



Florida Department of Environmental Protection

Division of Water Resource Management

***Beach Nourishment
&
Nearshore Hardbottom***

July 21, 2016

Lainie Edwards, Ph.D.





Beach Nourishment





Beach Nourishment

Statewide Beach Nourishment Monitoring





Beach Nourishments





Projects with Hardbottom





Hardbottom

Rocky *substratum*, immobile, serves as attachment surface for benthic flora and sessile fauna

Ecologically diverse:

- > 6,000 organisms (e.g., sponges, tunicates, fishes and turtles)
- 7 federally protected corals (listed under ESA)

Provides essential ecological functions:

- Nursery, spawning, foraging areas
- Shelter and recruitment surfaces
- Contributes to local food webs
- Filter feeding organisms maintain water clarity





Managing Hardbottom

Pre-project Assessment

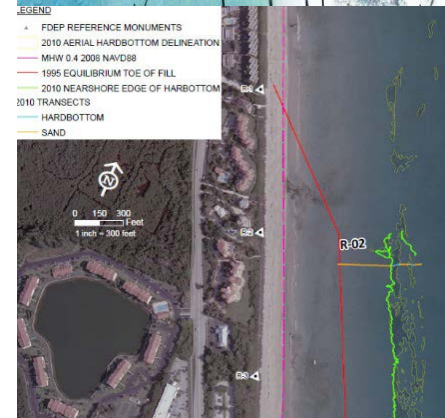
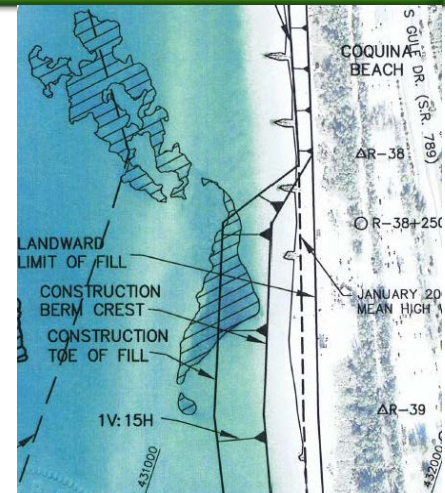
Estimate Resource Impact

