

Lessons Learned Designing & Permitting Living Shorelines and

Successful Seagrass Mitigation Options

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Estimated: Tens of Thousands of Miles of Hardened Shorelines



Seawalls and Bulkheads Problems

- Perpetuation of Erosional Forces
- Causes erosion to Adjacent Properties
- Costly to Construct and Maintain
- Loss of Habitat No Intertidal Zone
- Degraded Water Quality
- Interferes with Natural Sediment Transport

Turf grass = shoreline protection?

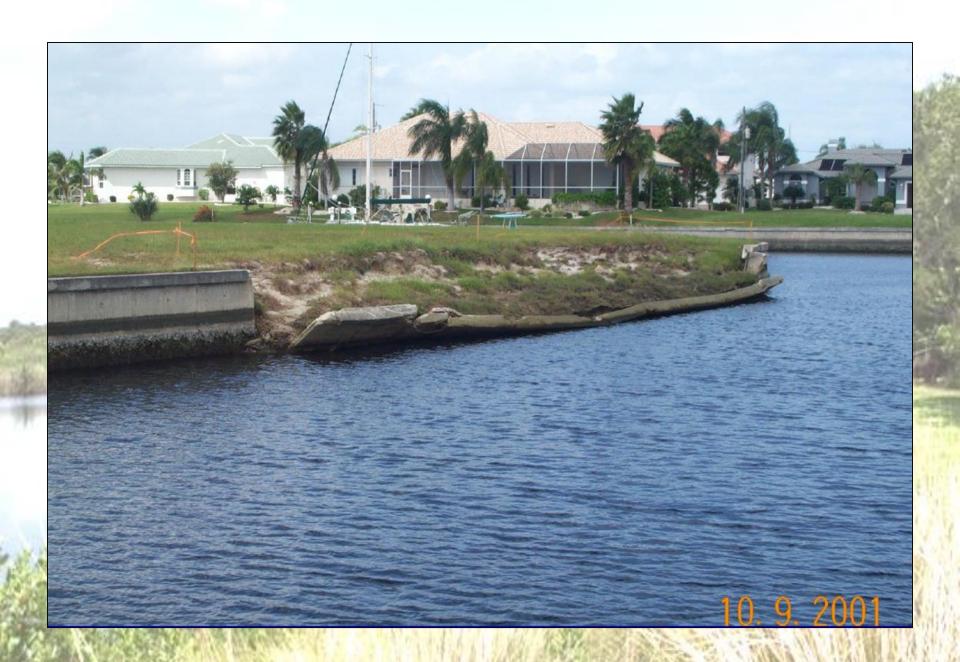


Seawalls = expensive repairs



Seawalls will fail

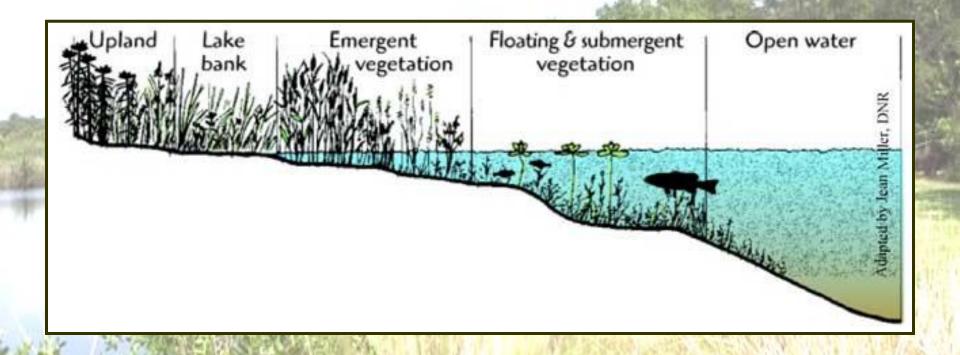




What is a Living Shoreline?

"Living shorelines utilize natural habitat elements for erosion control through careful site evaluation and strategic placement of habitat components along the upland/wetland interface (Ray-Culp 2007)."

Natural shoreline dynamics



Why Choose a Living Shoreline?

- Erosion Control
- Restore and Enhance Shoreline Habitat
- Increase Aesthetics & Property Values
- Opportunity to Educate the Public
- Improve Water Quality
- Property Protection i.e. absorb wave energy,
 storm surges, flooding events

Erosion protection

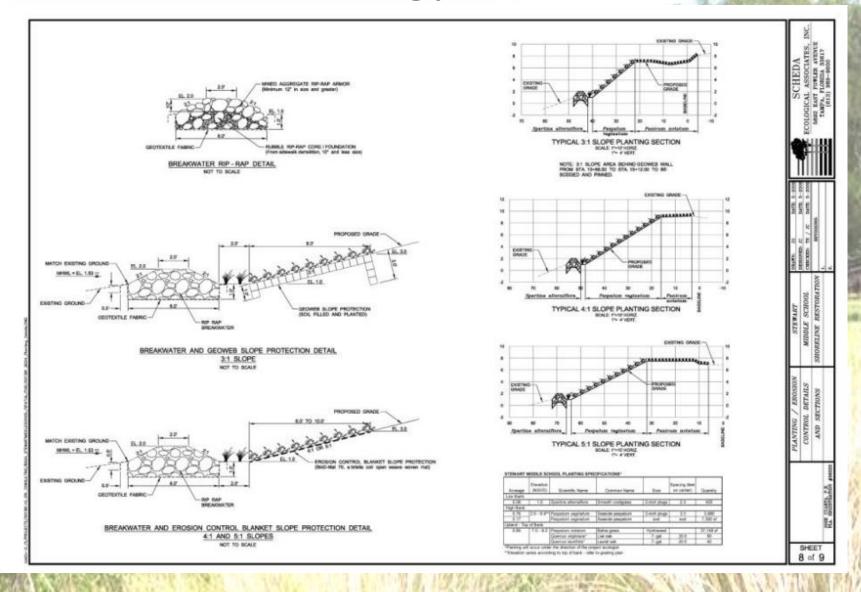




Sample Projects - Good and Bad

Stewart Middle School
Rivercrest Park
Sarasota Bayfront
Honi Hanta
Apollo Beach
Herb Dolan

