An Assessment of the Performance of Raccoon Island Breakwater Projects

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3rd Biennial State of Coast Conference
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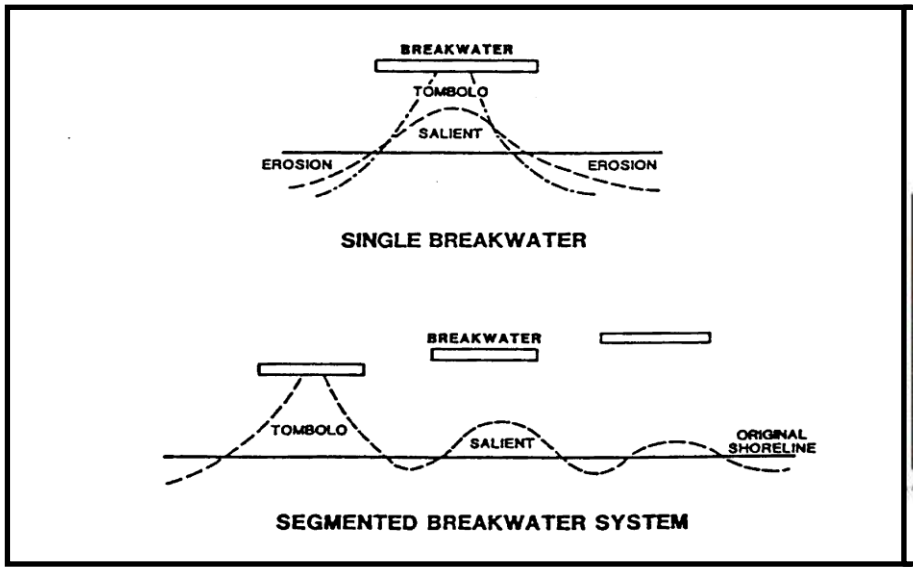
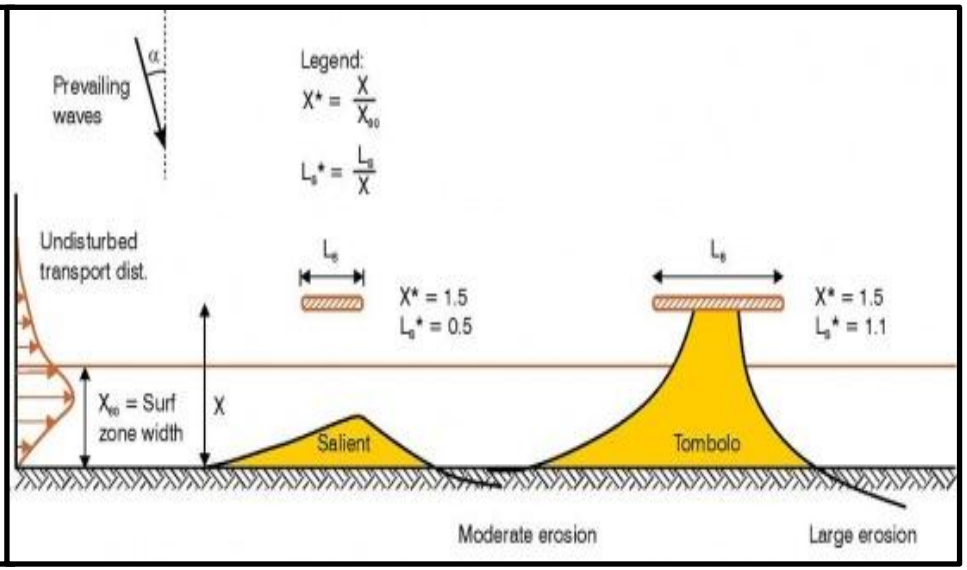
Ernest N. Morial Convention Center
New Orleans, LA

