BLIND PASS MAINTENANCE DREDGING PROJECT

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FEBRUARY 2010

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THE PROJECT

- Perform maintenance dredging to re-open Blind Pass
- Coastal Engineering Consultants was hired to provide construction administration services & conduct the physical and biological monitoring
- Conducted a value engineering assessment of containment cell design ~ resulted in cost savings of over $500,000

INTRODUCTION

- Historical Recap
- Physical Monitoring
- Biological Monitoring
  - Seagrasses
- Summary

Photo Credits: SCCF, Lee County and CEC

BLIND PASS BASICS

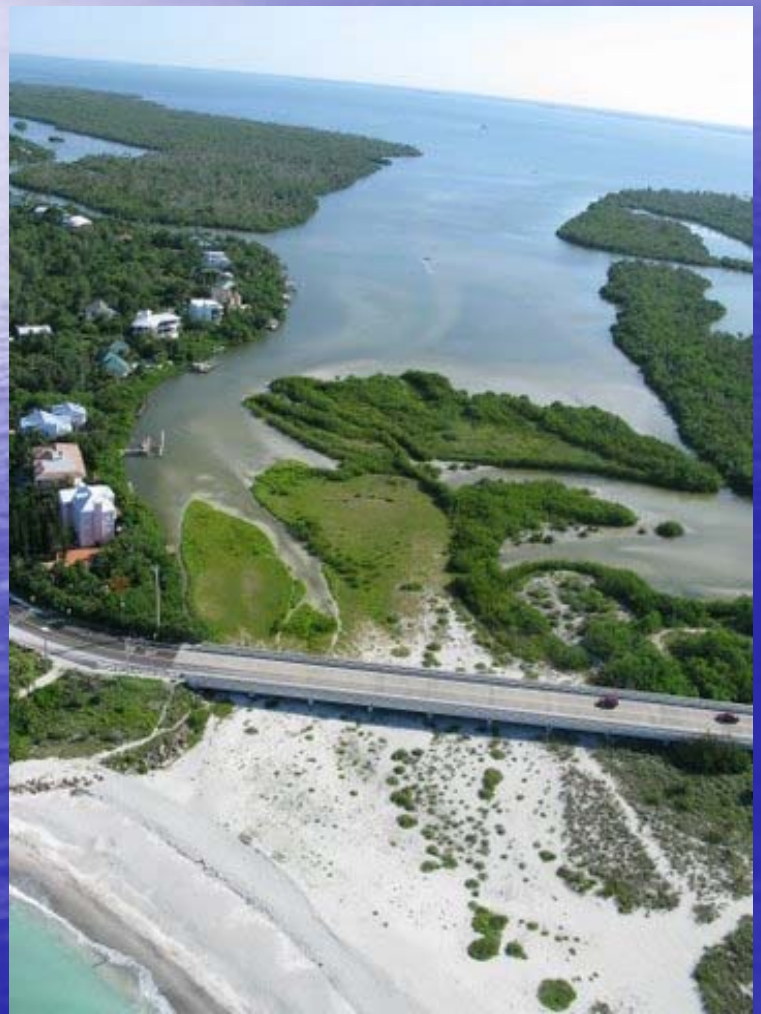
- Lee County Florida
- Separates Sanibel and Captiva Islands
- Natural Inlet altered by man-made activities


1987
0
1000ft


2002 3 29

BLIND PASS

- BEFORE (2008)



- AFTER (2009)

PROJECT SUMMARY

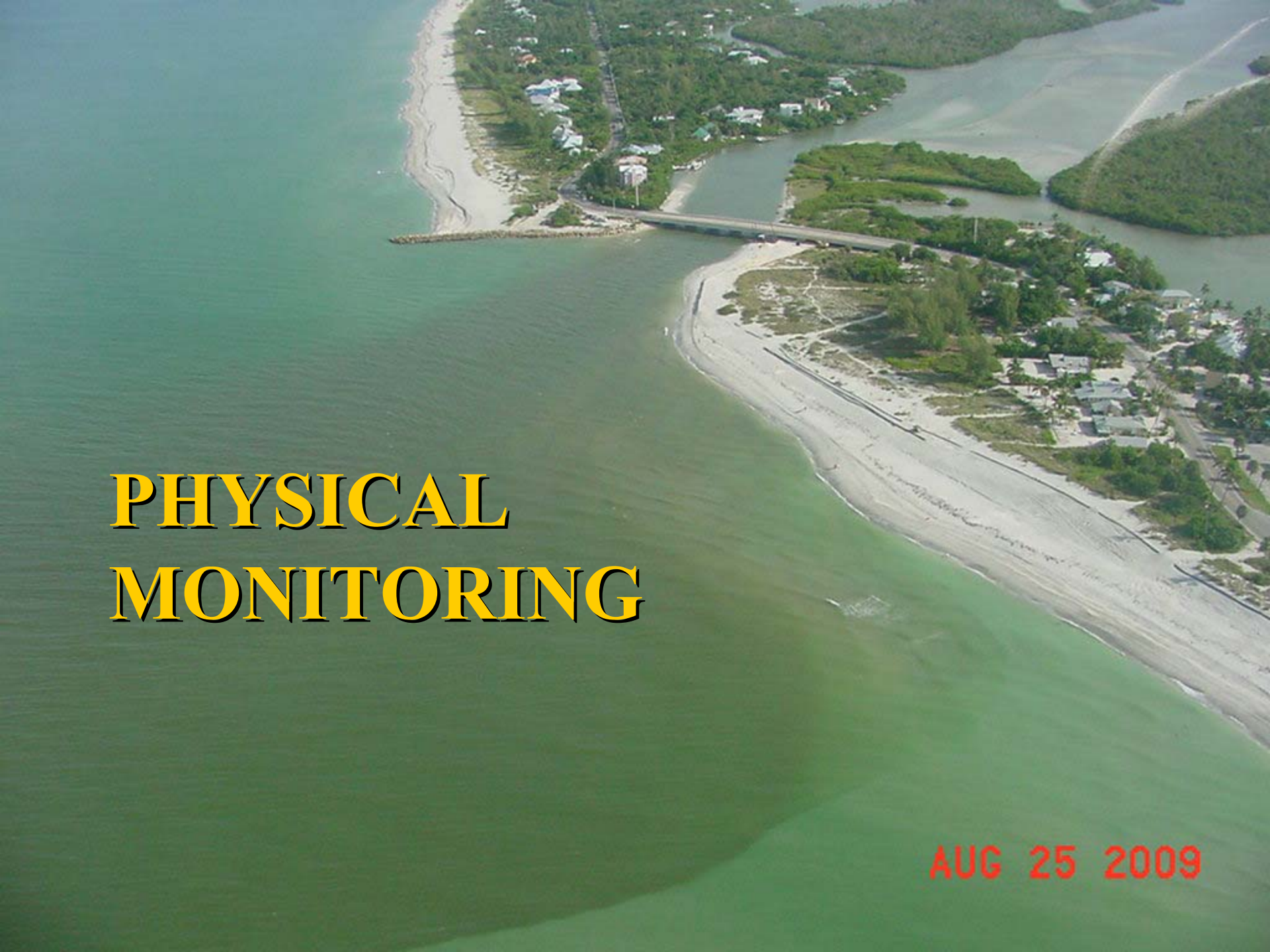
- DEP Permit issued June 2008
- Construction Cost = $2.17 Million
- Dredge 150,000 CY (Dec 08 – Aug 09)
- Three categories of material
  - Beach Compatible
  - Nearshore Compatible
  - Non-Compatible