Stewart Middle School Medium Energy Environment



Stewart Middle School

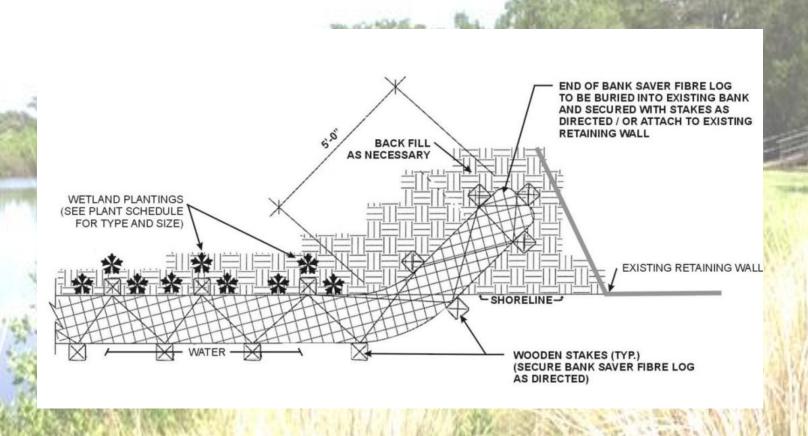




Before After

Rivercrest Park Low Energy Environment

Boat Wakes: Created Escarpment & Erosion



Rivercrest Park





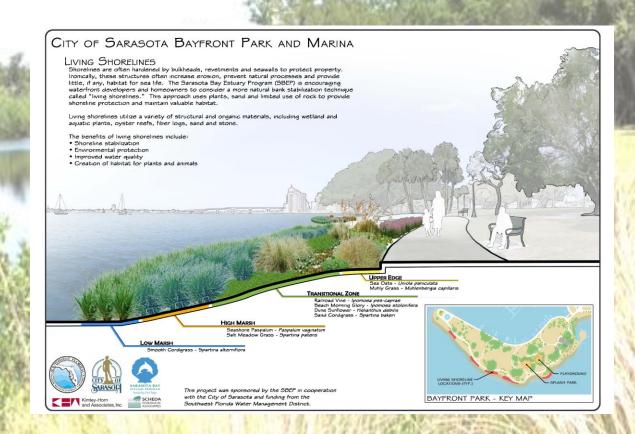
Before

After

Sarasota Bayfront

Medium Energy:

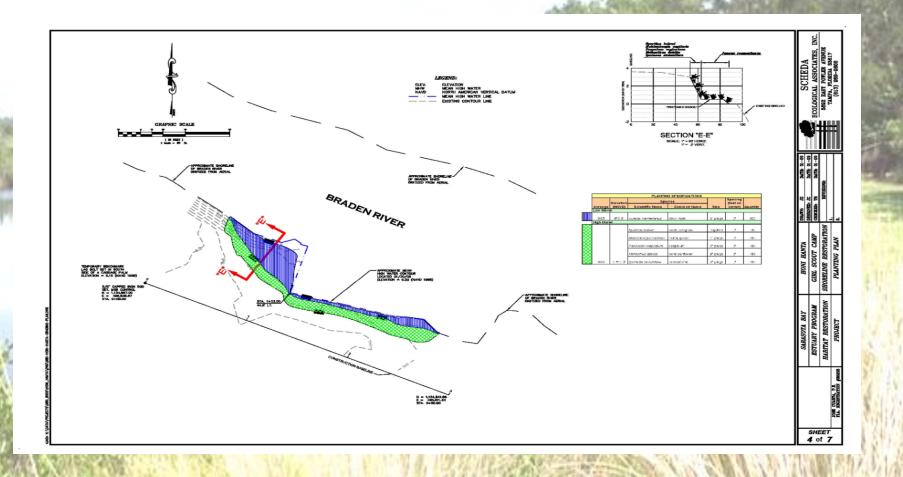
SBEP w/City of Sarasota Implemented a Living Shoreline Demo Project Palette of Native Wetland Species used to Stabilize the Shoreline





Honi Hanta

Low Energy Example: Removal of Dilapidated Seawall & Planted with Native Vegetation



Honi Hanta



Before



Apollo Beach – High Energy



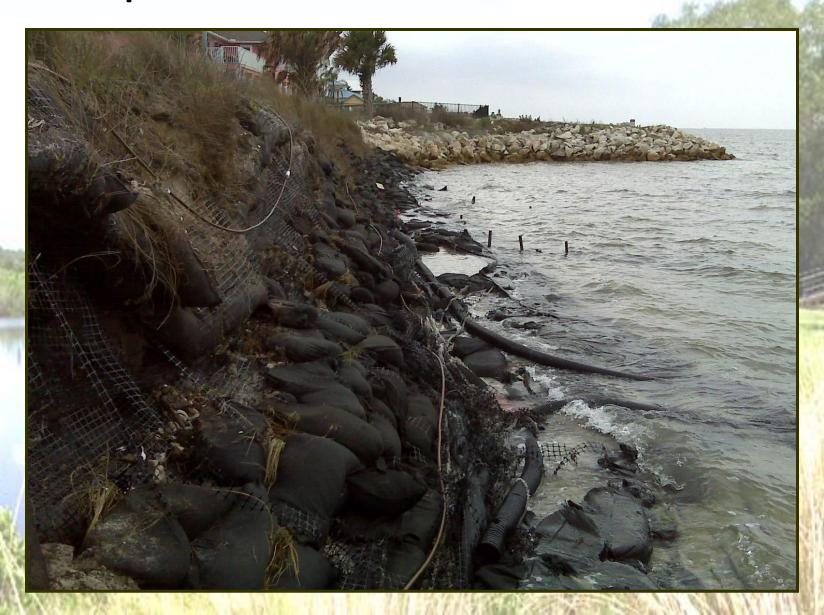
Apollo Beach – Envirolok w/Plants



Apollo Beach - Post Installation



Apollo Beach – 1 Year Later



Apollo Beach 2015





727.520.8181 www.aerophoto.com Apollo Beach Nature Preserve Shoreline Restoration C-0097-0-2013/JG

