



Longshore Bar Creation: a viable option for seagrass restoration?



Lindsay M. Cross, Tampa Bay Estuary Program

Holly Greening, Tampa Bay Estuary Program

Michael Seifert, Tampa Port Authority

Susan Burtnett, Acradis US Inc/Malcom Pirnie

Thomas Ries, Scheda Ecological, Inc.

Rob R “Robin” Lewis III, Coastal Resources Group, Inc.


RAE: October 24, 2012

Tampa Bay Estuary Program



- Study Area — location where NEPs focus their restoration efforts
- Watershed — land area that drains into an estuary

San Juan Bay



Overall project objectives

- Encourage seagrass recovery through creation of wave-attenuating longshore bars
- Find beneficial uses of materials, including construction barriers and dredged material

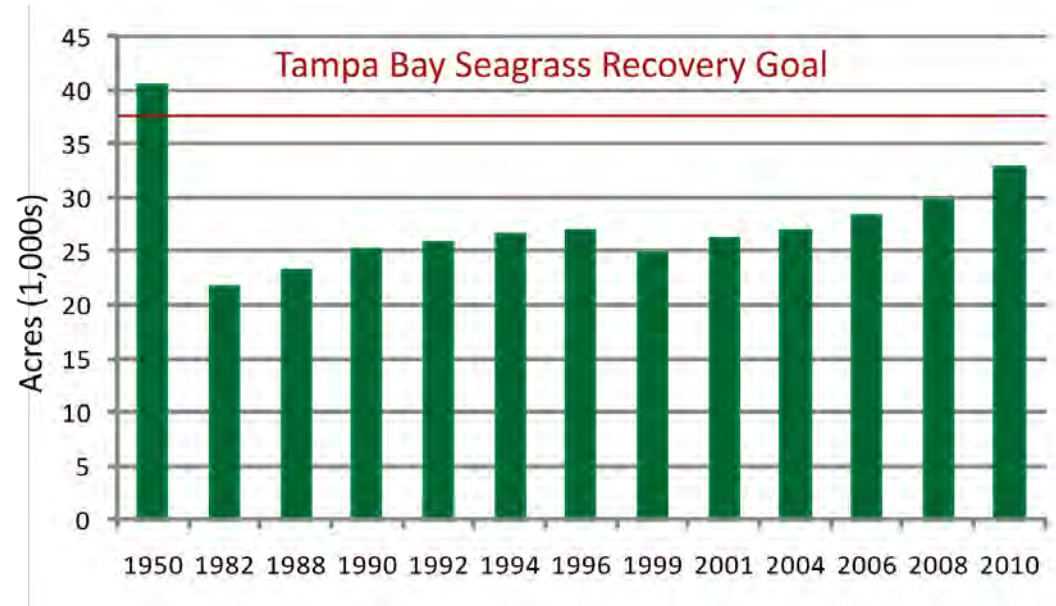


www.abconcrete.org

Seagrass recovery a major goal in Tampa Bay



Red areas indicate seagrass lost between 1950s and 1990s



- TBEP Goal: Protect/restore 38,000 acres of seagrass baywide

Longshore bars may protect seagrass from wave energy



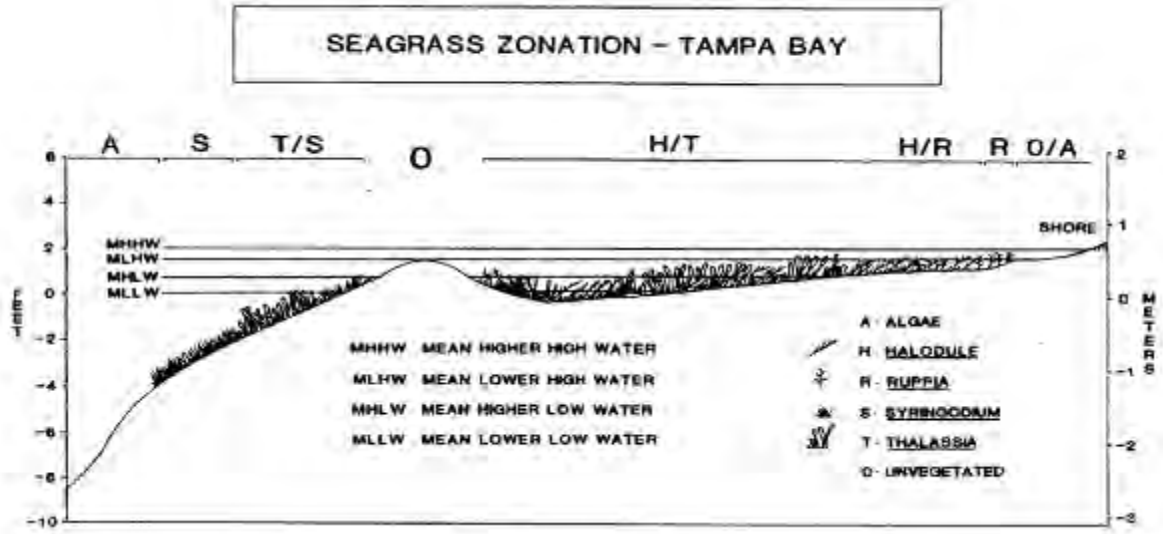
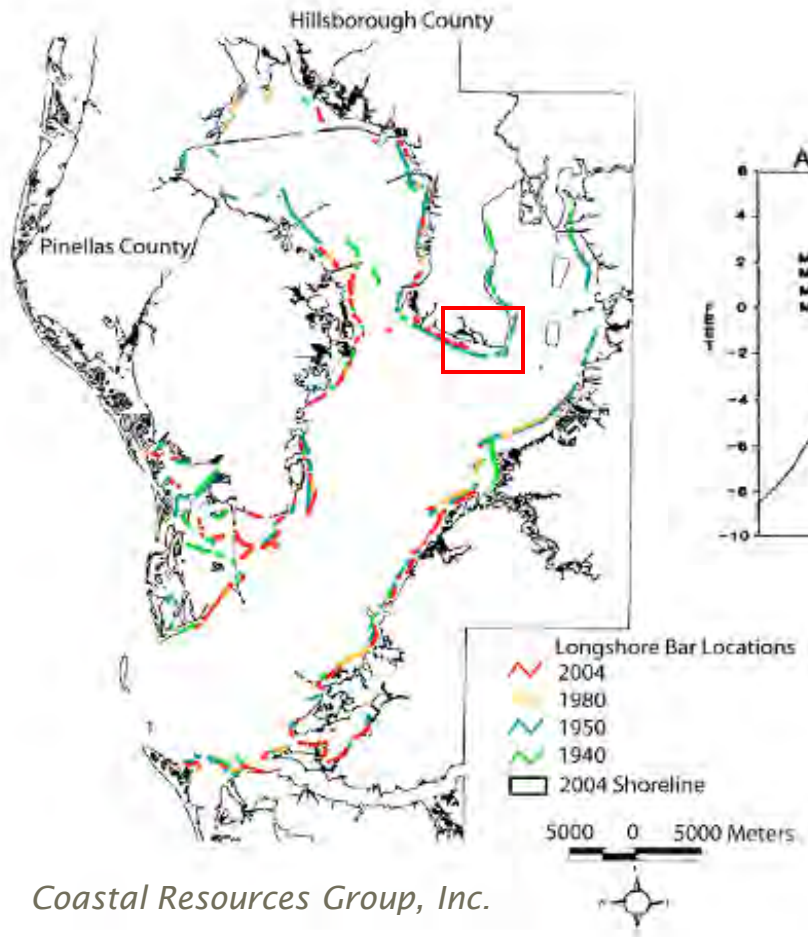
Loss of longshore bars in Tampa Bay may have led to a loss of seagrass in front of and behind bars