- Direct
- Secondary

Mitigation to offset predicted impacts

Monitor adjacent resources

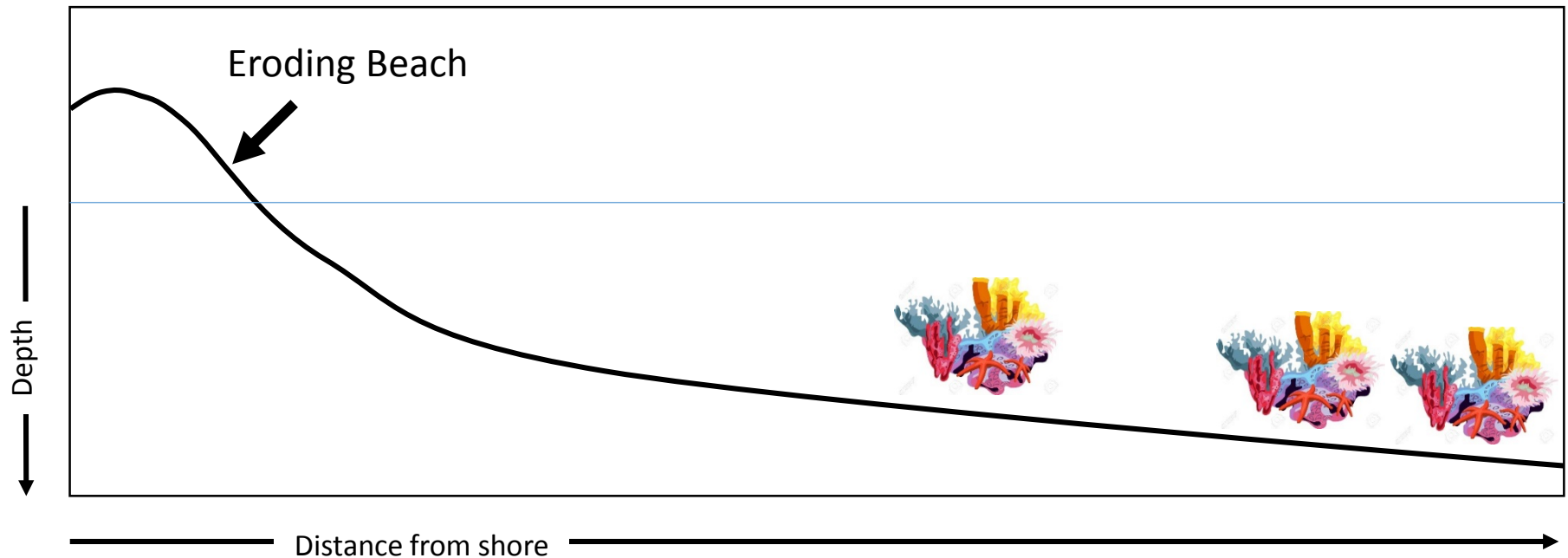
Mitigate for unanticipated impacts





Nourishment Projects with HB

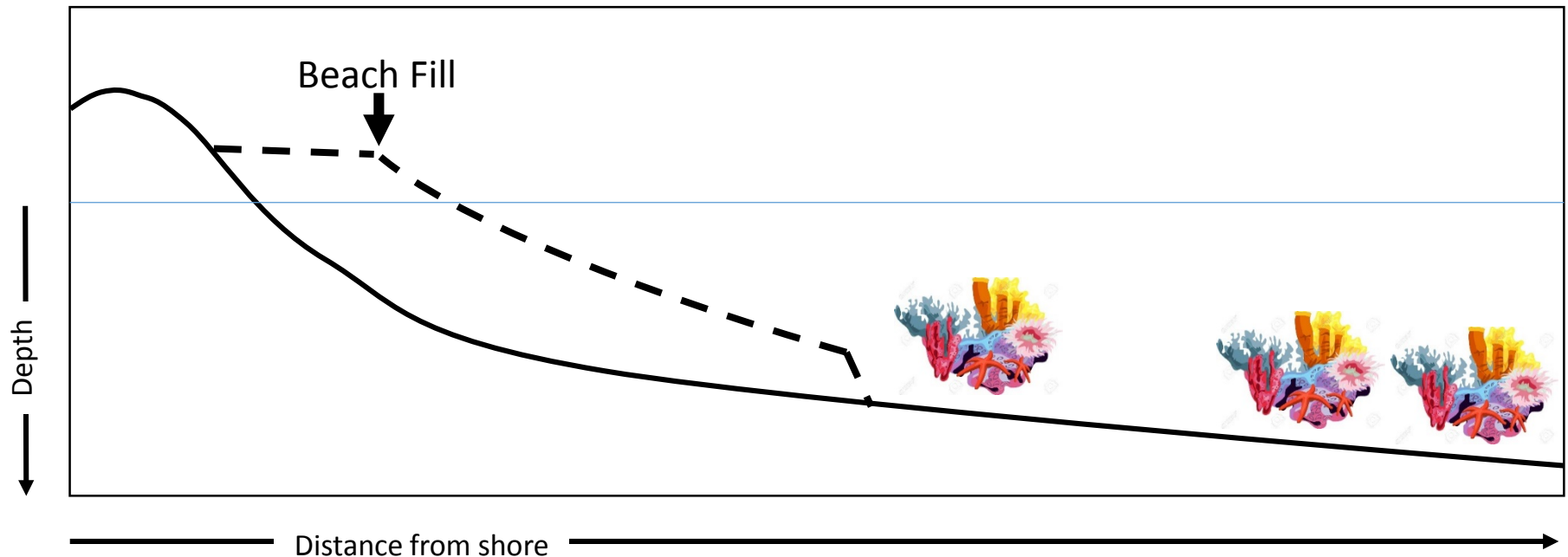
Potential consequences





Nourishment Projects with HB

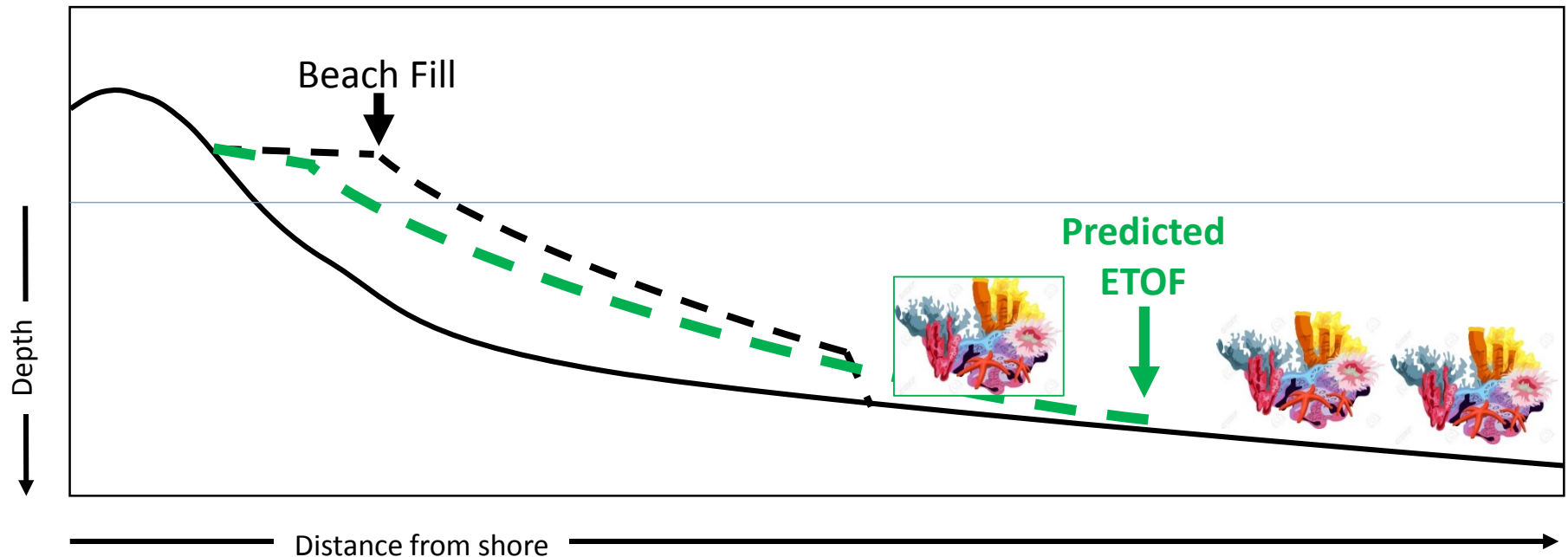
Potential consequences