Image # 150128 0215 Date 01.28.15

Herb Dolan – Medium Energy







Lessons Learned

- ID Appropriate Technologies for Specific Condition
- Modeling, Bathymetry, and Geotech Required
- Design for Sea Level Rise
- Viewshed is Important
- Continue to Educate Public
- Promote Living Shoreline Solutions

Seawall enhancement projects are NOT living shorelines







Previously Permitting Discouraged LS

Federal (USACE)

• NW 13

State Agencies

No Permit Required for Seawall Replacements

Local Authorities

- Ordinances (e.g. no fill in bays)
- No Homeowner Incentives

Permitting Levels

Federal (USACE) New Nationwide 54 (3/2017)

- 30 ft. channelward of MLW in tidal waters
- 500 ft. along the bank (unless waived by DE)

Additional Living Shoreline NW Information

- Authorizes construction and maintenance of LS
- May include stone or reef structures
- Does not authorize beach re-nourishment or land reclamation
- Discharges of dredge & fill (sills,breakwater) in waters of the US must be minimal necessary for establishment & maintenance of LS

Florida Issues

State Permitting-FDEP

 Recent Statewide Programmatic General Permit Includes Living Shorelines

FDEP Exemptions

- < 500 linear ft., use native plants
- If using a breakwater: use non-degradable material, include gaps for tidal exchange, stay within 10 ft. of MHWL, no SAV impact, and don't build breakwater higher than MHWL

Mangroves

- Viewshed is #1 issue
- Education
- Build Mangrove Trimming into the Permit

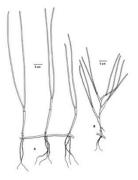
Local authorities

- Counties
- Municipalities









PHYSICAL DESCRIPTION

Leaves are terete
Leaf blades:10-30 cm long, 0.8-2 mm wide
Leaves have 2 pericentral veins
HABITAT

Subtidal zones: 0.7–0.5 m deep Mixed meadows with Thalassia testudinum Monospecific meadows to 18 m deep





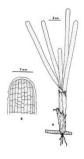
Leaf blades: 3.5-32 cm long, 0.3-2.2 mm wide Leaf tip truncate and bidendate at the edge of mature leaf tip

Leaves clustered from a distinct node on the rhizome

2–5 roots and a leafy shoot emerge from each node: roots are not branching **HABITAT:** Grows almost anywhere







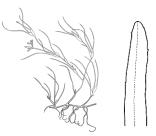
Leaves flat, & linear (strap-like) Leaf blades:10-12 cm long, 4. 5-10 cm wide Rhizomes scaly

HABITAT

Commonly in waters low tide - 10 m deep Prefers mud, relatively sheltered locations

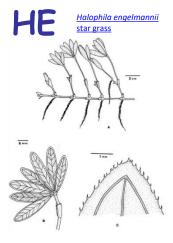






Thread-like leaves with a pointed tip
Leaves alternate, < 1 mm wide & < 20 cm long
Leaf tips vary (obtuse/serrate)-(acute/entire)
Leaves grow from a branched stem
HABITAT:
Grows in all substrate types
Grows in brackish to freshwater
Typically grows in water up to 2 m deep

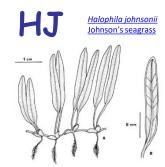




NO basal sheaths Leaves long, elliptical, & finely serrulate Leaf blades 1-3 cm long & 3-6 mm wide 2 scales at leaf base & 1/2 up the leaf stem Leaves psuedowhorl: 4-8 leaf blades HABITAT:

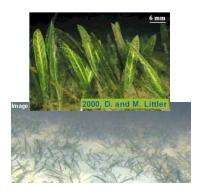
Sheltered sites from the lowest tide -deep Found on sand, mud, & possibly shell-hash

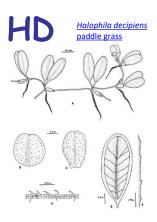




NO basal sheaths
Leaves long & elliptical
Leaf blades 0.5-2.5 cm long, 1-4 mm wide
Leaves pointed at the tip
Leaves occur in pairs
HABITAT:
Prefers coastal lagoons
Grows in the intertidal zones

Found in sandy substrates



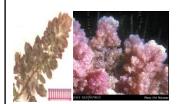


NO basal sheaths Leaves round/ovate: "paddle shaped" Leaf blades 1-2.5 cm long, 3-6 mm wide Leaf margins are serrulate Thin rhizome At the base of the leaf there are 2 scales *HABITAT*: 10–30 m deep, Euryhaline



Asparagopsis taxiformis

- Fluffy, fine, filamentous
- 4-10 cm high
- pink to grey color



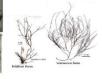


Gracilaria tikvahiaei

- Highly variable
- dark green, red, brown
- 10 20 cm high







Feldmannia indica

- Soft filamentous tufts
- 5 cm high
- brown-green



Codium decorticatum

- Spongy
- bushy clumps
- 6-9 cm long
- dark yellow-green





<u>Gracilariopsis lemaneiformis</u>

- tangled, slippery
- 50 cm high
- purple, brown, rose



Hypnea musciformis

- bushy, tangled, wiry
- to 50 cm high
- orange-red
- irregular branching



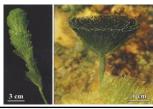
Penicillus captatus

- Stiff, calcified
- brush-like
- dull blue-green
- 2-18 cm high



Rhipocephalus oblongus

- lightly calcified
- flat-topped
- to 20 cm high
- dark green





Caulerpa prolifera

Leaf blades:

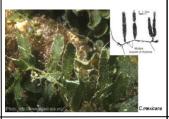
- oval, elongated
- 6-15 cm long
- stolons creeping Common in SG beds 15m



