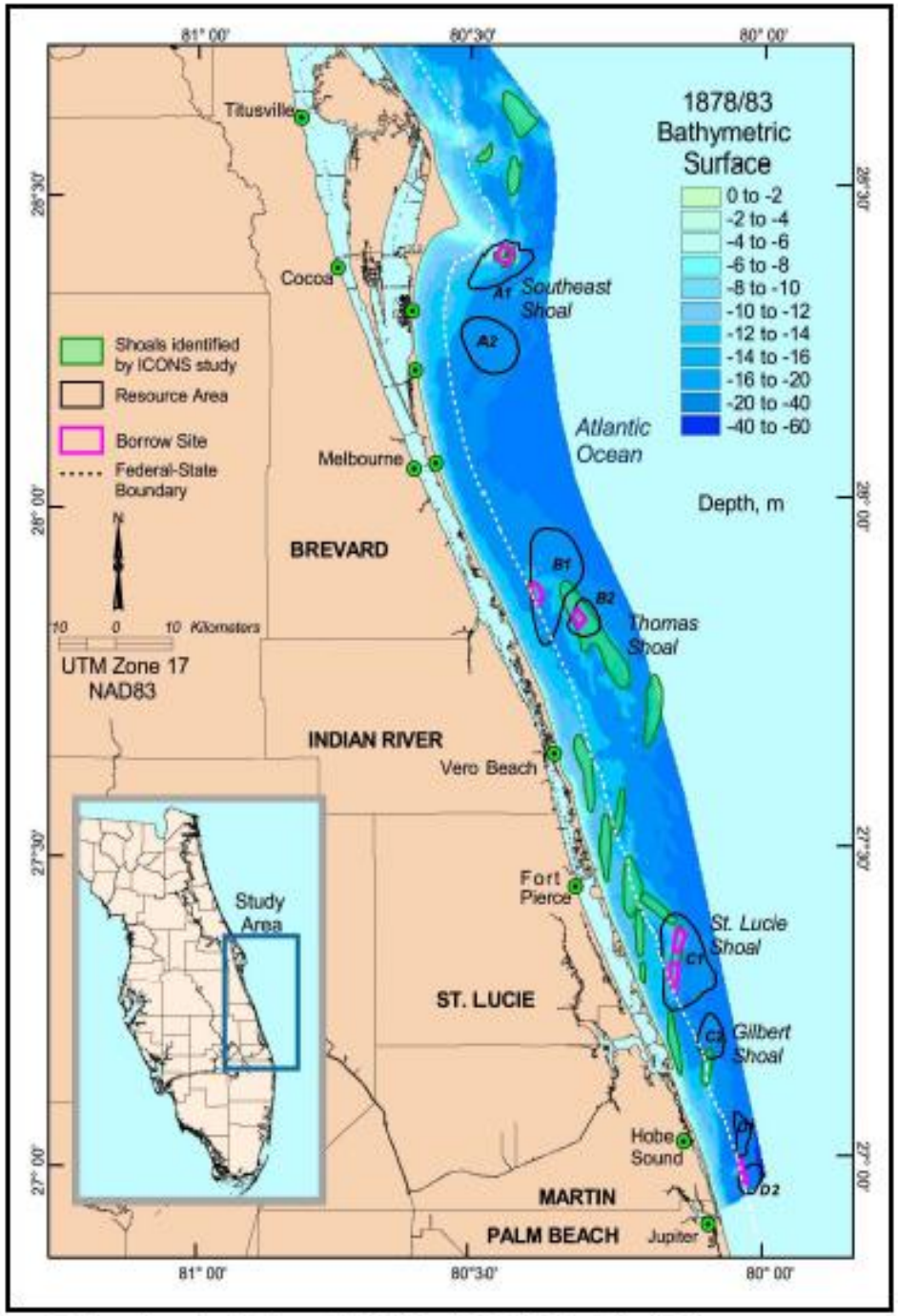


Figure 3-17. Nearshore bathymetry (1878/83) with ICONS shoals identified.

Probable Obstacles to the Use of St. Lucie Martin County Sites

1) Color
2) Cost- 240 miles per load
3) Possible Legal Action


Small and Large Scale Truck Hauls
ACOE Project Scheduled for Summer of 2016 in Miami Beach- Approximately 220,000- 300,000 Cubic Yards


CASE
621D


Atlantic Civil Quarry- Homestead, Florida


Florida
Great Abaco Island
60
Eleuthera Island
The Bahamas
500
Turks and Caicos Islands
Ragged Island
600-800
Cuba
Dominican Republic
Haiti
Navassa Island
Grand Cayman
Jamaica
Image NASA
© 2007 Europa Technologies
Image © 2007 TerraMetrics
Google
Pointer 22°54'11.12" N 75°45'34.35" W
Streaming 100%
Eye alt 949.49 mi

Potential Project Management Issues Associated with the Use of Foreign Sand Sources

* Transportation Distance = Increased Cost

  Miami-Dade Project Costs Expected to Approximately Double

* Cost Uncertainty

  Historical Offshore Sources Relatively Predictable

  Many Variables will Affect Other Sources: Distance, Methodologies, Extraction Fees, Profit, Source Origin

Maritime Law Issues

The Cost of Doing Business is Increasing

Avg. Cost Per Cubic Yard	
Initial Construction 1975- 1981	$ 10.96
Offshore Renourishment- 1982-2001	$ 25.83
Small Truck Hauls 1998- Present	$ 38.50
Contract E- 2012	$ 46.81
ACOE Truck Haul- 2016	$ 60- $80
St. Lucie/ Martin County	$ 80- ?

Price Range for a One Million Cubic Yard Project Would Likely be from $50-$100 million.

Long-Term Planning Implications

- Funding May Dictate Project Design More Than Engineering
- Long Term Project Permits Which Can Be Used as Needed
- Smaller, More Frequent Nourishment Events as Opposed to Large Projects
- Increased Collaboration and Coordination of Projects, Particularly in Southeast Florida, to Optimize Mobilization and Construction Costs