Beach Compatible

Nearshore Compatible

Non-Compatible


05/28/2009

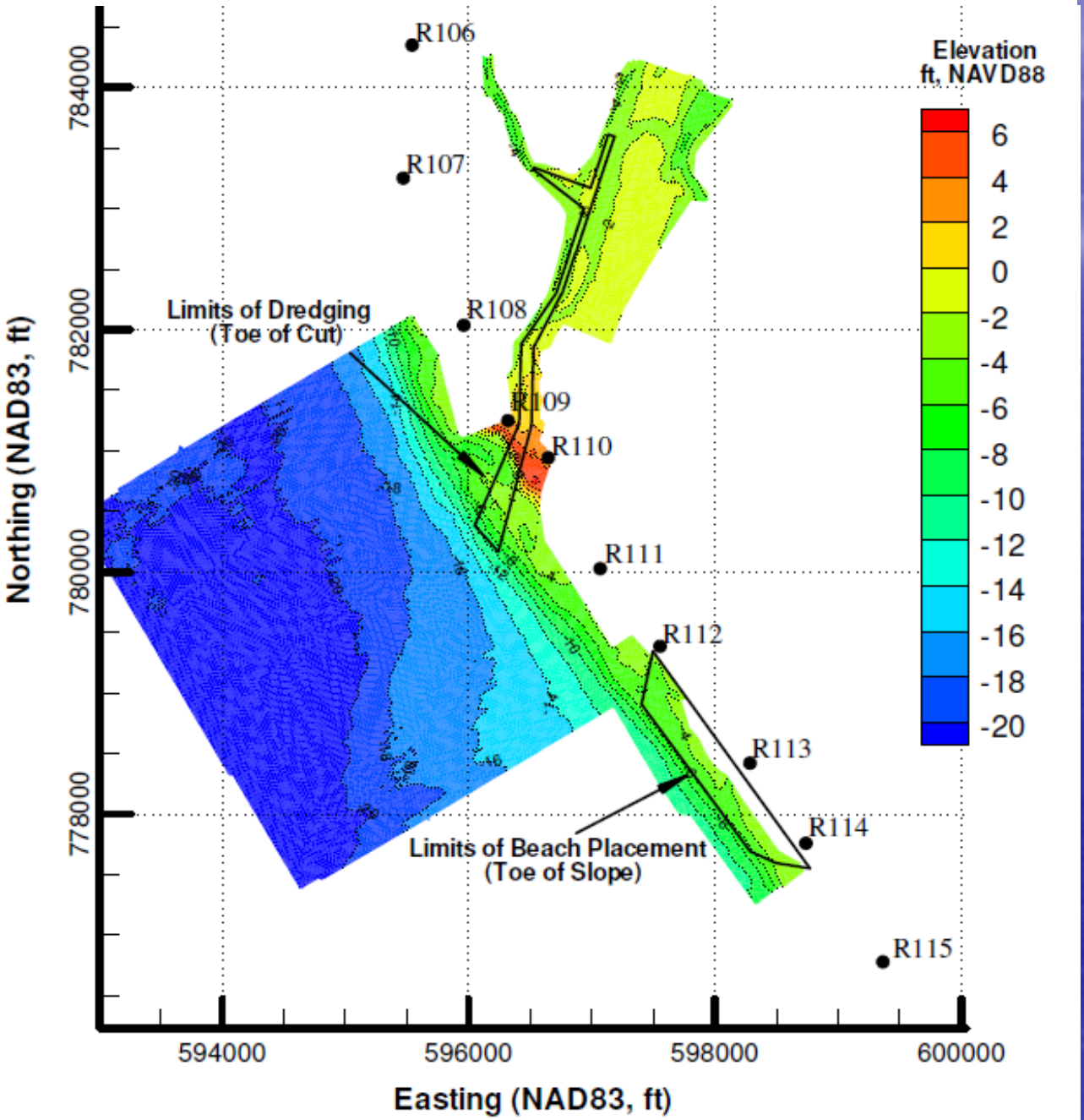

PHYSICAL
MONITORING
AUG 25 2009

PHYSICAL MONITORING

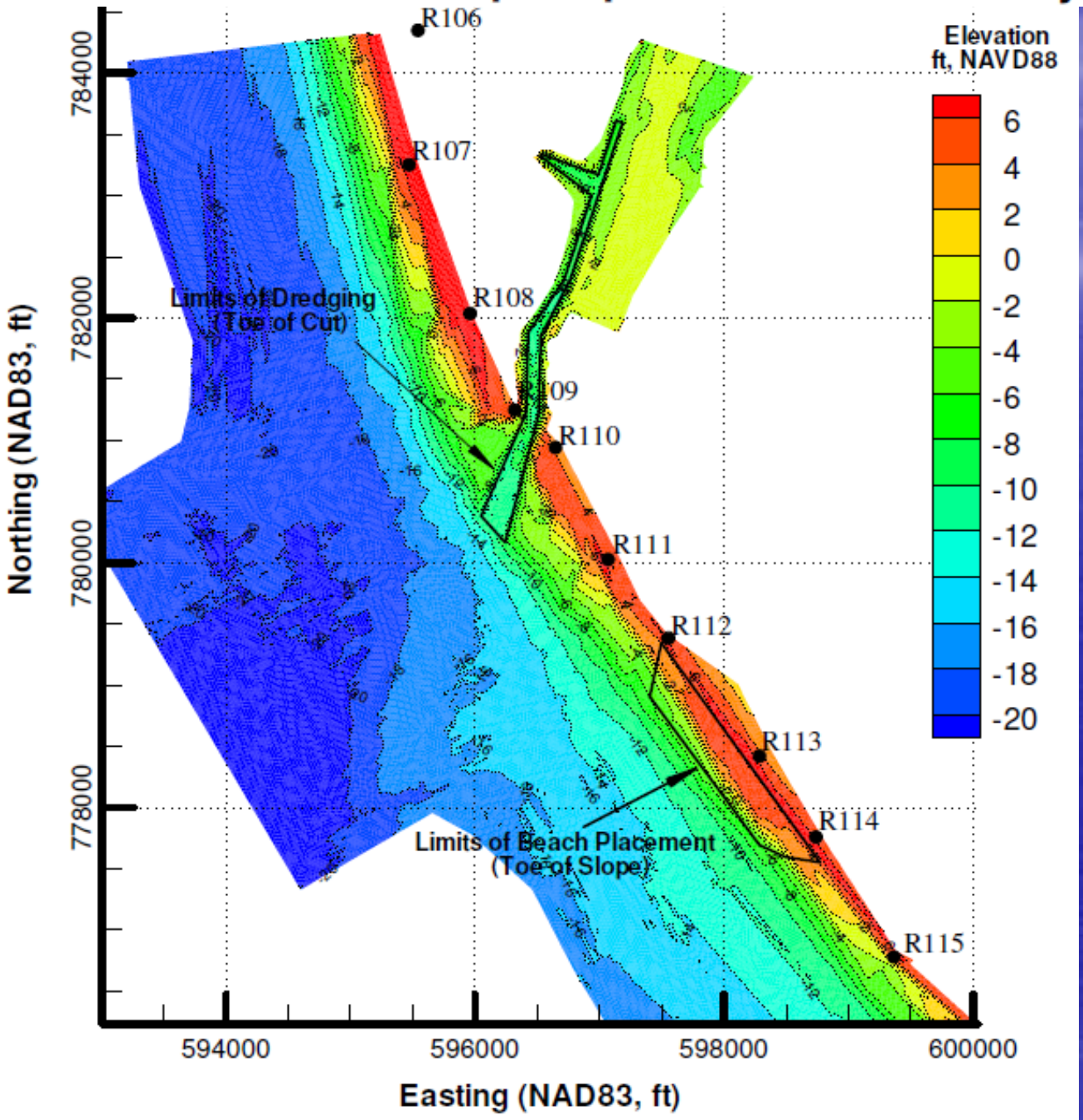
- Ebb Shoal Survey
- Blind Pass Survey
- Beach Profiles
- Aerial Photography
- Sediment Analysis

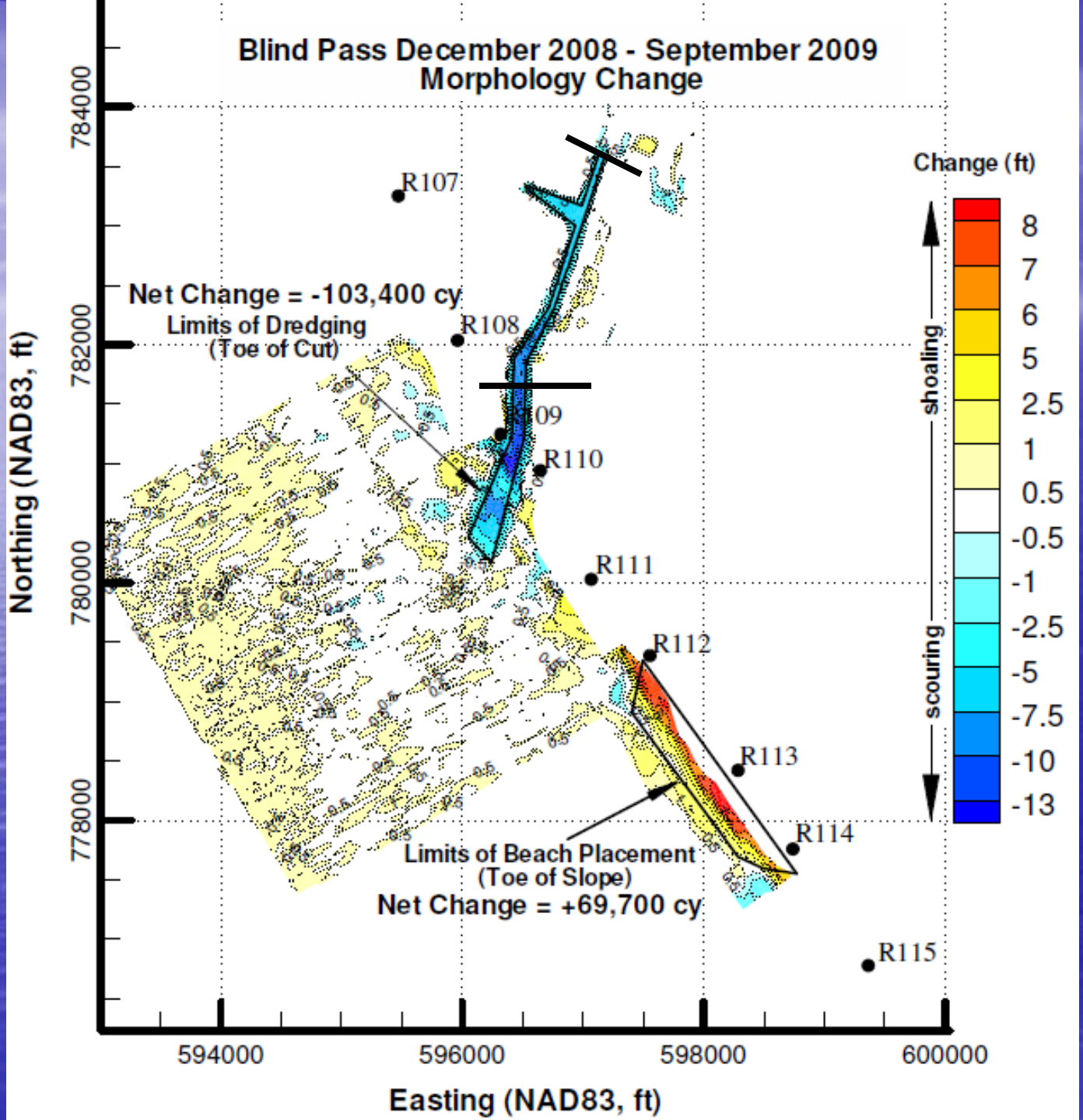
Pre and post-construction and annually for five years