CM

Caulerpa mexicana

- Flattened feathers
- highly variable
- 2-25 cm high



HI

<u>Halimeda incrassata</u>

- heavily calcified
- disc-like oval
- to 25 cm high
- light to dark green



Halimeda monile

- Calcified, distally cylindrical
- dark green
- to 20 cm high



CS Caulerpa sertularioides

- feather-like
- occasionally branched
- to 20 cm high, 2 cm
- light green





UV

<u>Ulva fasciata</u> sea lettuce

- thin, sheet-like
- bright apple green
- clusters of strap-shaped blades



UF

<u>Udotea flabellum</u>

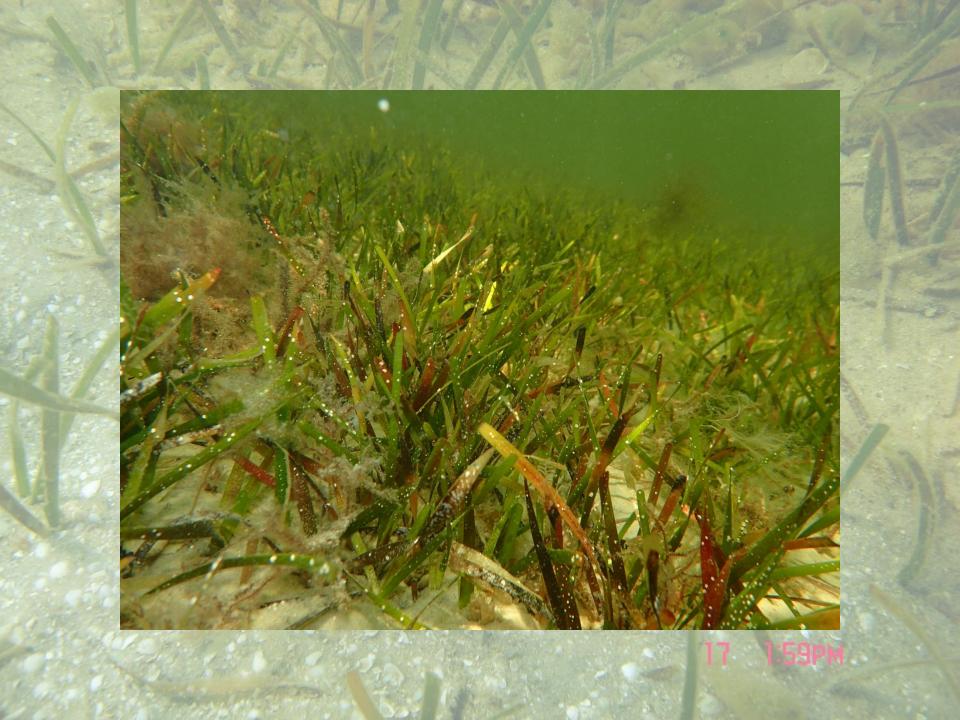
- fan shaped
- moderately calcified
- to 30 cm high
- pale to dark green

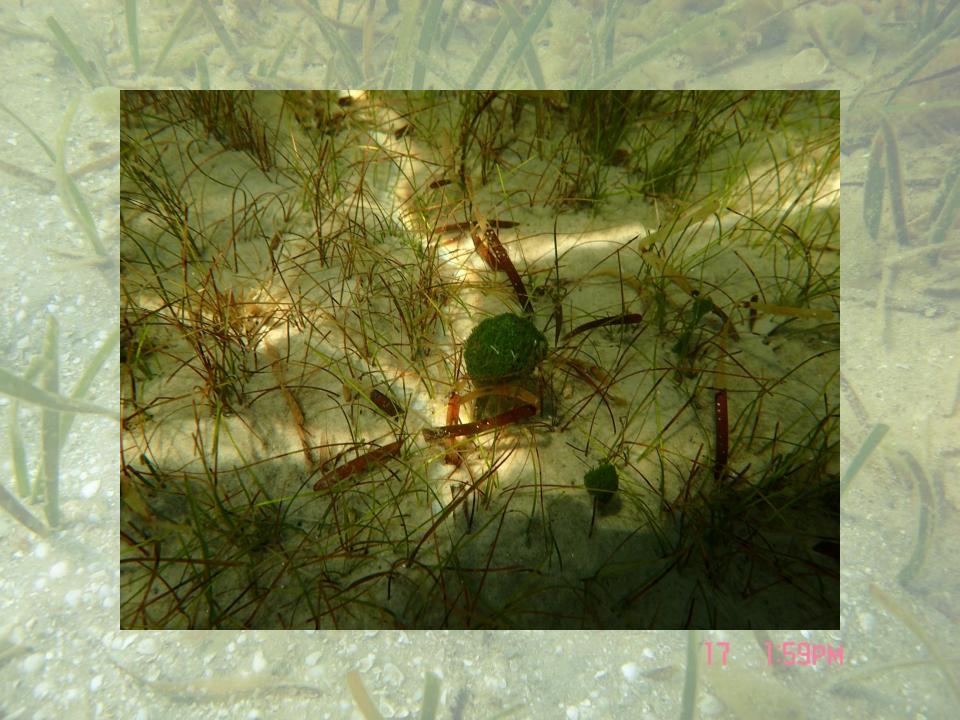


AS Acetabularia sp.