Historical longshore bar from 1957 and the same location in 1990



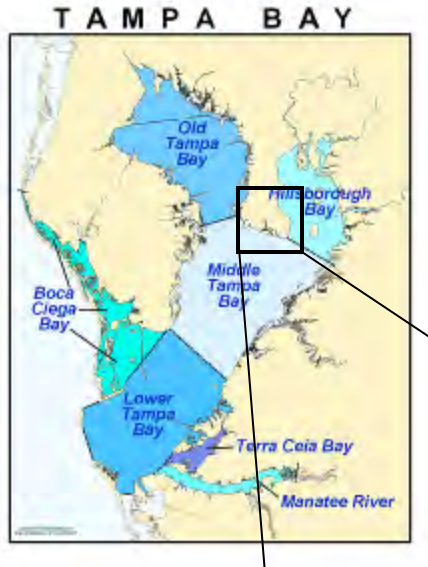
Source: Southwest Florida Water Management District

Longshore bars in Tampa Bay have decreased



Total length has decreased from ~72 miles in 1940 to ~41 miles in 2004

Hypothesis: Construction of an artificial bar will encourage volunteer seagrass recovery



Project Info:

- South of MacDill Air Force Base peninsula
- 950-foot long bar with 4, 200-foot-long sections
- 4 materials/techniques

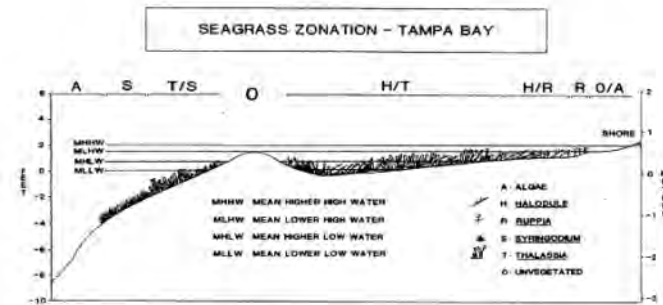
Bar construction part of a larger project

1. Characterize bathymetry of bars in relation to seagrass distribution
2. Develop conceptual model of seagrass/ longshore bar system
3. Measure natural and man-made wave energy
4. Transplant seagrass plots as potential way to restore bar systems
5. **Develop engineering criteria for reconstruction of bars as beneficial use of dredged material and use of installed wave barriers**
6. **Prepare all permit materials**
7. **Construct a bar system and test its integrity over time**
8. **Monitor establishment of seagrass at constructed bar site**

Task 1



Task 2

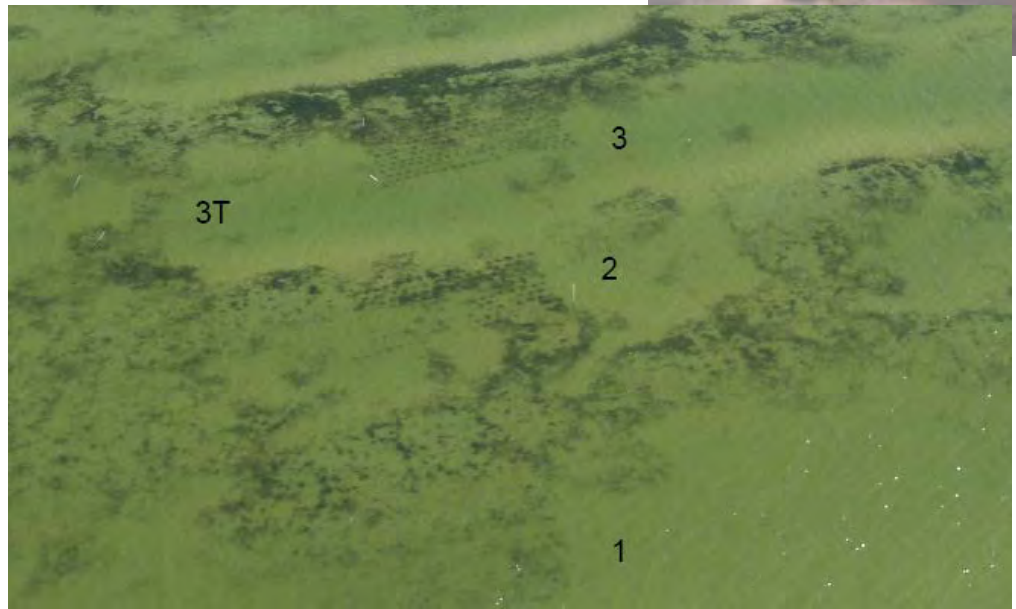
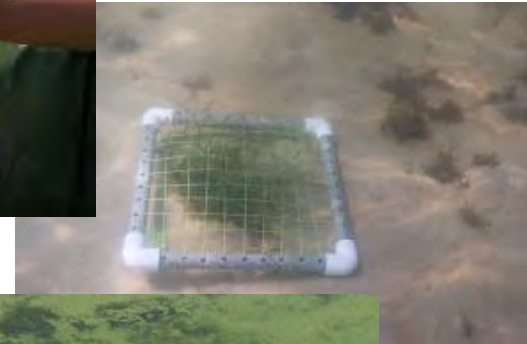