Blind Pass Contour Map: December 2008 Survey

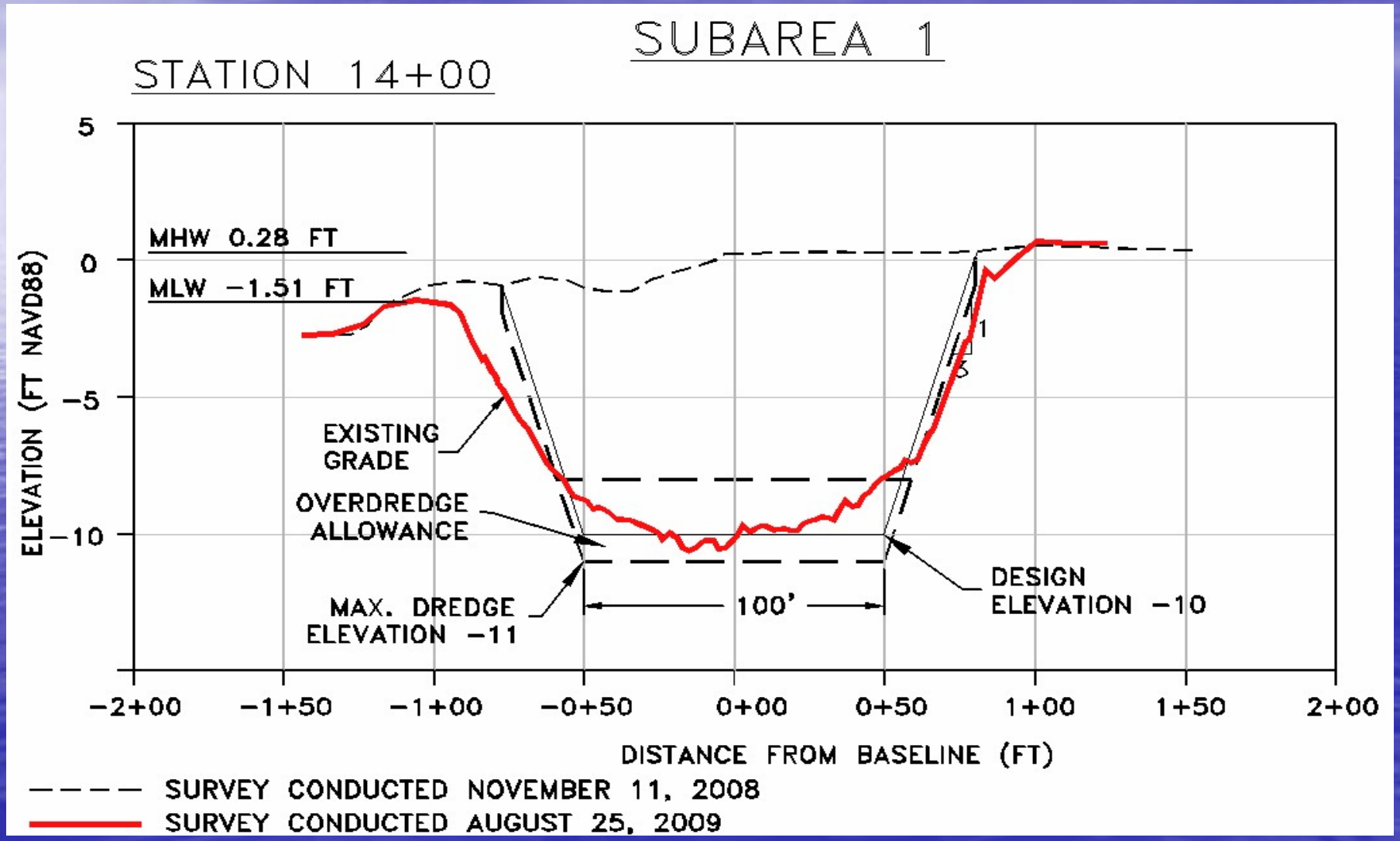


Blind Pass Contour Map: September 2009 Survey

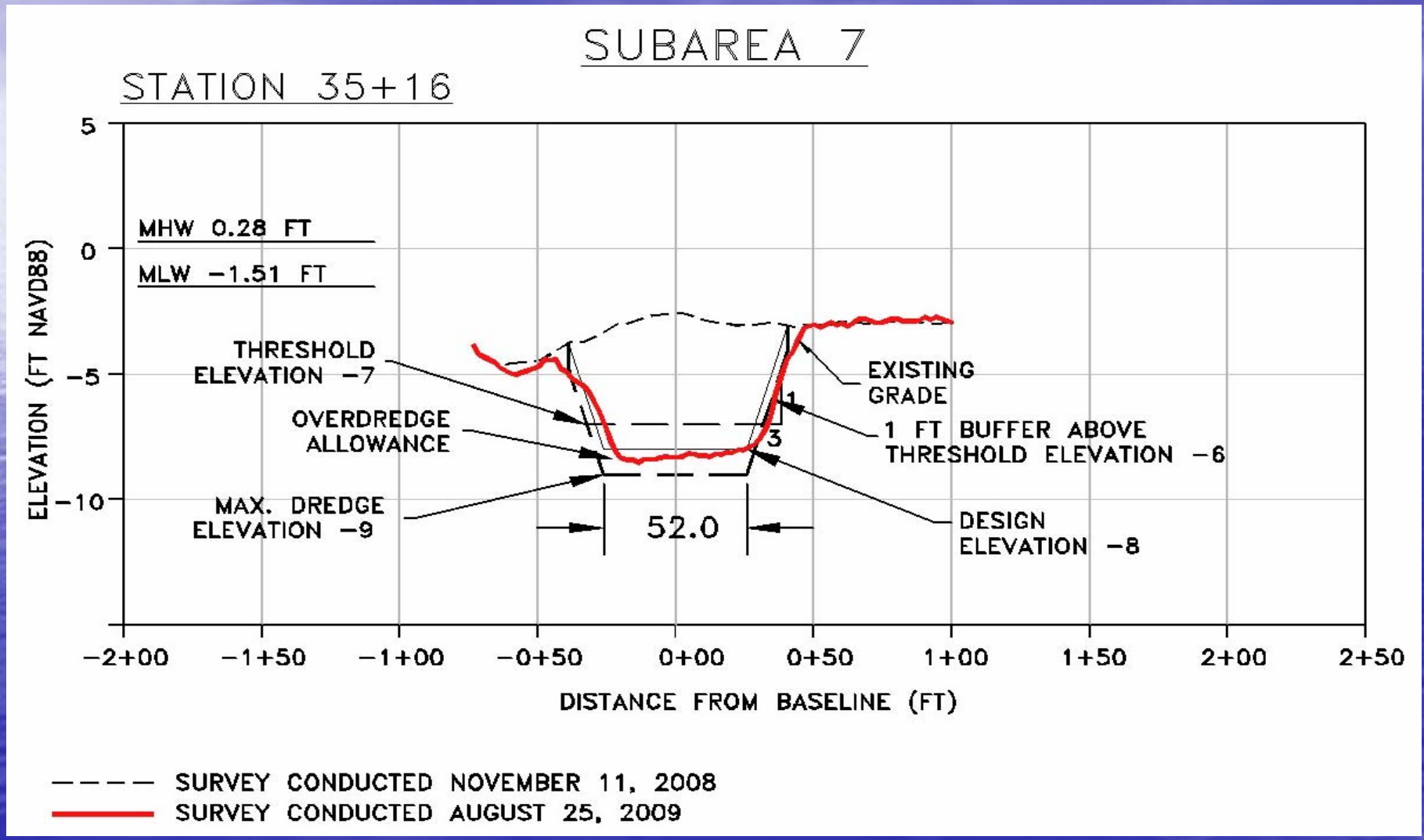



Blind Pass December 2008 - September 2009
Morphology Change
Change (ft)
shoaling
scouring
8
7
6
5
2.5
1
0.5
-0.5
-1
-2.5
-5
-7.5
-10
-13
Net Change = -103,400 cy
Limits of Dredging
(Toe of Cut)
Limits of Beach Placement
(Toe of Slope)
Net Change = +69,700 cy
R107
R108
09
R110
R111
R112
R113
R114
R115
784000
782000
780000
778000
Northing (NAD83, ft)
594000
596000
598000
600000
Easting (NAD83, ft)