- parasol-shaped
- moderately calcified
- 2-8 cm high
- white-green

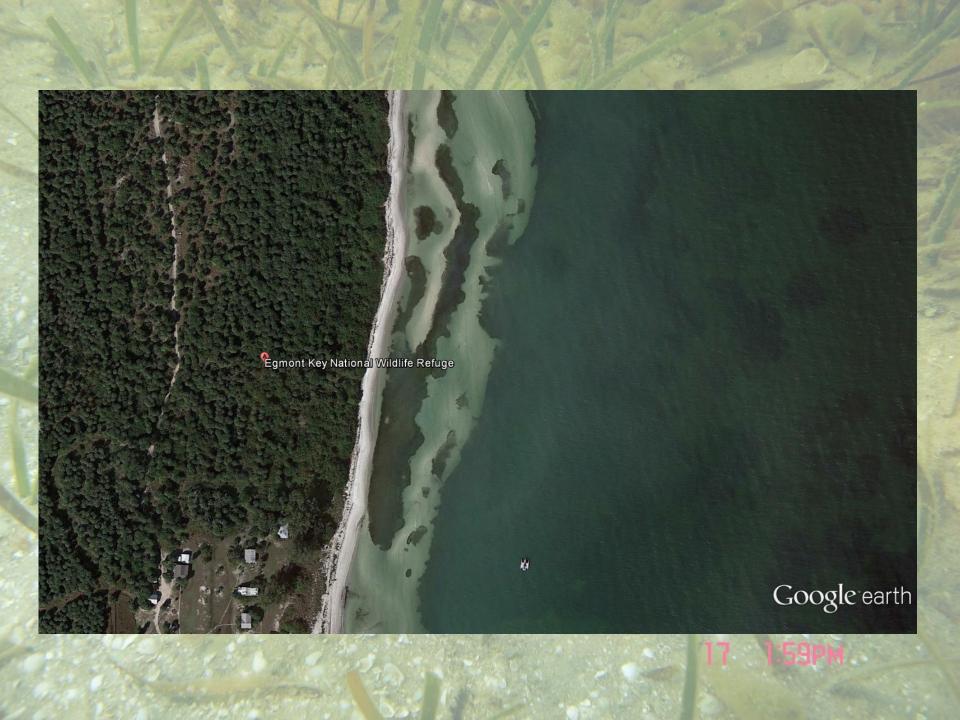




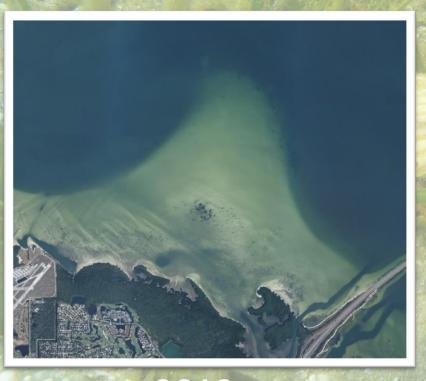


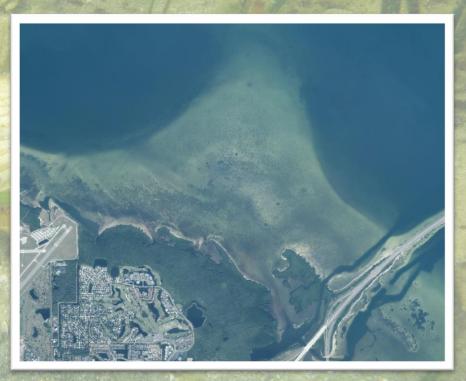






Tampa Bay Gains

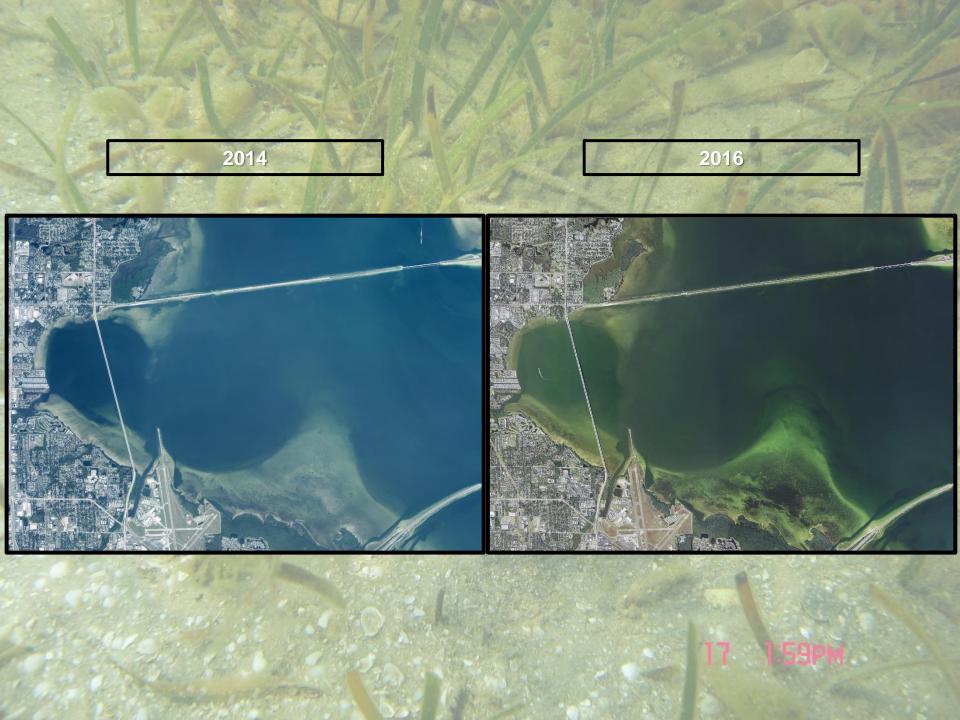


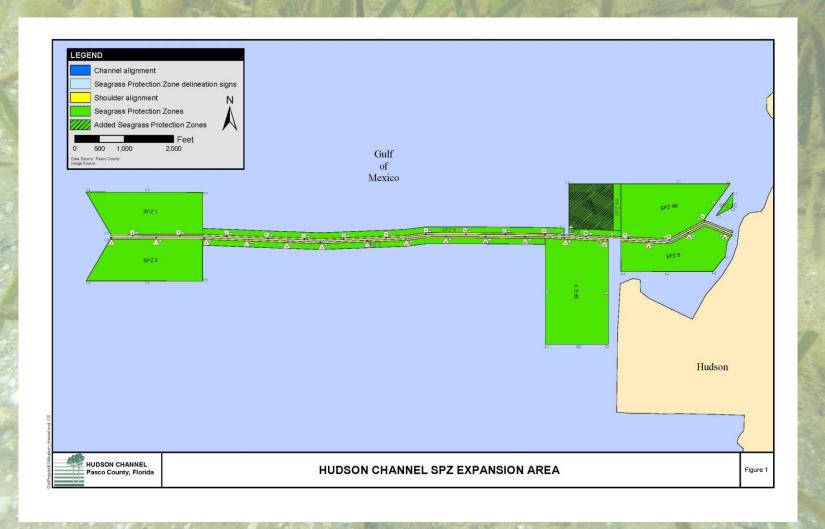


2012

2014

7 1:59PM







Hudson Channel Educational Sign

When was the channel dredged and what are its dimensions?