Task 4



Seagrass Transplanting Phase

- Manatee grass transplanted in large sods (20 cm x 20 cm)
- 1,200 units planted in 2006
 - 2nd phase in 2009
 - 3rd phase in 2010
- Monitored for survival and expansion
 - 28 x increase in cover after 2 years
 - 3 of 6 plots showed large expansion in ground cover
 - 1 near-shore plot had substantial sediment accretion
 - Off-shore area more dynamic with some erosion



Project Partners and Funding Agencies



Important partnership with the Tampa Port Authority

- Joint participation agreement between TPA and TBEP
- Port contributions:
 - Oversaw design/permitting/monitoring
 - Developed bid documents
 - Managed construction
 - Arranged site visits
 - Contributing >\$115,000 cash towards construction plus significant in-kind



TAMPA PORT AUTHORITY TAMPA BAY LONGSHORE BAR PROJECT FOR SEAGRASS RESTORATION

AUGUST 2009



LOCATION MAP

PERMIT SET



VICINITY MAP



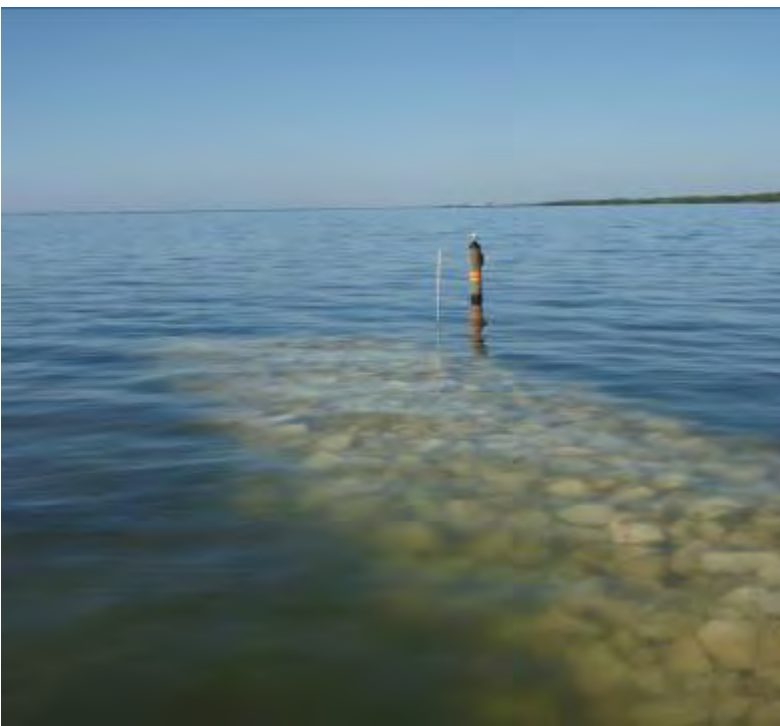
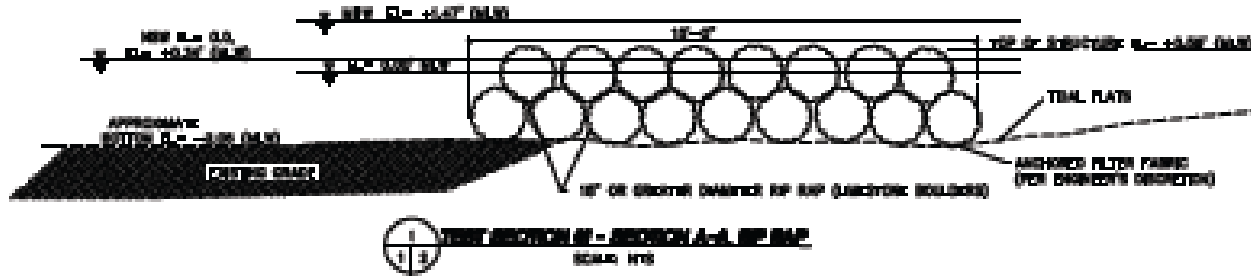
CERTIFICATE OF AUTHORIZATION NO. 87
INDEPENDENT ENVIRONMENTAL ENGINEERS,
SCIENTISTS AND CONSULTANTS
1300 E. 8TH AVE., Suite F-100
TAMPA, FLORIDA 33605
PHONE: (813) 248-8890
FAX: (813) 248-0088
MPI PROJECT NO.: 8881-003