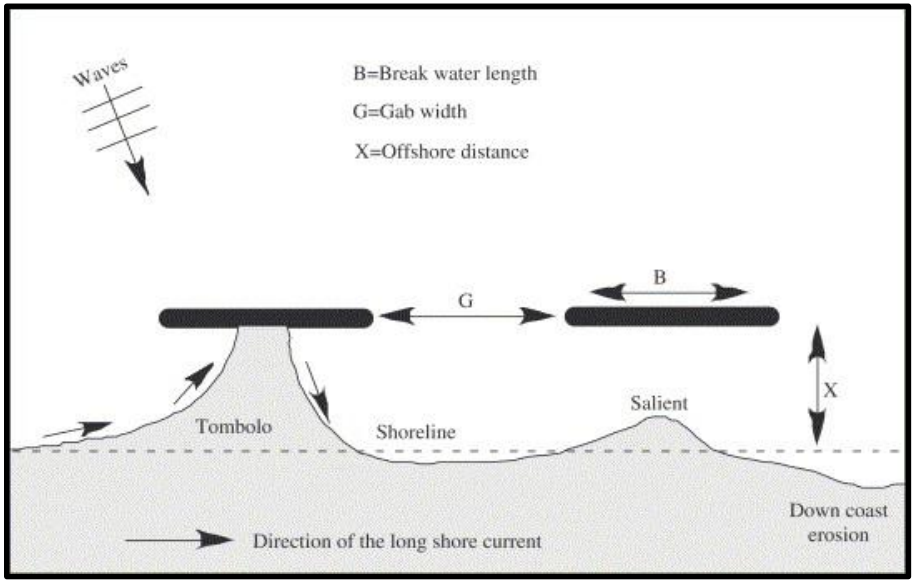
CPRA
Coastal Protection and Restoration Authority of Louisiana