Sub 1 Stn 14+00



Sub 7 Stn 35+16



BIOLOGICAL MONITORING

BIOLOGICAL MONITORING

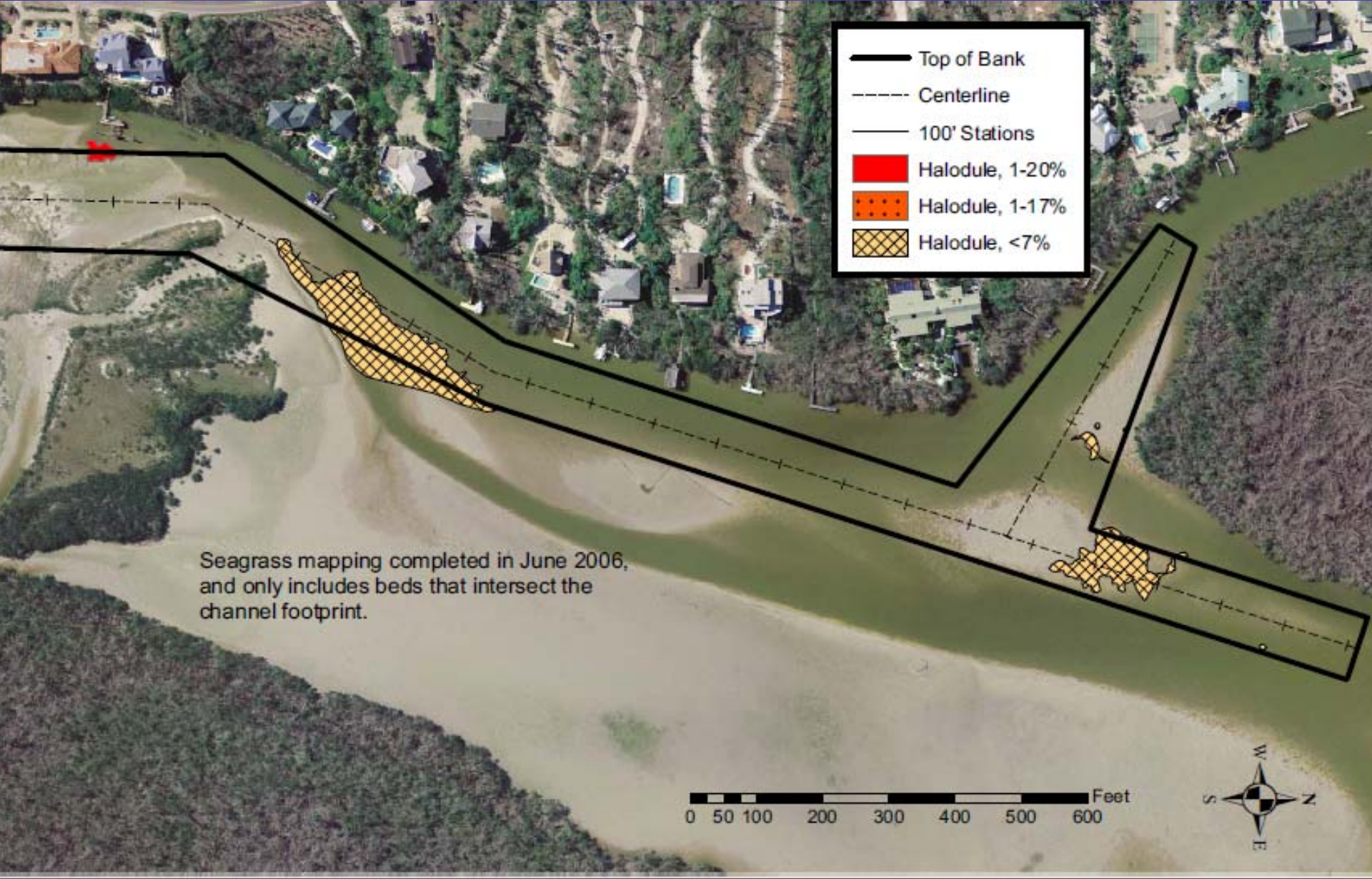
- Dune vegetation
  - Loss of native vegetation in area to be dredged
  - Mitigation was removal of Australian pines
  - Monitoring
- Mangroves
  - Loss of mangroves in dredge footprint
  - Mitigation is planting red mangrove seedlings
  - Monitoring

BIOLOGICAL MONITORING

- Marine turtles
  - Daily surveys during construction
  - Avoid nest sites
  - Post construction escarpment surveys
  - Daily monitoring of nesting activity for three years post construction
- Shorebirds
  - Daily shorebird monitoring
  - Mark areas of nesting activity
  - Weekly monitoring for two years post construction

BIOLOGICAL MONITORING SEAGRASSES

- Loss of 0.72 acres of seagrass
  - Located in dredge footprint
- Mitigation
  - Create Pole and Troll Zone near Wulfert Keys
  - Within this area, mitigate for 4.8 acres of prop scars
  - Contingency plan created and was used
    - Transplanted seagrasses from dredge area to nearby locations; monitoring is ongoing



LEE COUNTY
SOUTHWEST FLORIDA
Natural Resources Division
PO Box 398
Fort Myers, Florida 33902

Blind Pass Restoration

Figure 4. Seagrass Impact Area

DRAWN: SB

DATE: 12/29/2006

FILE: S\MARINE\BEACHMANAGEMENT\BLINDPASS\DRAWINGS\BP_MP_fig4

SHEET: 01 OF 01

BIOLOGICAL MONITORING SEAGRASSES

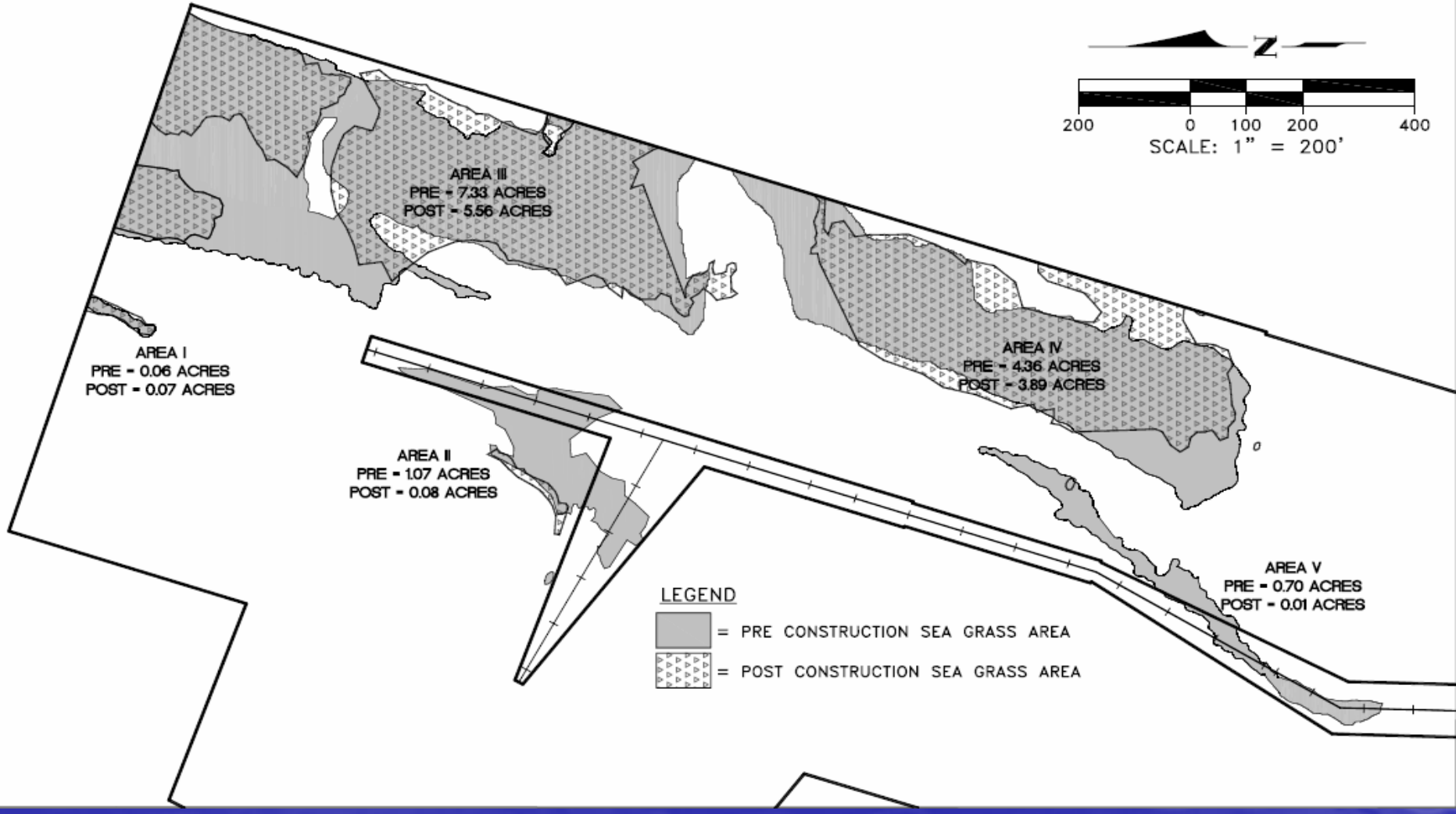
- Secondary Impacts to Seagrasses Adjacent to Channel
  - To determine if shoaling or scour is impacting seagrasses within a 500’ buffer of the dredge footprint
  - Map edge of seagrass beds prior to construction and annually for 5 years after
  - Conduct qualitative and quantitative sampling


Dredge Footprint plus 500' Buffer
PERMITTED
DREDGE CUT
A-108
500' BUFFER
N
0
100
200
400
SCALE: 1" = 200'