REGISTERED ENGINEERS/ STATE OF FLORIDA

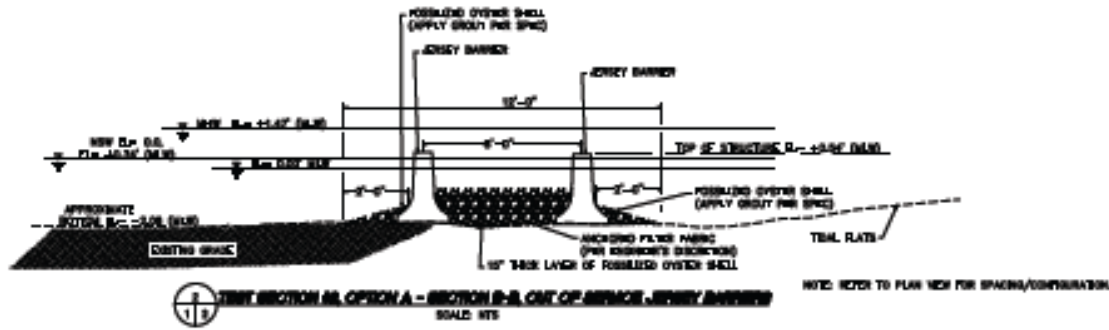
SEYMOUR
SAL
MECHANICAL

DAVID C. BIRN
P.E. 36847

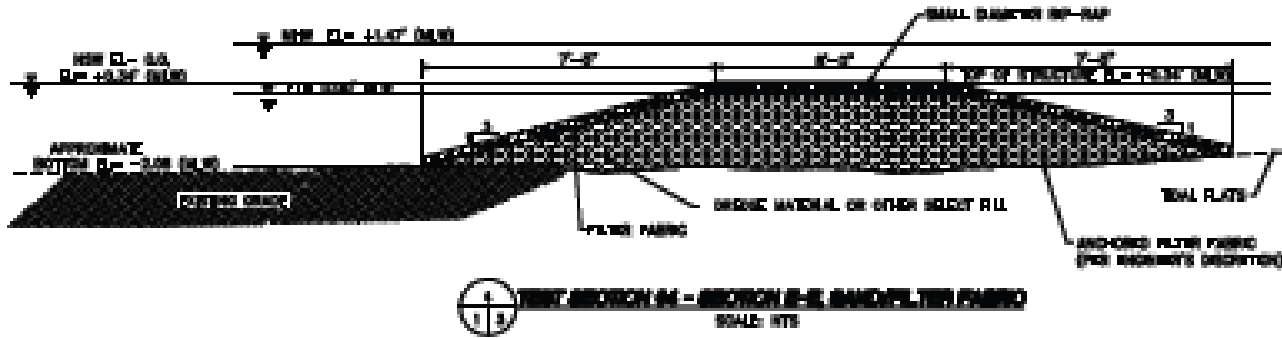
Rip-rap Technique



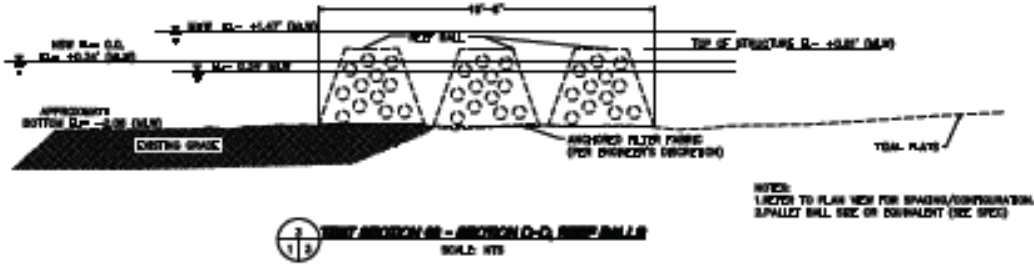
Highway Jersey Barriers Technique



Sand Bar Technique



Reef Ball Technique



Monitoring

- Construction completed January 2011
- Baseline monitoring prior to construction
- Post-construction monitoring will occur bi-annually for 3 years
 - Seagrass recruitment
 - Bathymetry
 - Structural integrity
 - Fisheries utilization
 - Water quality (monthly)



Seagrass Monitoring

- Bi-annual monitoring (spring, fall)
- 8 transects
 - 6 at longshore bar site
 - 1 reference transect
 - 1 control transect (long-term seagrass transect)
- 750 feet long
- Seagrass data collected every 25 meters
 - Species, Braun Blanquet, blade length, short shoot count, epiphyte coverage, sediment type



Preliminary Seagrass Results

	Time Zero	1st Annual		2nd Annual	
	March 2011	May 2011	Sept 2011	May 2012	Sept 2012
BT1 - Far West	4%	23%	52%	37%	48%
BT2 - Rip Rap	3%	27%	47%	23%	32%
BT3 - Jersey Barriers	3%	32%	59%	50%	44%
BT4 - Sand Bar	2%	37%	55%	43%	43%