The channel was dredged in 2004/2005. The channel is 2.10 miles long, 40 ft. wide, and 5' deep relative to mean low water (MLW).

Why is the channel only 40 ft wide and 5 feet deep?

Permitting agencies wanted to minimize environmental impacts and therefore limited the channel to those dimensions.

How many navigational markers were placed? Markers were staggered. In total there are 31 navigational markers along the channel: 16 red and 15 green.

What is a Seagrass Protection Zone (SPZ)?

It is an area set aside from motorboat usage in order to protect and enhance the seagrasses and associated marine life, such as recreational finfish and crustaceans. A condition of the dredging permit required the protection of 286 acres of seagrasses through the establishment of SPZs. These zones are delineated with Seagrass Area signs.

What are seagrasses and why are they important?

Seagrasses consist of a small group of flowering plants that are adapted to survive and reproduce in the marine environment. Seagrasses are a vital part of the marine ecosystem. Seagrasses provide food and habitat to a variety of marine species, including sport fish and endangered species, such as the manatee and the green sea turtle. Seagrasses also help stabilize marine sediments and maintain water quality. Images of common seagrasses are depicted on this flyer.

What is a prop scar?

A prop scar (propeller scarring) of seagrasses usually occurs when boaters motor through water that is shallower than the drafts of their boats. The propellers tear some combination of the seagrass leaves, stems and roots, managing at times to remove the sediments, creating unvegetated, linear troughs of varying lengths. The natural restoration of these scars of these scars may take years depending on the size of the scar and the level of protection these areas receive. Sometimes entire beds can be lost as a result of multiple scars and destabilized sediments.

Please practice smart boating by avoiding navigation through the Seagrass Protection Zones and other shallow grass bed areas.

How is the County protecting these zones?

Through education and smart boating practices. Anglers with motorized vessels can fish these areas by shutting off their engines, trimming their motors, and poling through these areas or drifting. Only air boats, canoes or sail boats are allowed to operate in these areas without restriction. Jet skis should not be used in the zones.

Is the speed in the channel regulated?

At this time it is not. Boaters are expected to comply with a courteous attitude and to observe safety measures while in the channel, especially when approaching or passing other vessels.

I have a small motorboat. What can I do to avoid the wake of a larger boat wanting to pass

You are allowed to pull over so that you are outside of the channel. The pull over area is not for navigation and it is only to be used when absolutely necessary. such as to avoid larger vessels and/or their wakes or in the case of an emergency. The pull over area will be shallower than the channel, so make certain to slow your speed and tilt up your engine, as this will prevent damage to your vessel and as well as existing seagrasses. After the vessel has passed, move back into the channel and resume normal operations. And always remember to use good judgment and safe boating practices.

Pasco County hopes that all persons utilizing its water ways have a safe and enjoyable time.





Prop Scars

Sources of information

Dawes, C.J., R.C. Phillips, and G.E. Morrison. 2004. Seagrass Communities of the Gulf Coast of Florida: Status and Ecology. Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute and the Tampa Bay Estuary Program. St. Petersburg, FL. 74 pp.

Florida Department of Environmental Protection's website http://www.dep.state.fl.us/coastal/habitats /seagrass/ "Seagrasses" webpage.

Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute's website http://research.myfwc.com/features/view Article.asp?id=22607 "Learn About Seagrasses"

Hughes, E. And T. Ries, 2007 Submerged Aquatic Vegetation (SAV) Assessment Seagrass Protection Zone (SPZ) Expansion For Pasco County Scheda Ecological Associates, Inc. 7pp.

Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute's website

http://research.myfwc.com/features/view





Turtle Grass

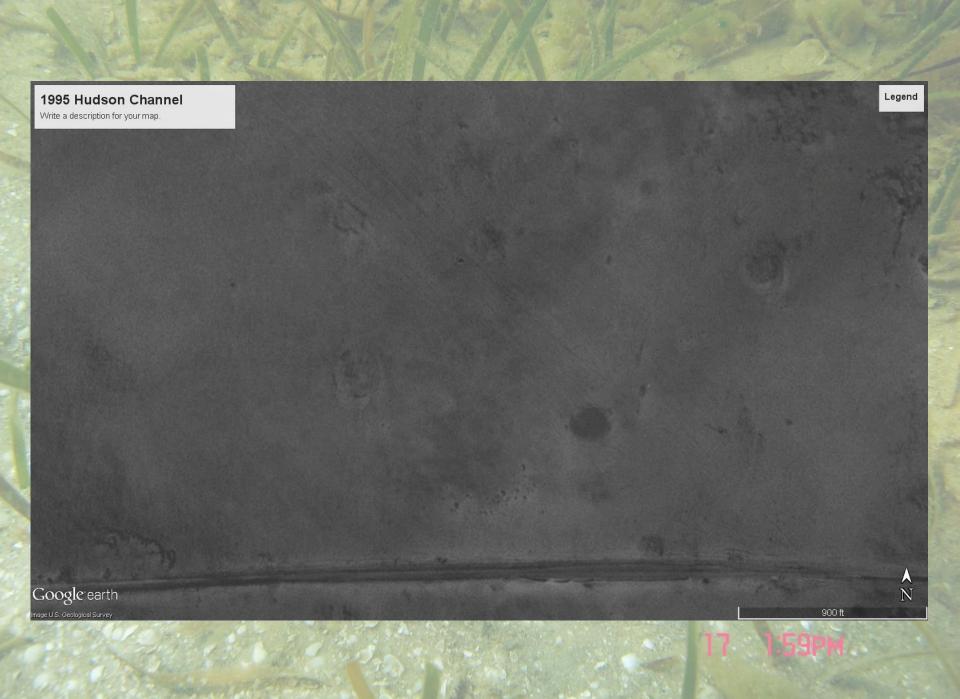


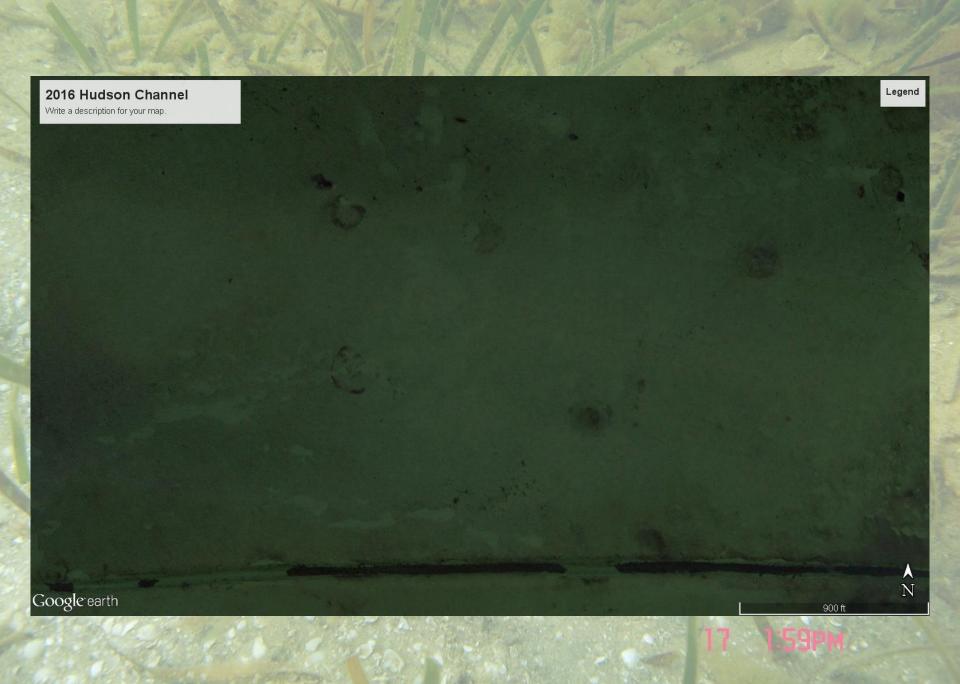
Hudson Channel and **Seagrass Protection Zones** (SPZ)