PRE-CONSTRUCTION: October 2008

YEAR ONE:
October 2009

CHANGES:
Pre Construction to Year One

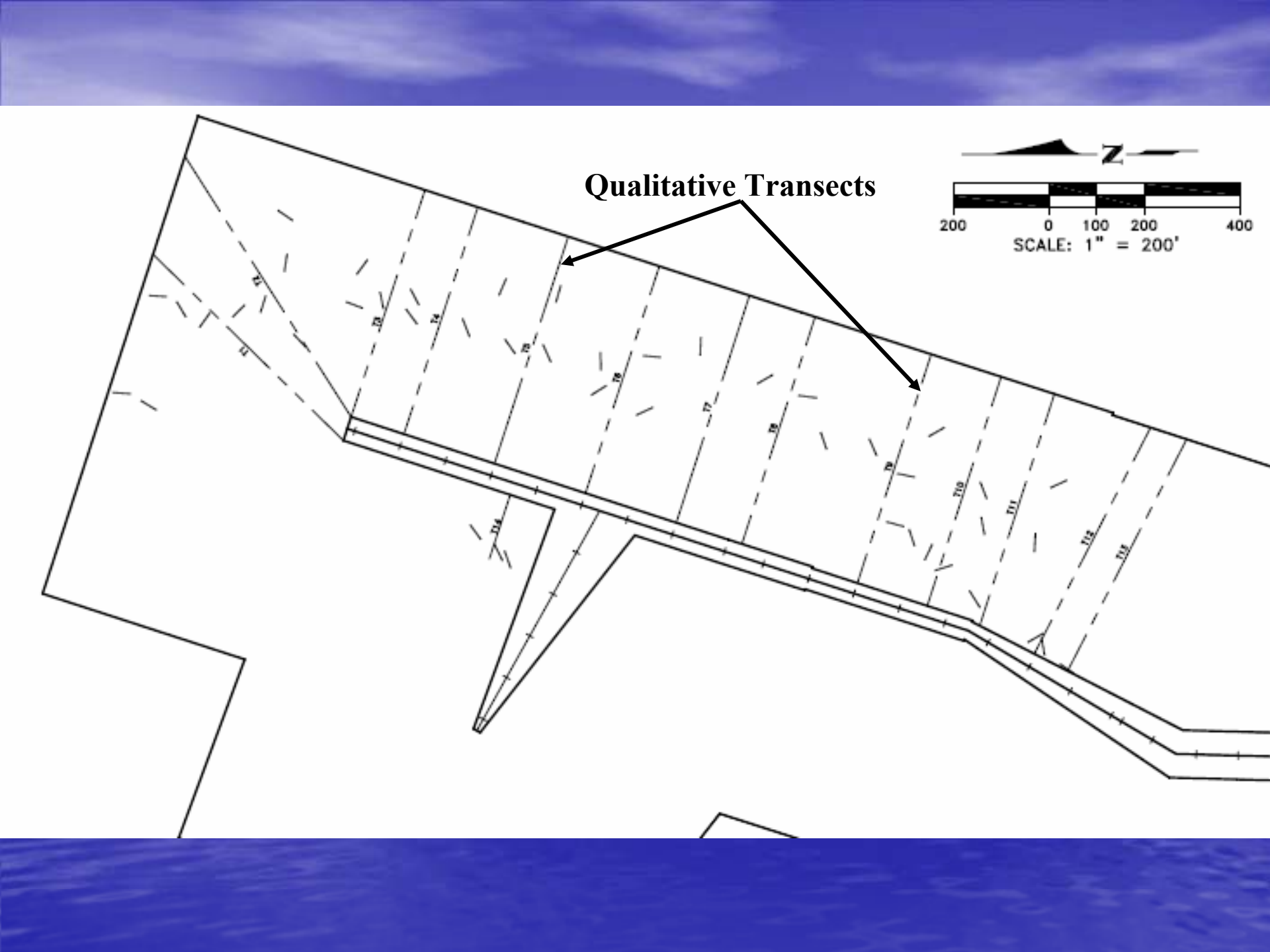


CHANGES:
Pre Construction to Year One

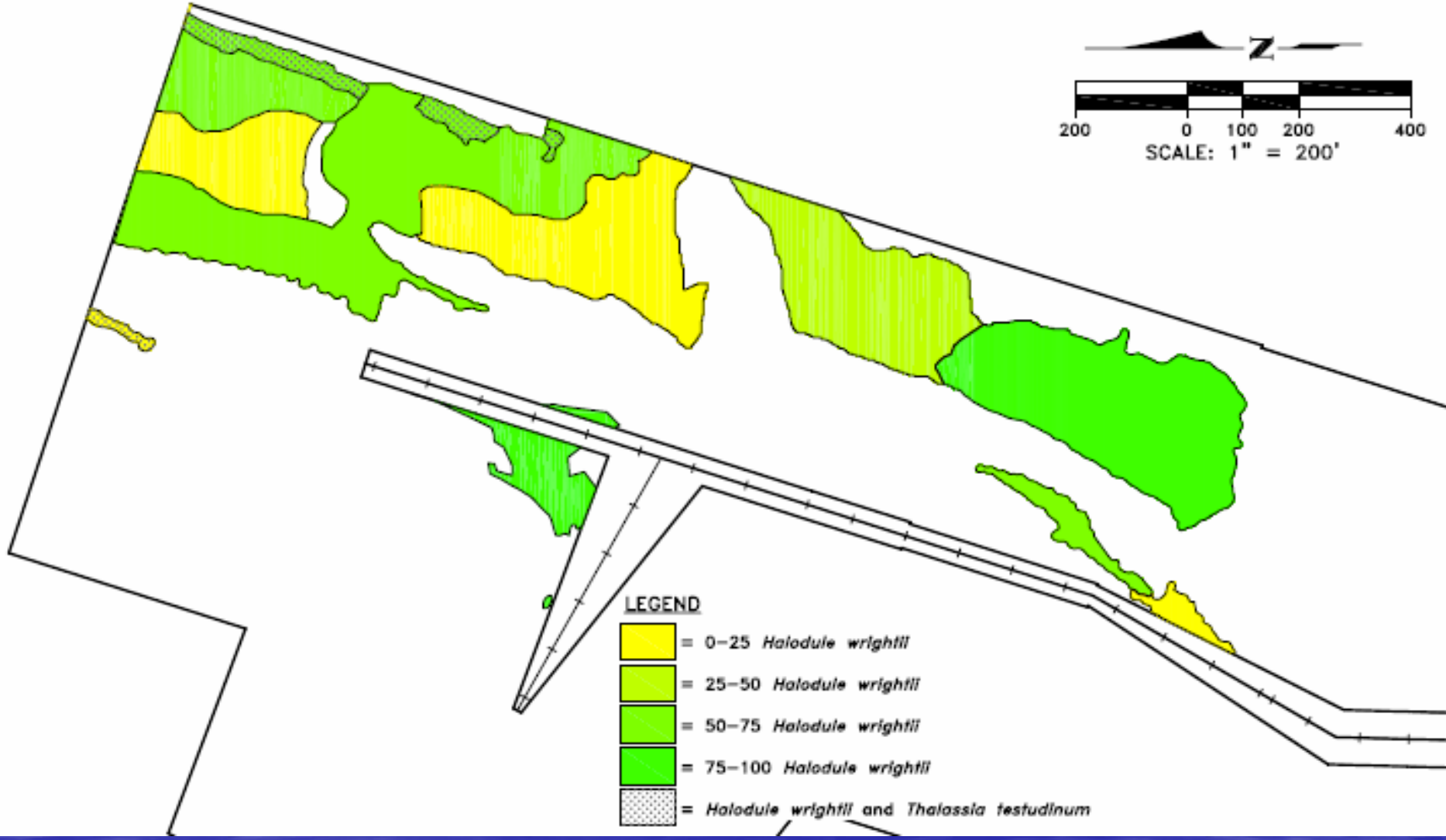
Area	Pre-Constrn	Year 1	Change	% Change
1	0.06	0.07	0.01	17.00
2	1.07	0.08	0.99	92.50
3	7.33	5.56	1.77	24.20
4	4.36	3.89	0.47	10.80
5	0.7	0.01	0.69	98.60
Total	13.52	9.61	**3.91**	**28.90**