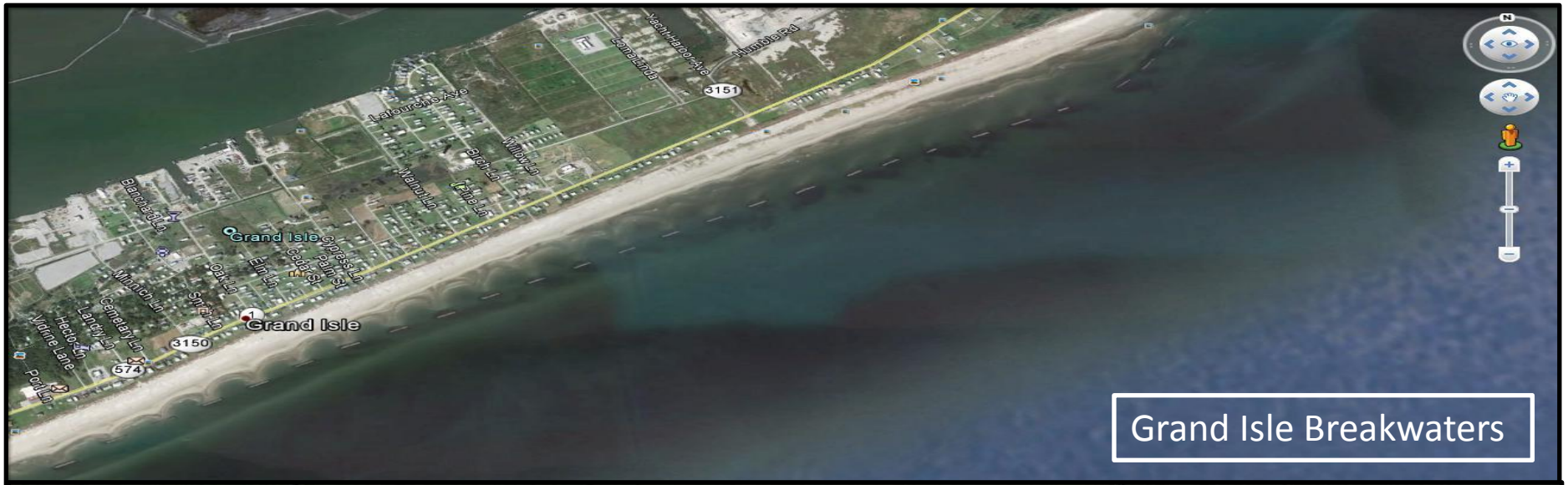
committed to **our coast**

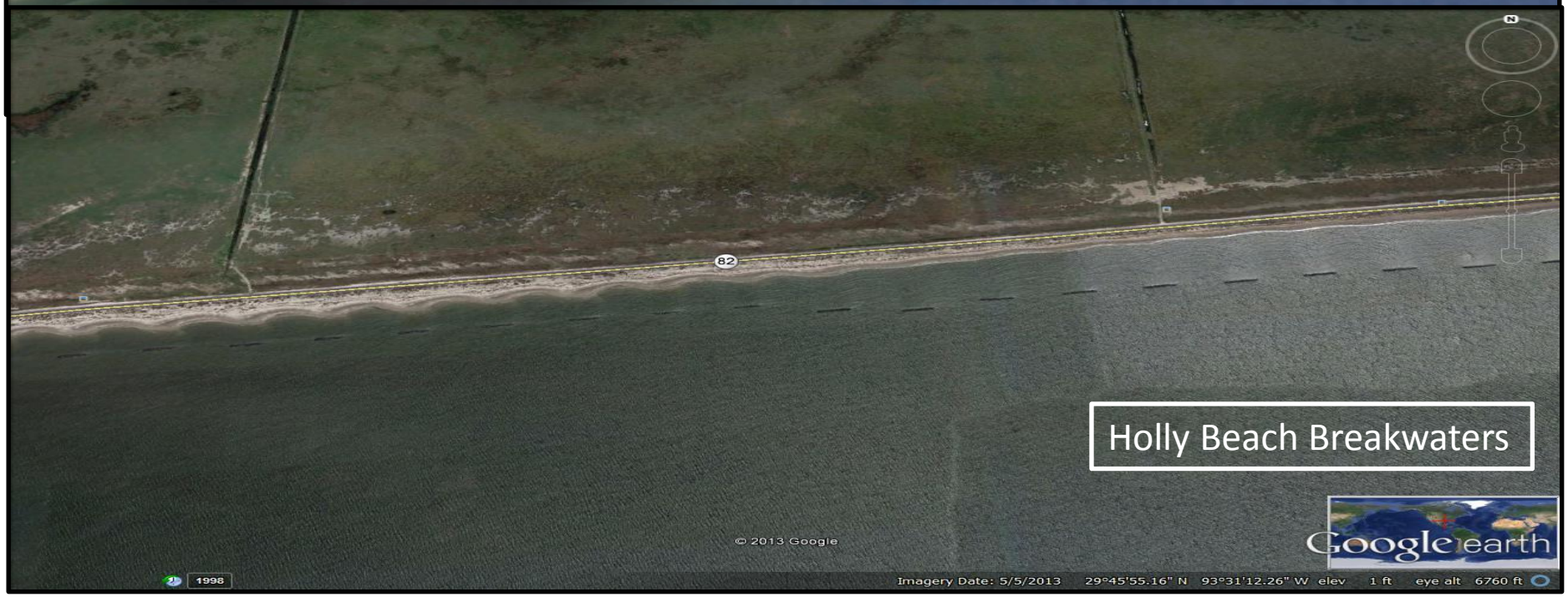
BREAKWATER FUNCTION





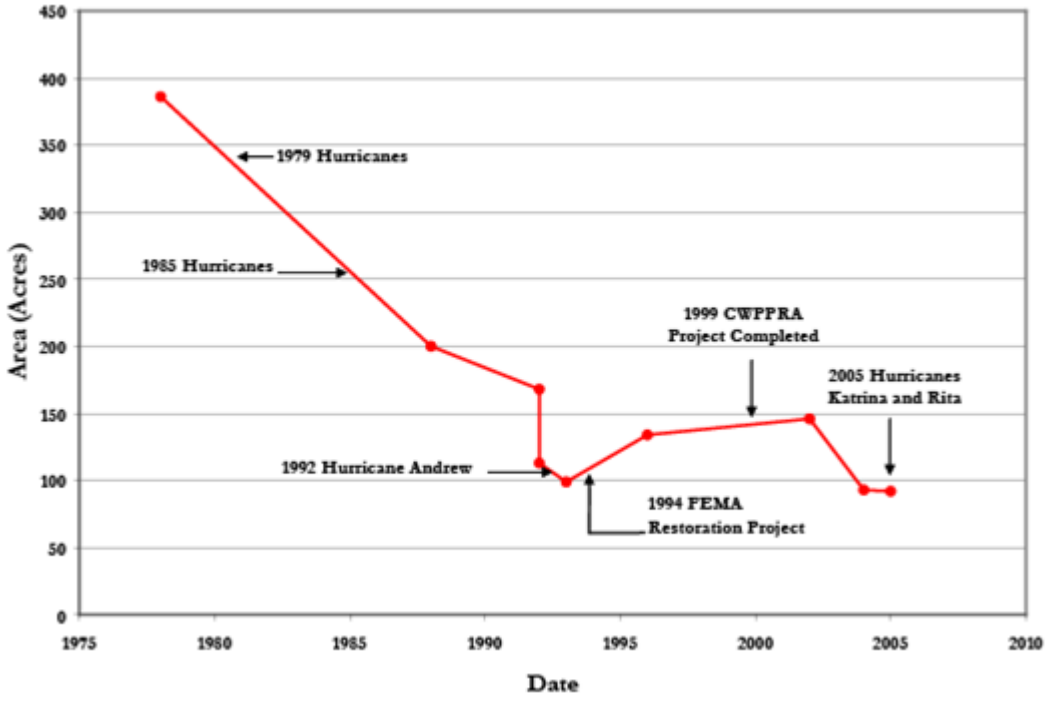


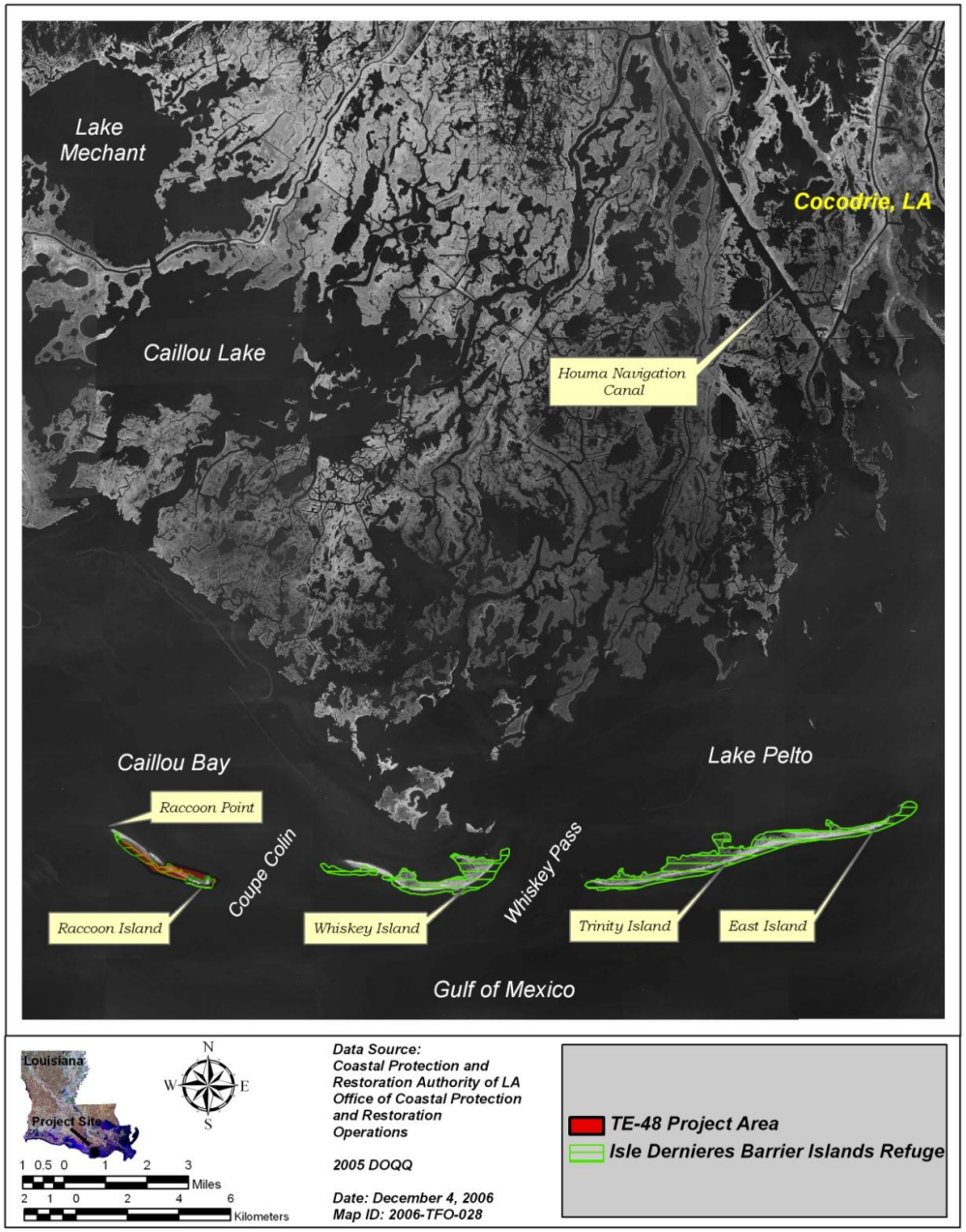

Grand Isle
Grand Isle
3151
3150
574
Grand Isle Breakwaters


82
Holly Beach Breakwaters
© 2013 Google