BT5 - Reef Balls	3%	41%	64%	44%	46%
BT6 - Far East	3%	46%	62%	49%	36%
Bar Transects (combined)	3%	34%	57%	41%	41%
Reference Transect 1	3%	20%	64%	43%	43%
Reference Transect 2	n/a	38%	66%	50%	53%

Model for future Tampa Bay projects

- Partnerships necessary for continued improvement of Tampa Bay
- Innovative, experimental projects require dedication and vision
- Potential benefits to TPA
 - Seagrass mitigation tool
 - Essential Fisheries Habitat mitigation Beneficial use of dredged material
 - Positive publicity
- Potential benefits to Tampa Bay
 - Increased seagrass acreage
 - Tool for improving seagrass management baywide
 - Increased fisheries habitat
 - Beneficial use of dredged material
 - Model for other coastal systems



Project Managers: Mike Seifert (TPA), Lindsay Cross (TBEP) and Drew Puffer (EPA)



Anticipated Research Outcomes

- Determine whether creation of artificial longshore bar system will result in seagrass recruitment due to wave attenuation
- Compare this technique with project task to transplant seagrass for bar establishment
 - Chicken and the egg question



Dennis Novak/Getty Images

Questions?

Lindsay Cross
lcross@tbep.org
(727) 893-2765