SECONDARY IMPACTS: Qualitative Sampling

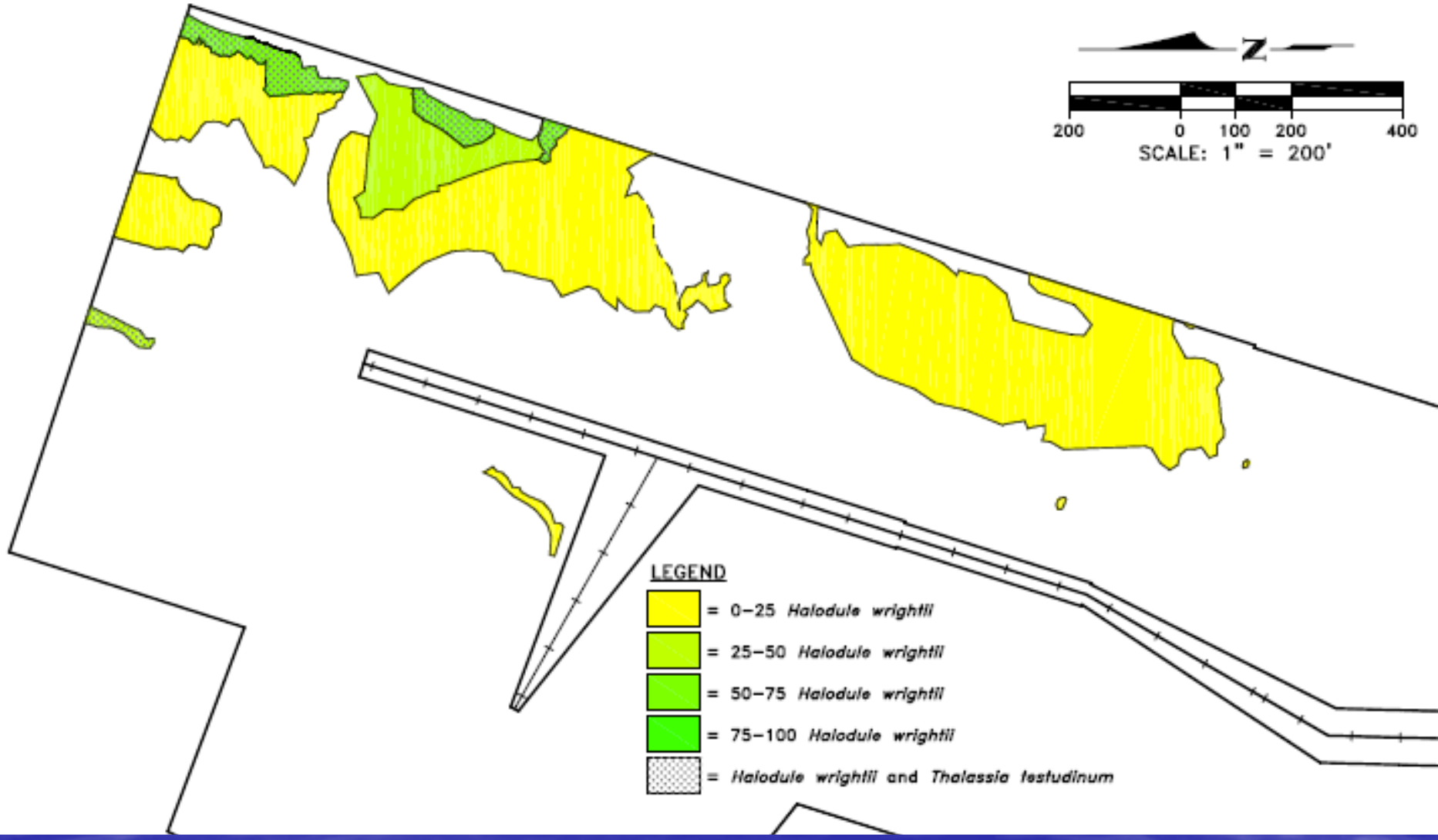
- Qualitative - Assess seagrass bed density and species composition
  - Reconnaissance level survey of general area
  - 14 transect lines established; % cover and species composition estimates


Qualitative Transects
N
200
0
100
200
400
SCALE: 1" = 200'

PRE-CONSTRUCTION DENSITY

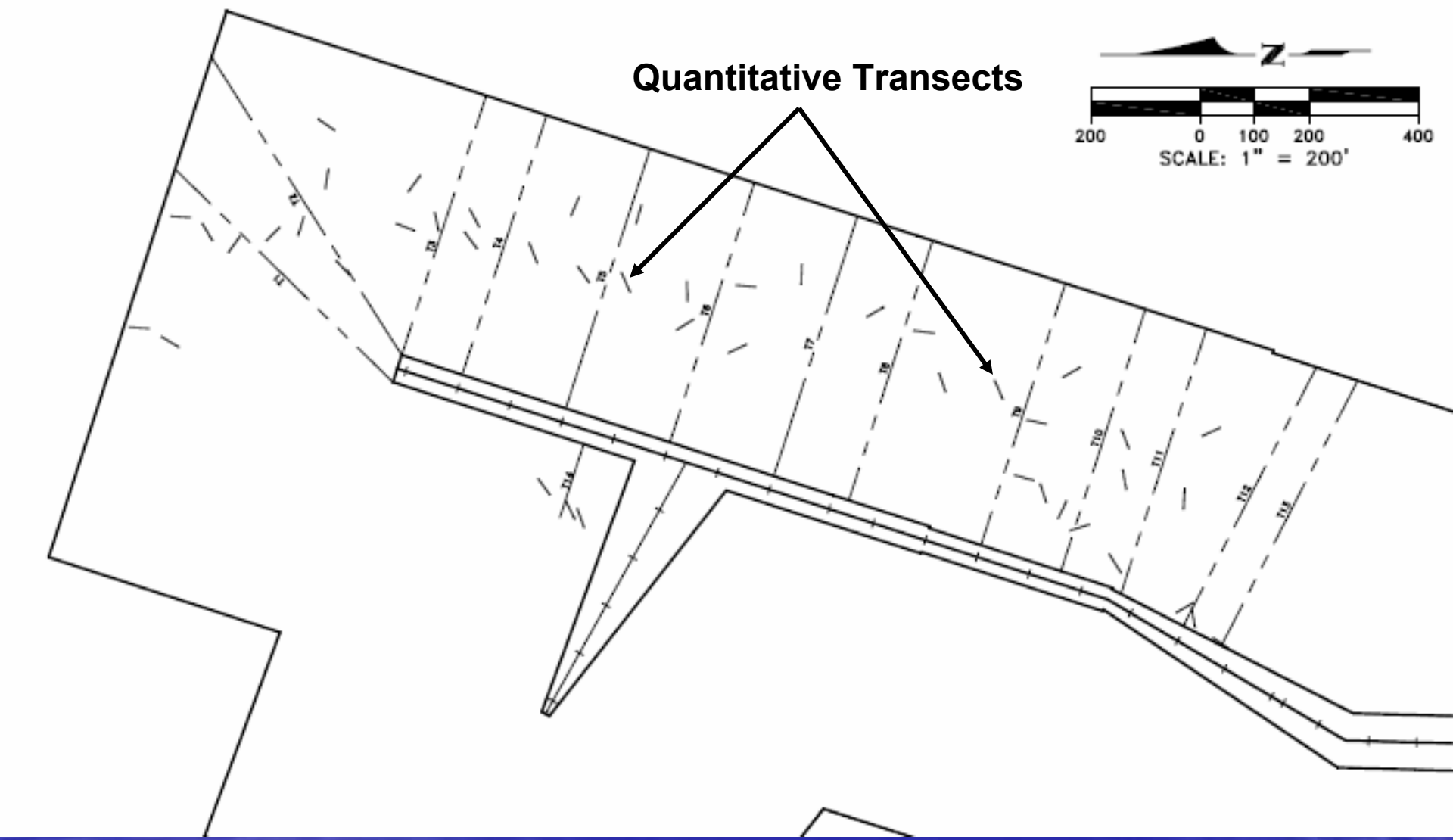


YEAR ONE DENSITY



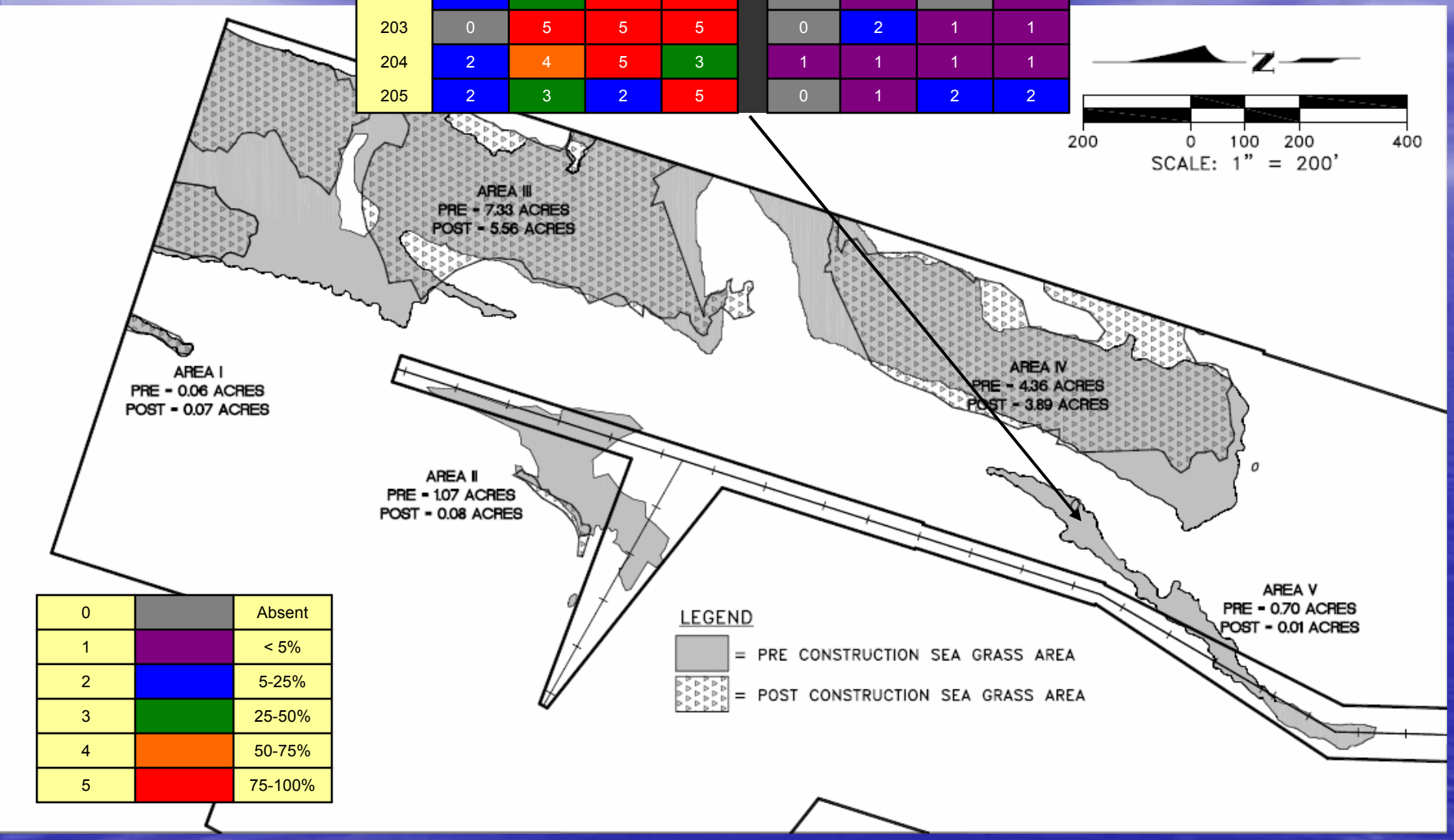
SECONDARY IMPACTS: Quantitative Sampling