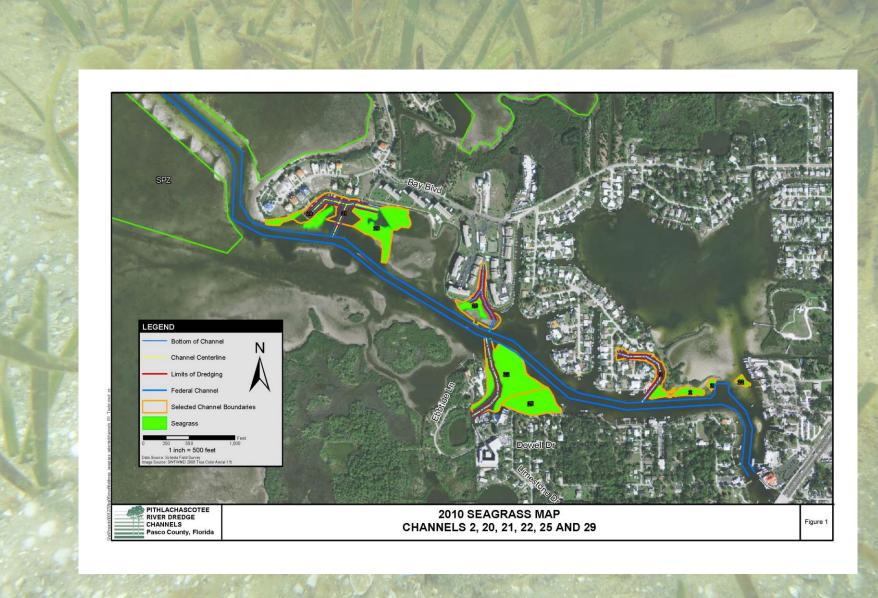


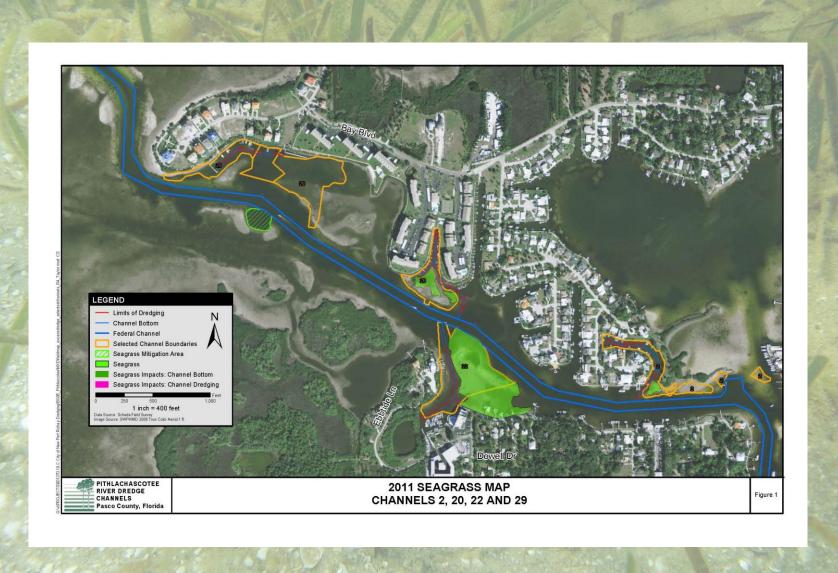


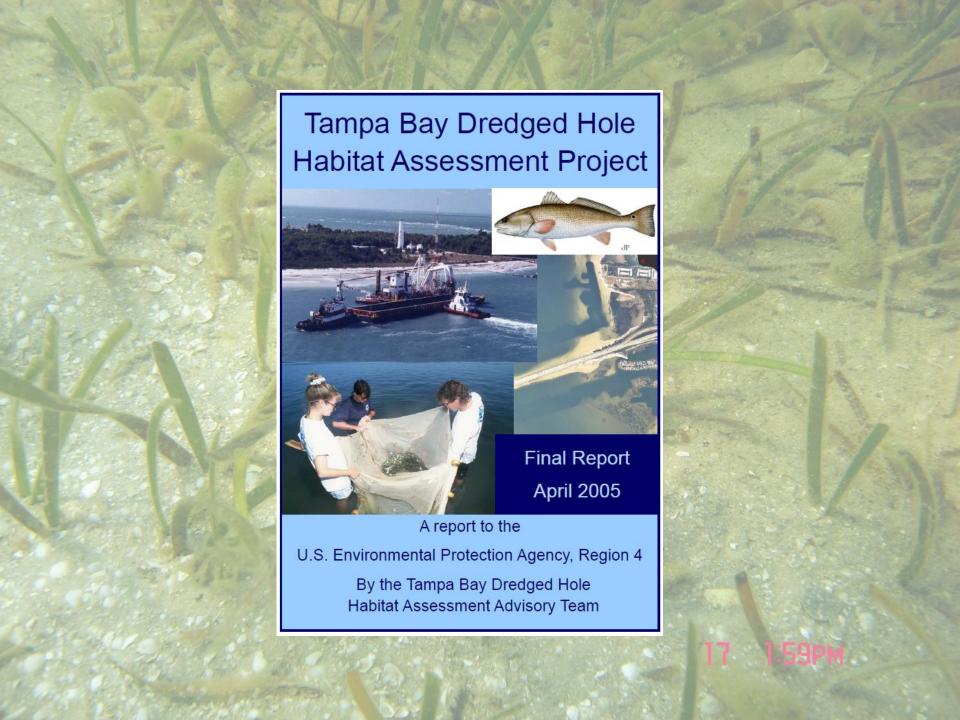


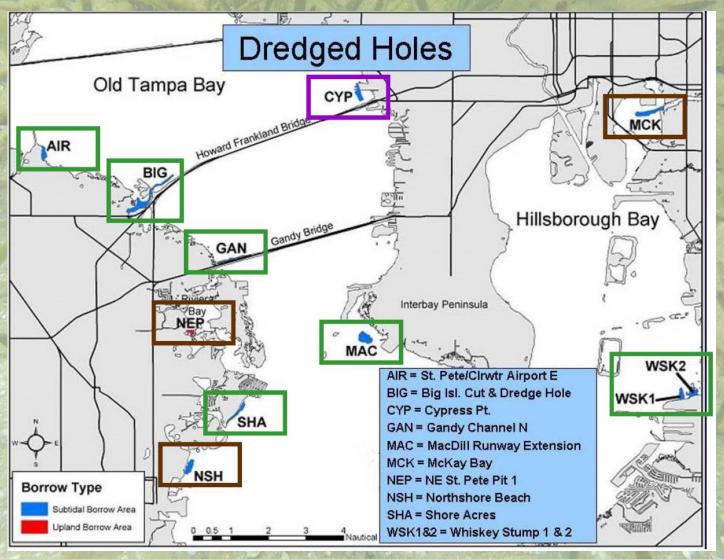




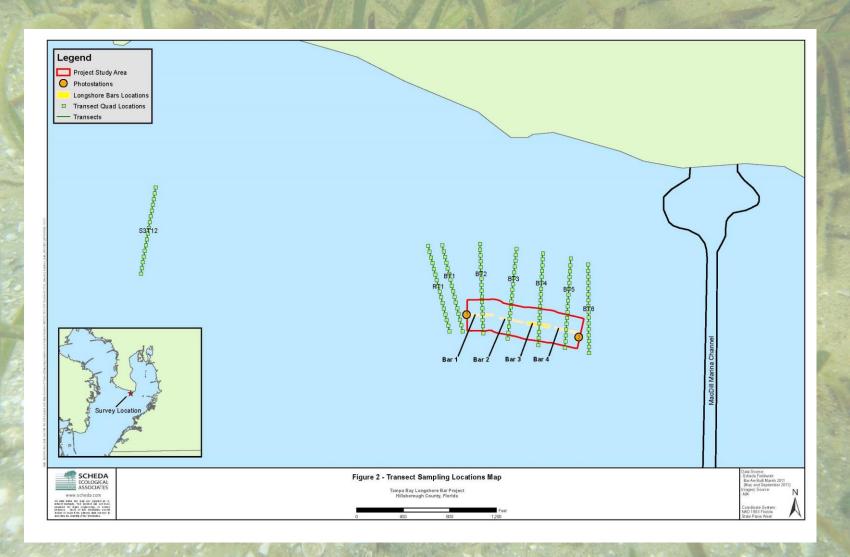


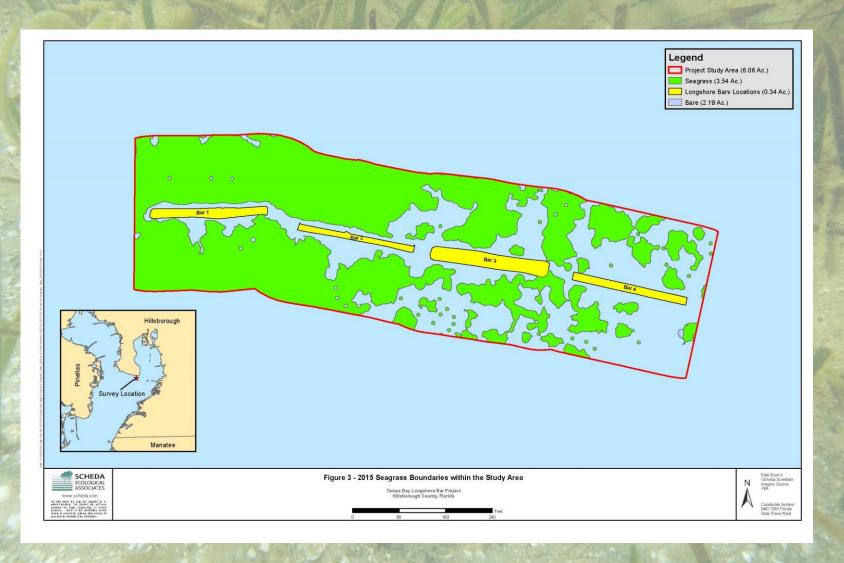














Seagrass Mitigation Summary

- Avoidance
- Minimization

- Seagrass Protection Zones (SPZ)
- Dredge Hole Restoration
- Prop-Scar Repairs
- Protective Structures (Longshore Bars)
- Water Quality Improvements