Nourishment Projects with HB

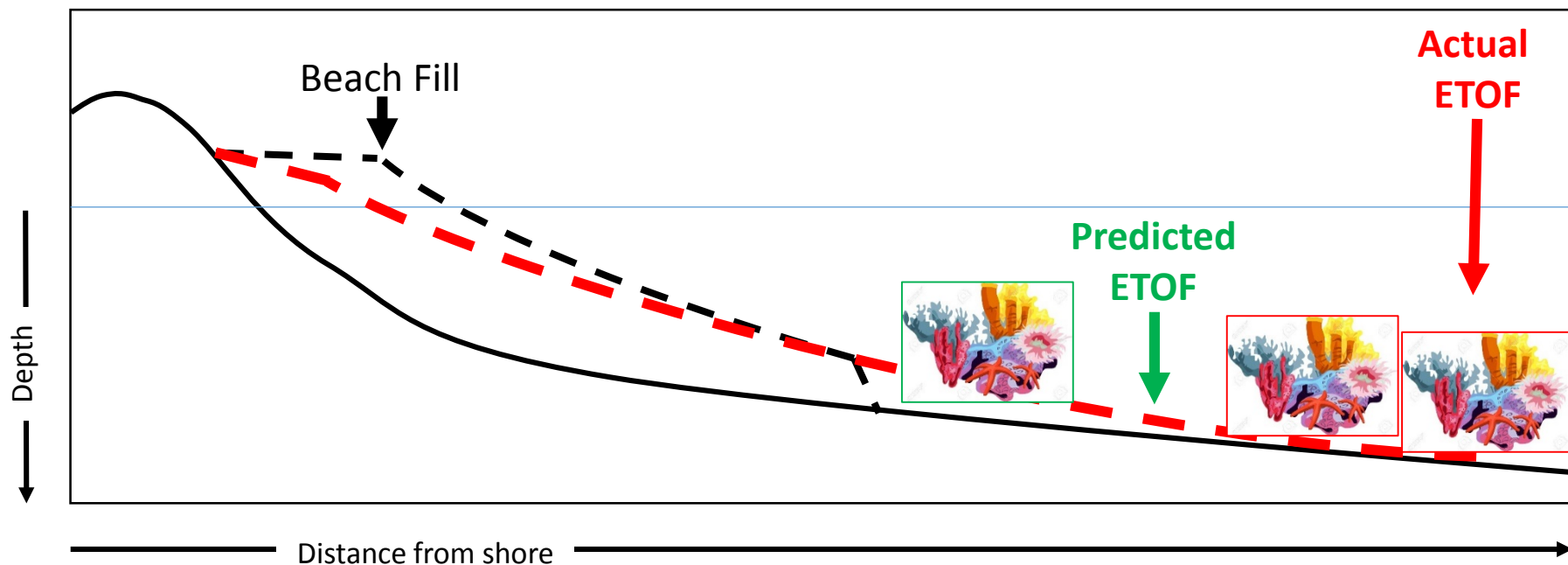
Potential consequences





Nourishment Projects with HB

Potential consequences





Hardbottom Monitoring

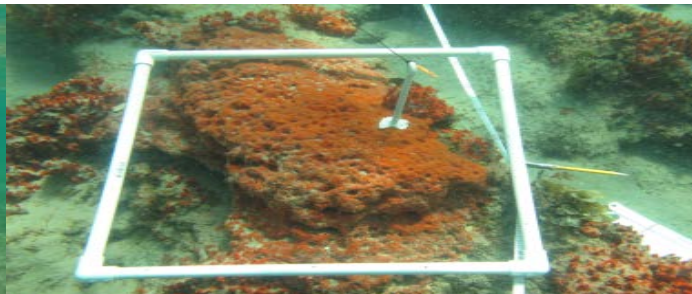
Goal: Determine if project related impacts exceed predicted impacts provides regulatory reasonable assurance

Standardized monitoring techniques:

Hardbottom SOP

http://www.dep.state.fl.us/beaches/programs/envpe_rmt.htm

Consistent resource review





Monitoring Methods

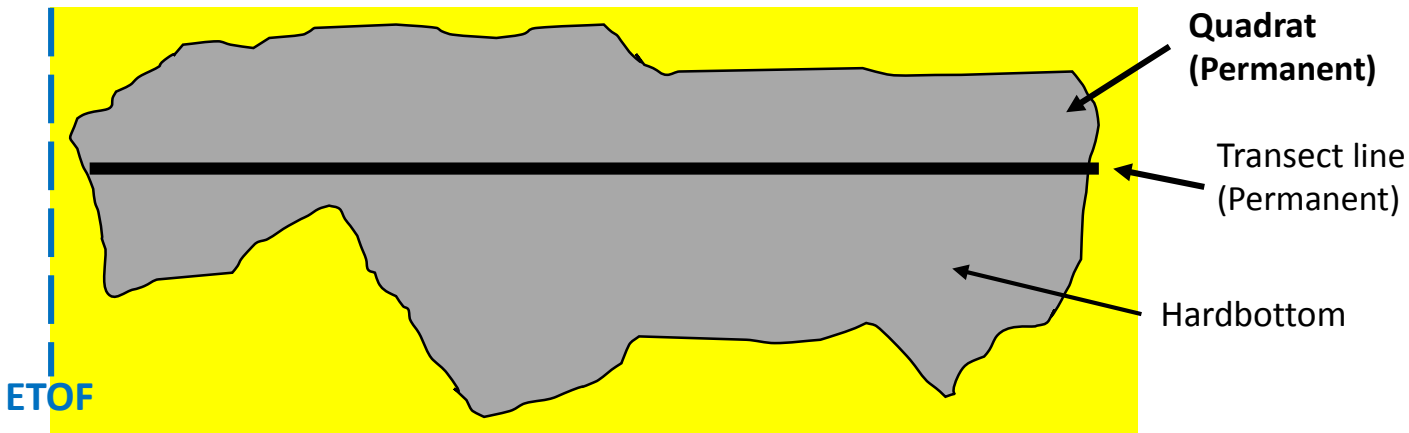
Based on:

A. Transect surveys

B. Hardbottom edge surveys

Nearshore

Offshore



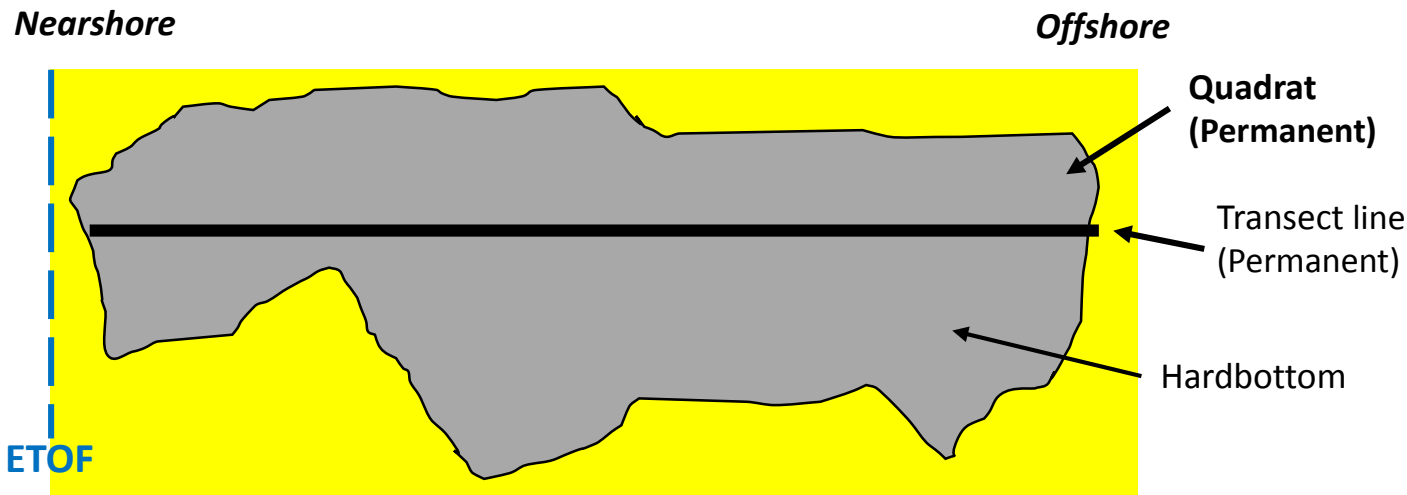


Monitoring Methods

Based on:

A. Transect surveys

1. Within quadrat surveys
2. Interval sediment depth and line-intercept for sand / hardbottom





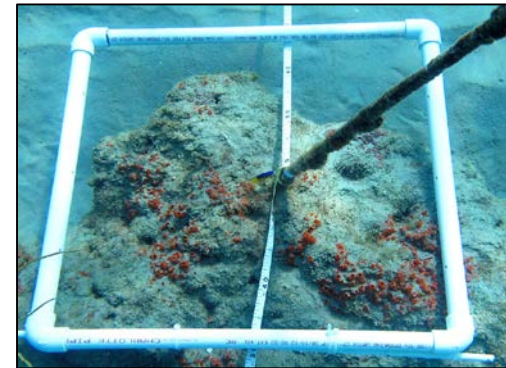
Monitoring Methods

Based on:

A. Transect surveys

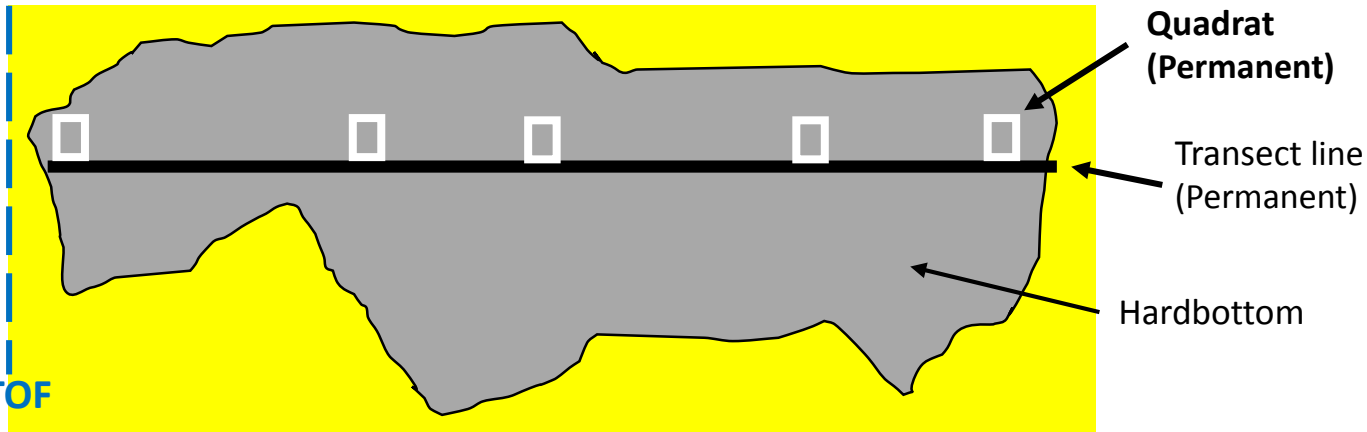
1. Within quadrat surveys

- Mean Sediment Depth
- Percent Sediment Cover



Nearshore

Offshore



Quadrat
(Permanent)

Transect line
(Permanent)

Hardbottom

ETO



Monitoring Methods

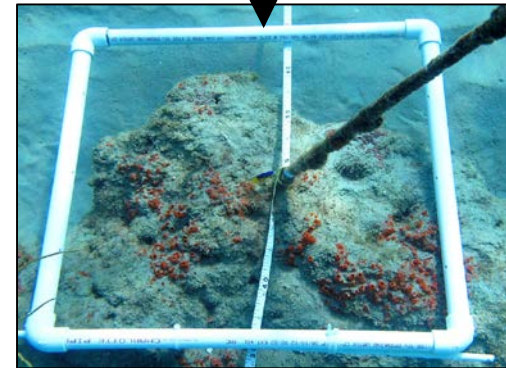
Based on:

A. Transect surveys

1. Within quadrat surveys

- a. Mean Sediment Depth
- b. Percent Sediment Cover
- c. Benthic Characterization

Within each Quadrat estimate planar **percent cover** of groups



Major Functional Groups

Biological Functional Groups

Abiotic

Biotic

Macroalgae

Invertebrates

Sediment

Macroalgae

Chlorophyta

Sponges

Bare

Turf Algae

Phaeophyta

Hydroids

Substratum

Rhodophyta

Octocorals

Coral Rubble

Encrusting Red Algae

Scleractinian Corals

Invertebrates (Fauna)

Bryozoans

Tunicates



Monitoring Methods

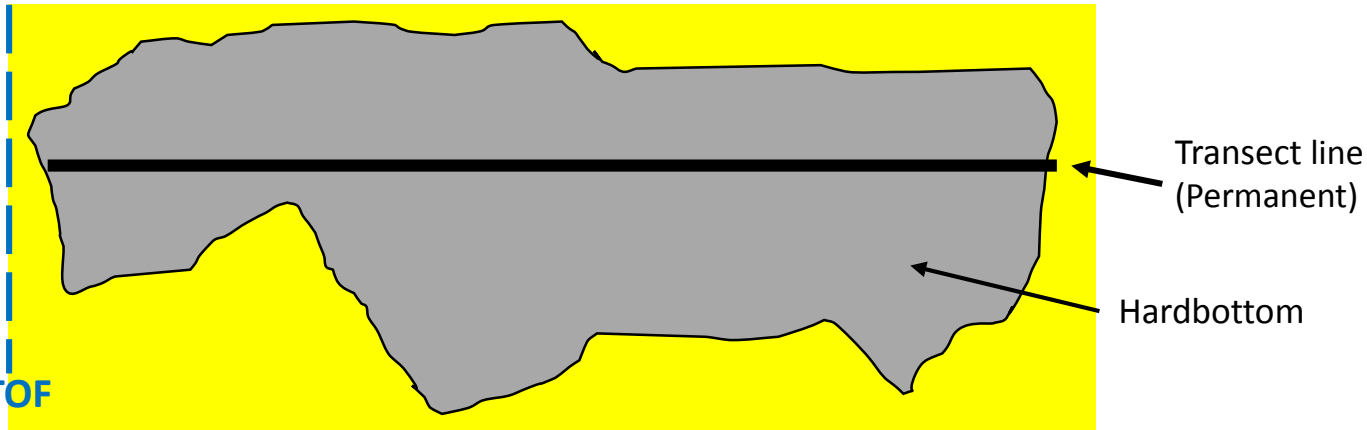
Based on:

A. Transect surveys

1. Within quadrat surveys
2. Interval sediment depths....

Nearshore

Offshore





Monitoring Methods

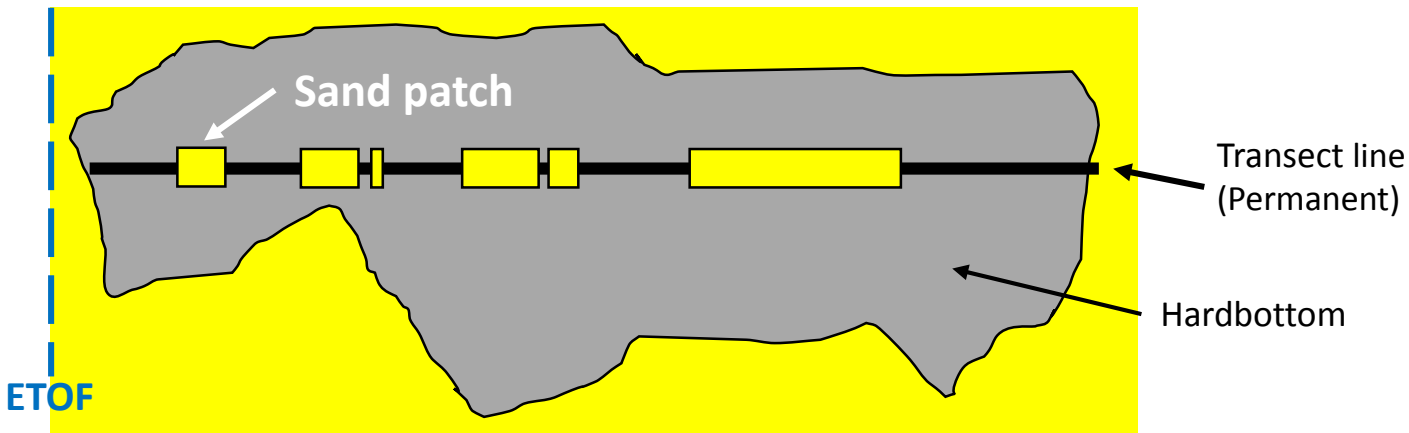
Based on:

A. Transect surveys

1. Within quadrat surveys
2.and line-intercept for sand / hardbottom

Nearshore

Offshore





Monitoring Methods

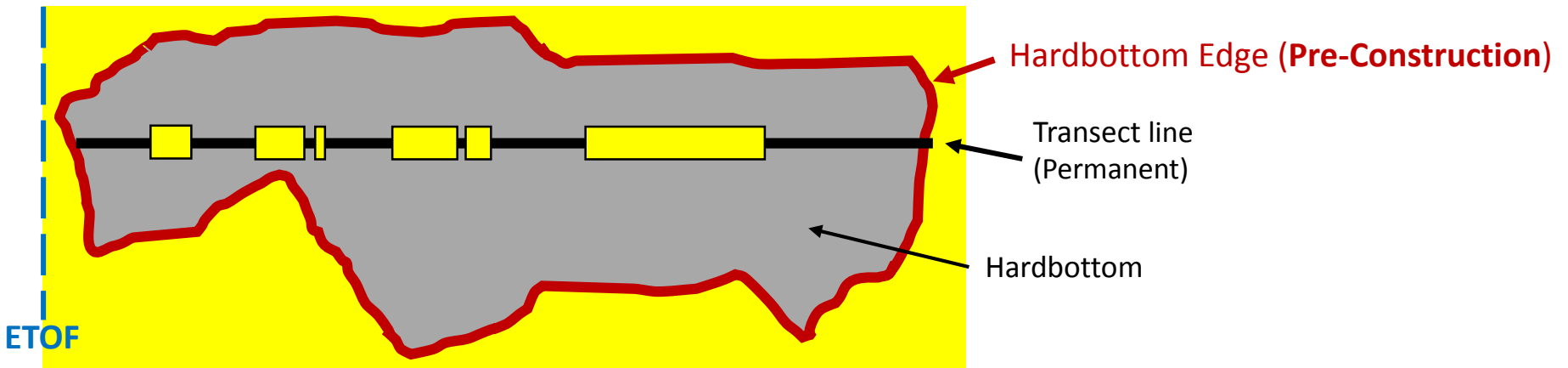
Based on:

A. Transect surveys

B. Hardbottom Edge Surveys

Nearshore

Offshore





Monitoring Methods

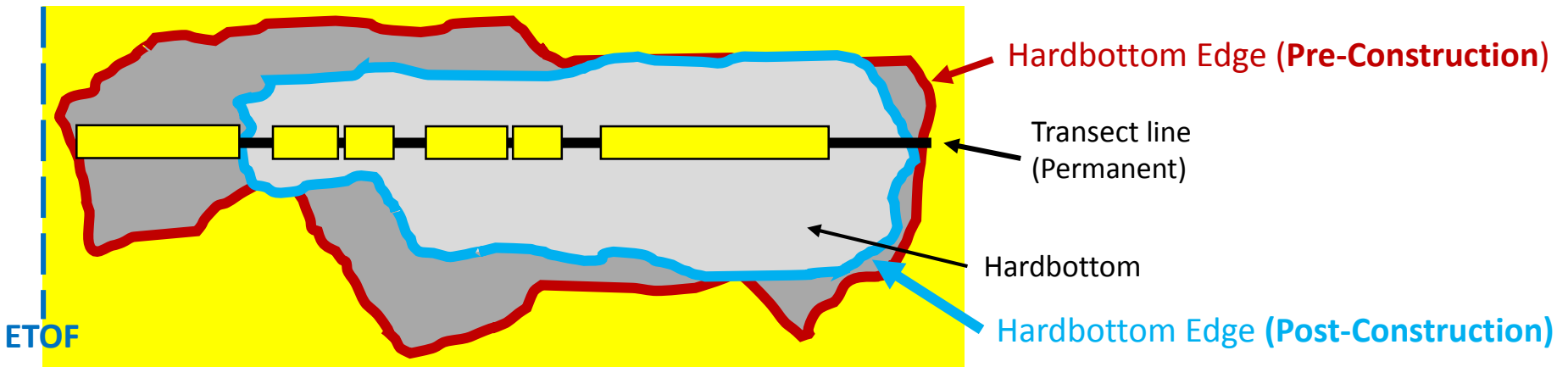
Based on:

A. Transect surveys

B. Hardbottom Edge Surveys

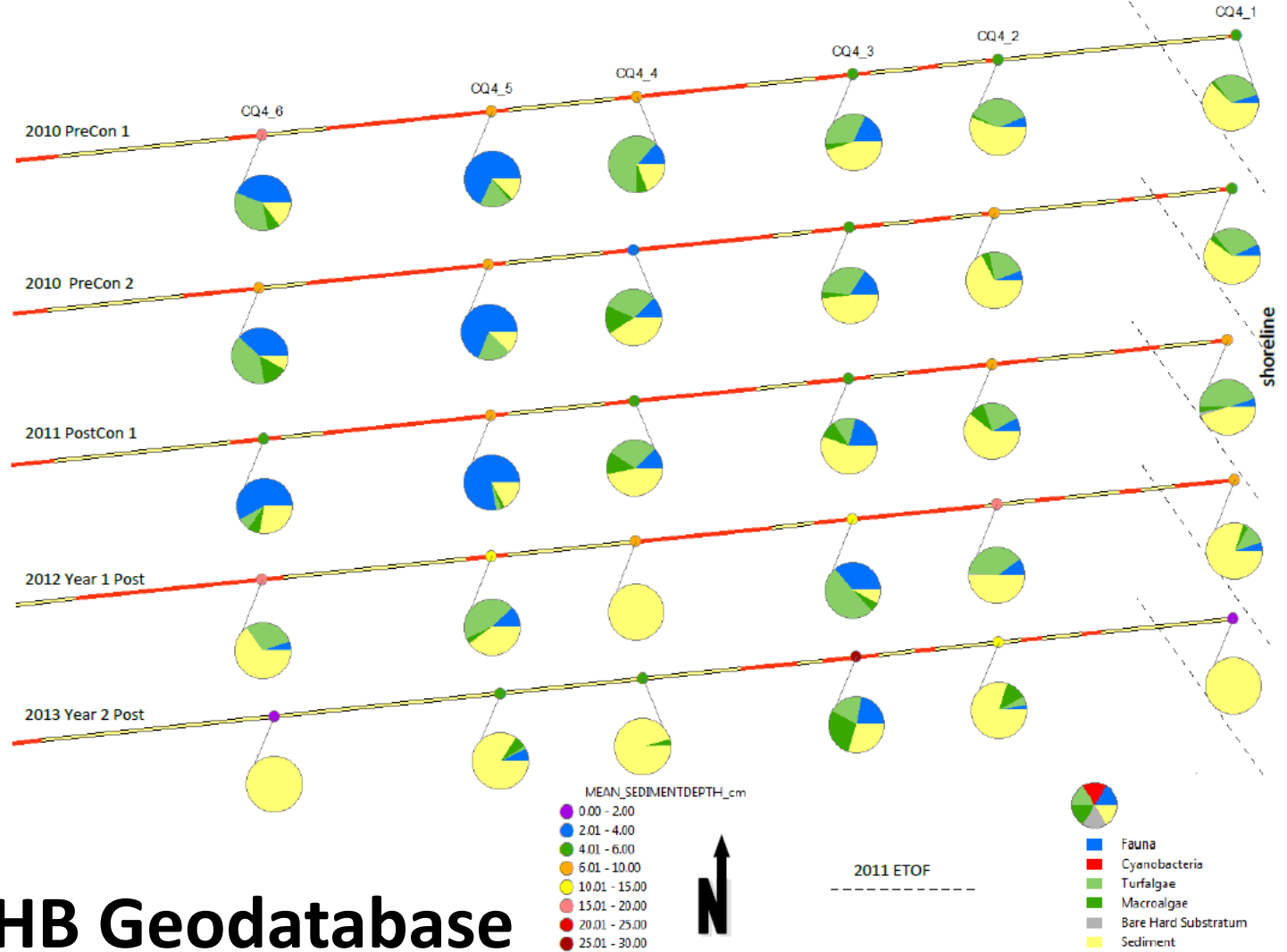
Nearshore

Offshore





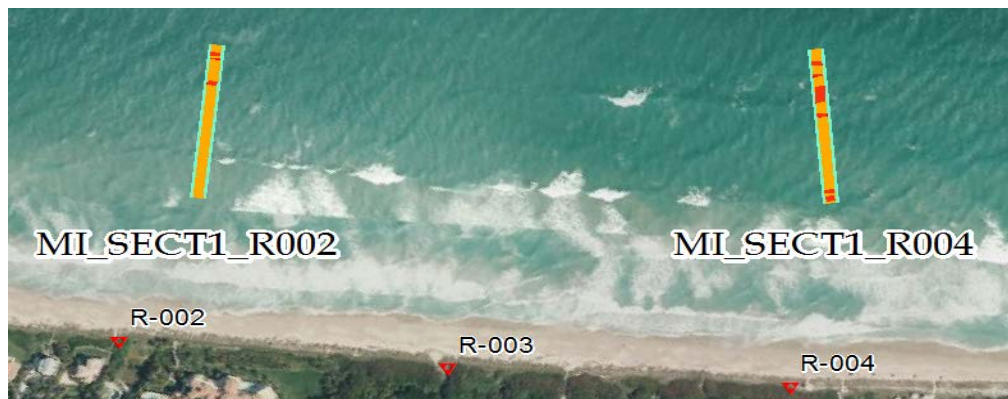
Community Change Analysis



HB Geodatabase



Line Intercept Survey by Year



2013 Post 1 Hardbottom Delineation

Hardbottom

Sand



2014 Post 1 Hardbottom Delineation

Hardbottom

Sand



Impact Assessment

- Comprehensive monitoring data review during last 3 years
- Many projects “in review” phase
- Project review showing indication of impact in certain projects
- Impacts vary according to
 - Size of the Project
 - Density of Fill
 - Characteristics of Fill
 - Nourishment Intervals
 - Position of Hardbottom
 - Amount of Hardbottom
 - Type of Hardbottom
 - Water depth





Impact Assessment

Moving Forward

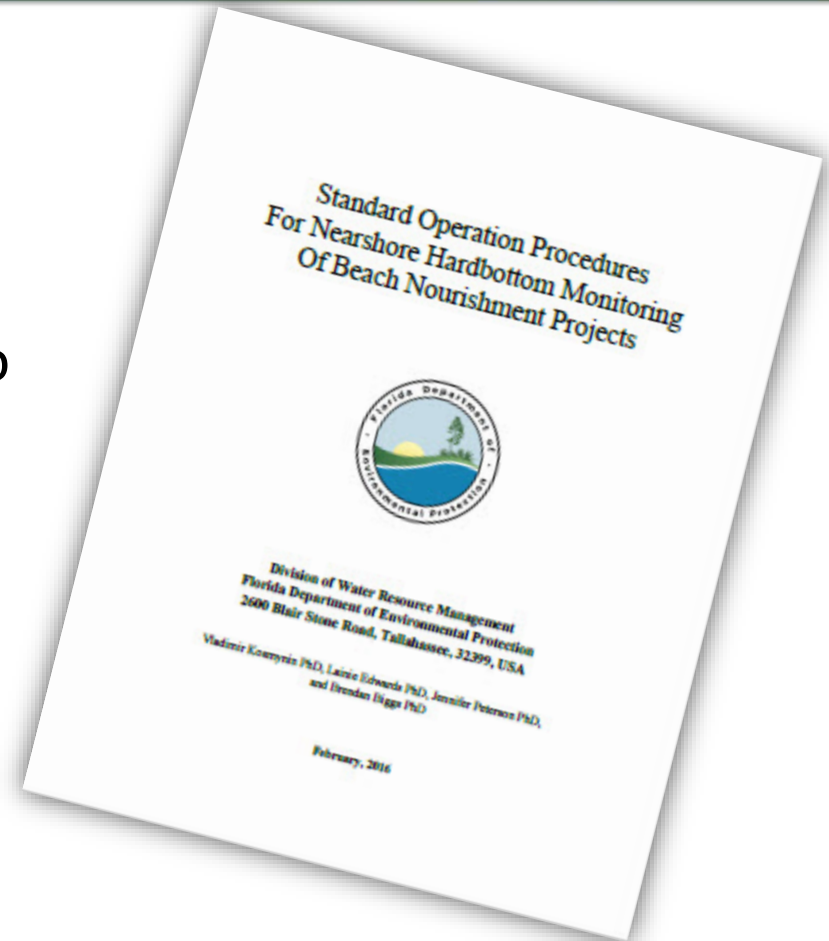
- Additional mitigation
 - Habitat creation
 - Enhancement options
- Project adjustments
 - Fill design
 - Fill amount / type
 - Frequency





Guidance Documents in Development

- Nearshore HB Monitoring Plan Template in development
- New appendices to be added into HB SOP:
 - Borrow Area Monitoring
 - Pipeline Corridor Monitoring
 - Mitigation Reef Monitoring





THANK YOU

Lainie Edwards, Ph.D.

Lainie.edwards@dep.state.fl.us

850-245-7617