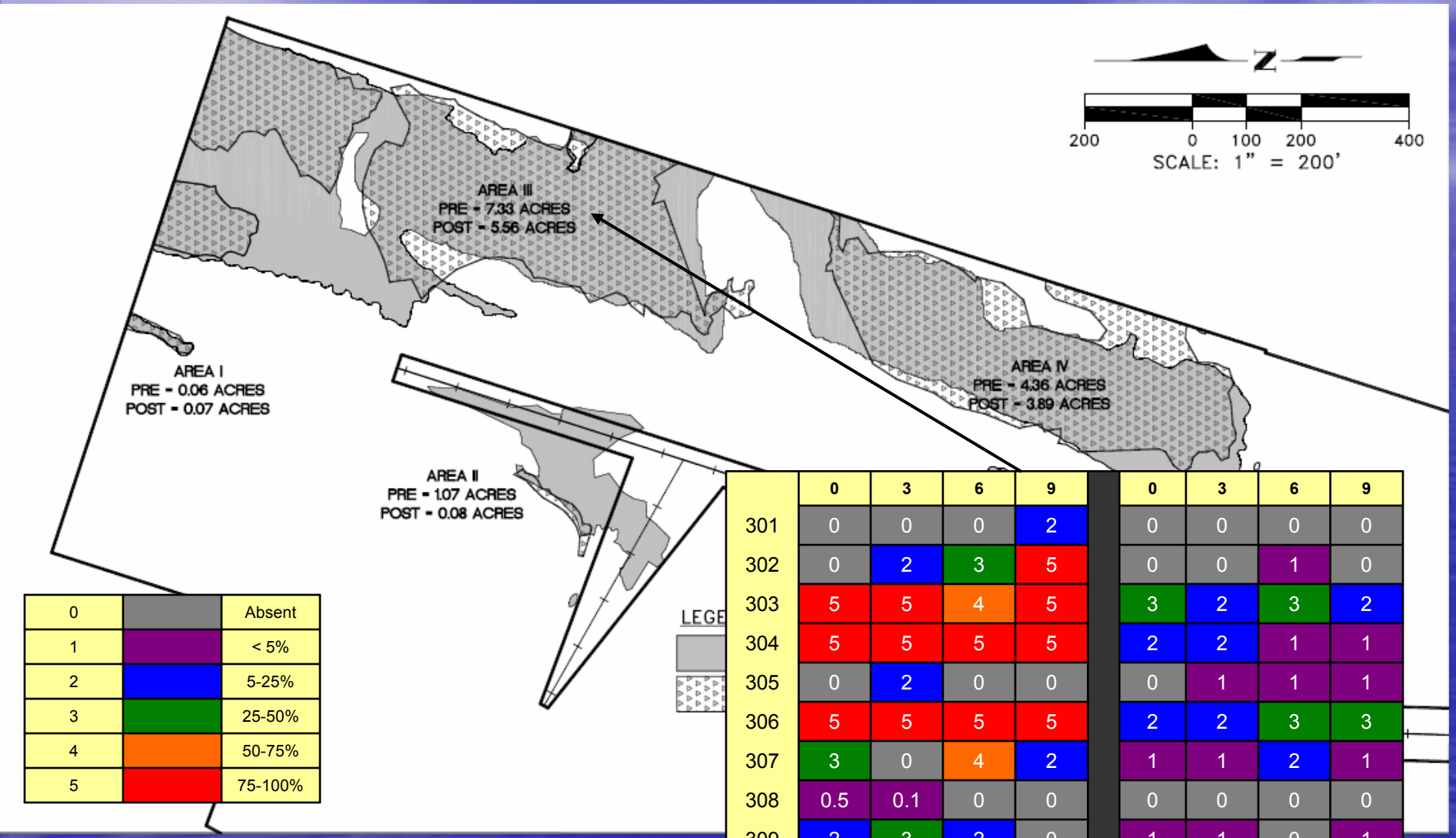
- Quantitative Sampling to describe seagrass cover
  - 46 ten meter transects established in 9 areas;
  - Using a 0.5 m^2 quadrat samples at 0, 3, 6 and 9 meters are evaluated for visual percent cover
  - Compute Braun-Blanquet score


Quantitative Transects
N
200
0
100
200
400
SCALE: 1" = 200'

Braun-Blanquet Abundance Scores

- 0 Species absent from quadrat
- 0.1 Species represented by a solitary short shoot, < 5 % cover
- 0.5 Species represented by a few (< 5%) short shoots, < 5% cover
- 1 Species represented by a many (> 5%) short shoots, < 5% cover
- 2 Species represented by many (> 5%) short shoots 5%-25% cover
- 3 Species represented by many (> 5) short shoots, 25%-50% cover
- 4 Species represented by many (> 5) short shoots, 50%-75% cover
- 5 Species represented by many (> 5) short shoots, 75%-100% cover

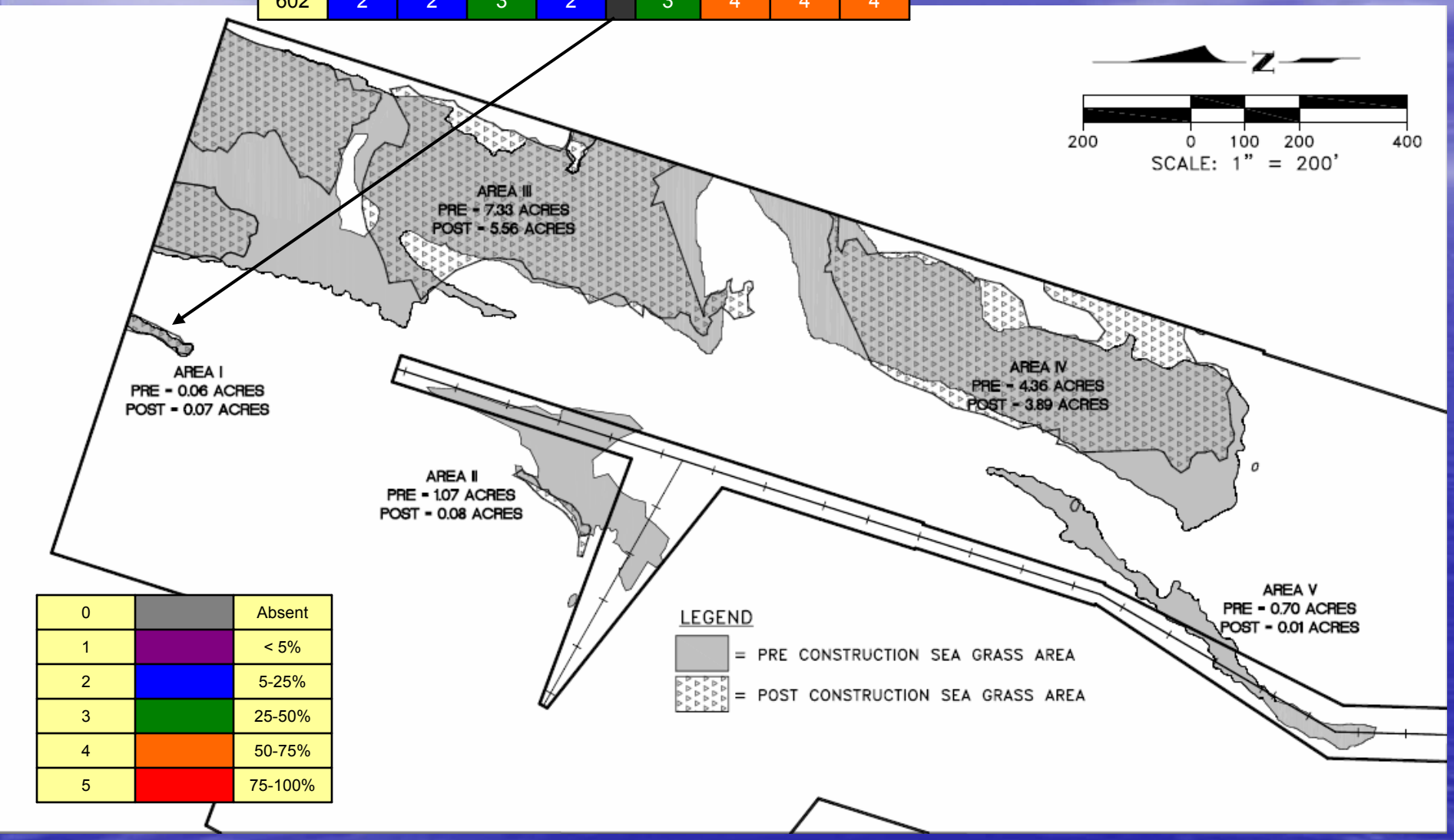

0 3 6 9
201 3 5 5 5
202 5 3 5 5
203 0 5 5 5
204 2 4 5 3
205 2 3 2 5
0 3 6 9
0 1 0 0
0 1 0 1
0 2 1 1
1 1 1 1
0 1 2 2
N
200 0 100 200 400
SCALE: 1" = 200'
AREA I
PRE - 0.06 ACRES
POST - 0.07 ACRES
AREA II
PRE - 1.07 ACRES
POST - 0.08 ACRES
AREA III
PRE - 7.33 ACRES
POST - 5.56 ACRES
AREA IV
PRE - 4.36 ACRES
POST - 3.89 ACRES
AREA V
PRE - 0.70 ACRES
POST - 0.01 ACRES
LEGEND
= PRE CONSTRUCTION SEA GRASS AREA
= POST CONSTRUCTION SEA GRASS AREA
0 Absent
1 < 5%
2 5-25%
3 25-50%
4 50-75%
5 75-100%



0		Absent
1		< 5%
2		5-25%
3		25-50%
4		50-75%
5		75-100%

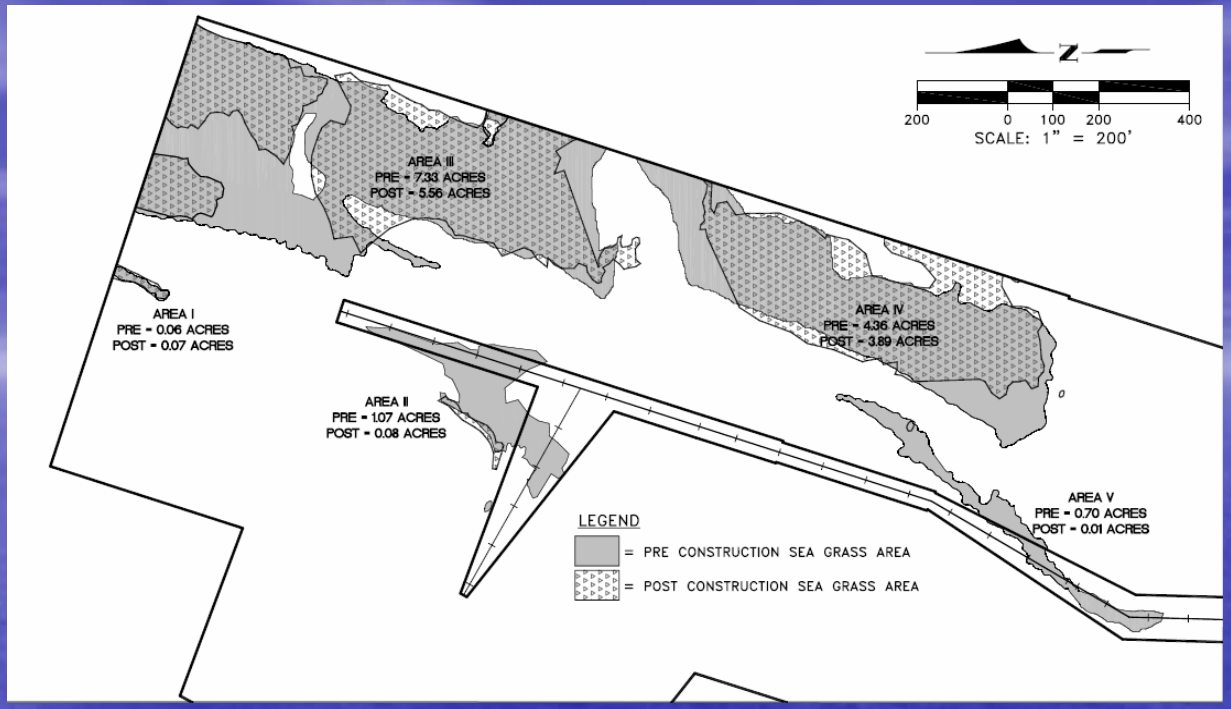
	0	3	6	9	0	3	6	9
301	0	0	0	2	0	0	0	0
302	0	2	3	5	0	0	1	0
303	5	5	4	5	3	2	3	2
304	5	5	5	5	2	2	1	1
305	0	2	0	0	0	1	1	1
306	5	5	5	5	2	2	3	3
307	3	0	4	2	1	1	2	1
308	0.5	0.1	0	0	0	0	0	0
309	2	3	2	0	1	1	0	1
310	0.5	0.5	2	4	0	0	0	0
311	0	0	0.1	0	0	0	1	0
312	0	0.5	0.5	2	0	1	0	2

	0	3	6	9		0	3	6	9
601	0	2	2	2		3	3	3	2
602	2	2	3	2		3	4	4	4



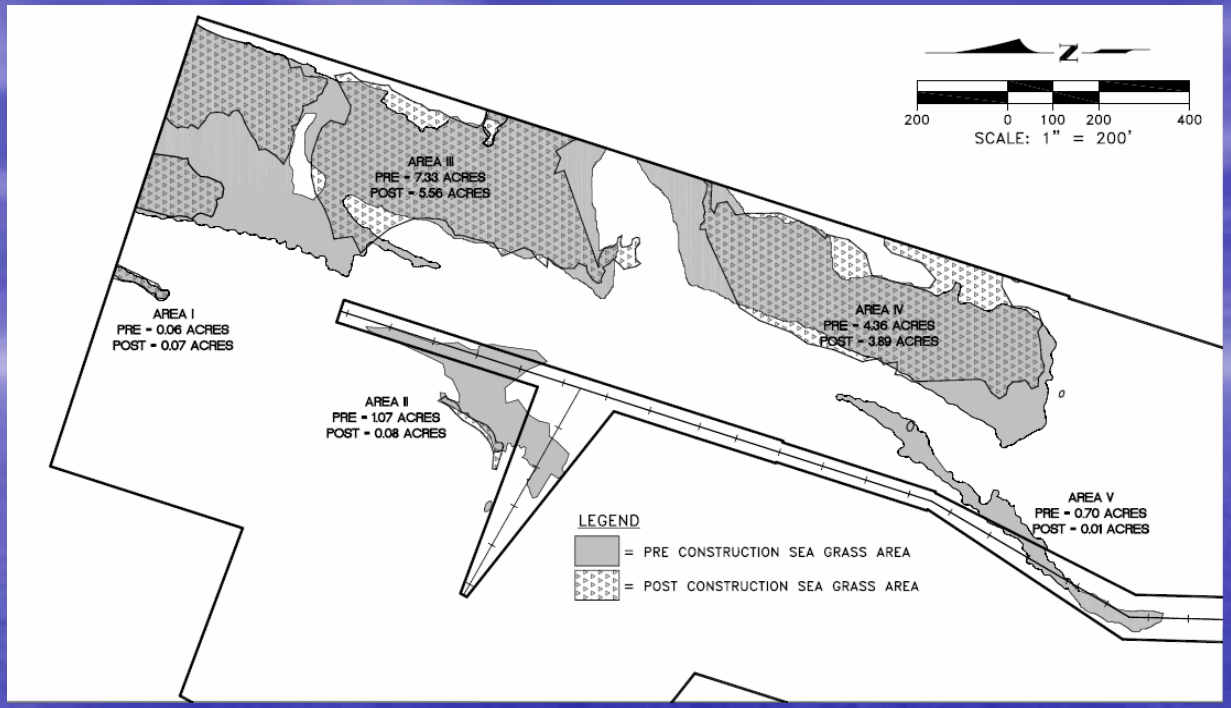
0		Absent
1		< 5%
2		5-25%
3		25-50%
4		50-75%
5		75-100%

DISCUSSION



- NO CHANGE IN SPECIES COMPOSITION
- EDGE OF BED CHANGES
  - Loss of Total Area = 29% decrease
  - Small areas (II and V) near dredge cut most affected
  - Larger Areas (III and IV) have less decrease
  - One area (I) remained constant

DISCUSSION



- QUALITATIVE AND QUANTITATIVE SAMPLING
  - Density decreased to 25% or less over all areas except one area where density increased
  - Year One Braun Blanquet scores lower than Pre-Construction = fewer stems

FIELD OBSERVATIONS

- WATER CLARITY IMPROVED – Positive sign for seagrass survival
- SEDIMENT CHANGES – Hypothesis was that the fine sand that was dominant in the areas of seagrasses (especially the large seagrass areas - III and IV) would be washed out when tidal connection was re-established.
- Observed a layer of coarser sand was transported into and deposited over the seagrasses

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JULY 2008
OCTOBER 2009

SUMMARY

- Area is undergoing a transition
- Seagrasses stressed due to sediment deposition
- Year 2 will show how recovery progresses
- Combination of increased current velocity and water visibility combined with the fact that seagrasses are still present in the area suggests the recovery will occur

ACKNOWLEDGEMENTS

- Lee County
- Captiva Erosion Prevention District
- City of Sanibel
- Florida Department of Environmental Protection
- Sanibel Captiva Conservation Foundation
- J.N. “Ding” Darling National Wildlife Refuge
- Bayou’s Preservation Association
- Sanibel-Captiva Audubon Society
- Energy Resources
- AEWF


THANK
YOU