Imagery Date: 5/5/2013 29°45'55.16" N 93°31'12.26" W elev 1 ft eye alt 6760 ft
Google earth

RACCOON ISLAND INFORMATION

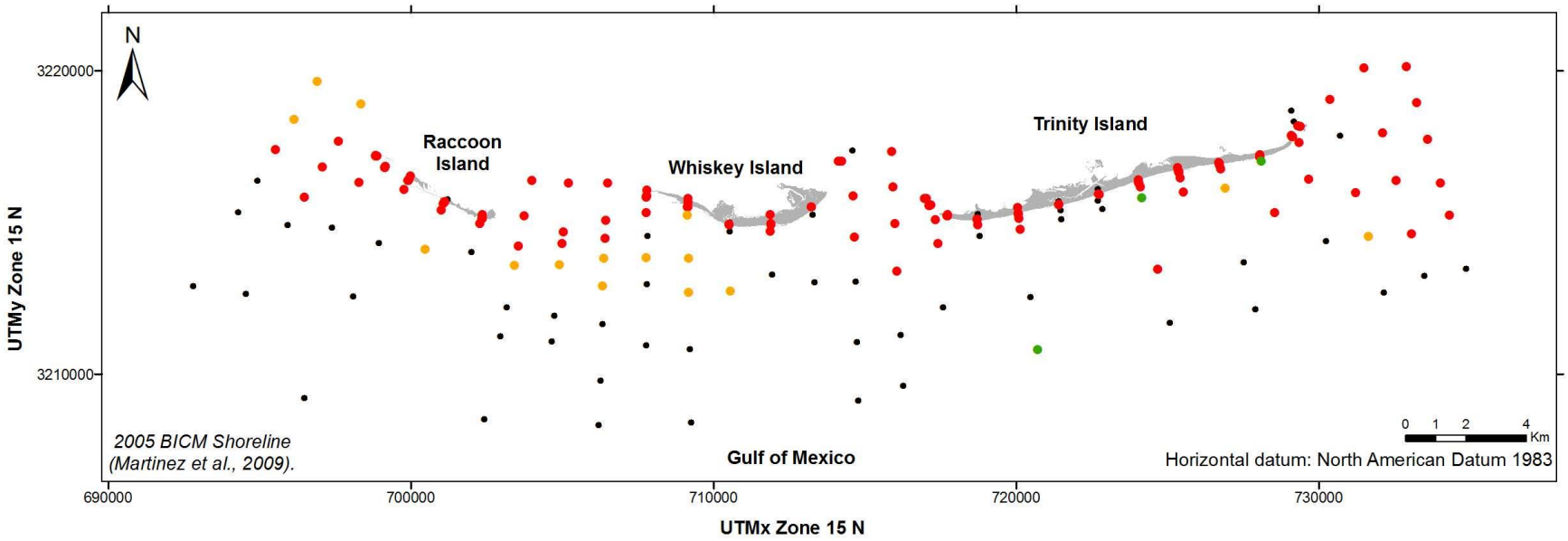
- Important Brown Pelican Nesting Colony
- Terminal Island in Isle Dernieres Barrier Island Arc
- Sand Resource Scarcity
- Net Longshore Transport to the West and Localized
- Low Wave Energy Shoreline
- Historic Shoreline Erosion Rate of 27.9 ft/yr (1855-2005)
- Area Decreased by Approximately 300 Acres from 1978-2005




Lake Mechant
Cocodrie, LA
Caillou Lake
Houma Navigation Canal
Caillou Bay
Lake Pelto
Raccoon Point
Coupe Colin
Whiskey Pass
Raccoon Island
Whiskey Island
Trinity Island
East Island
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1 0.5 0 1 2 3
Miles
2 1 0 2 4 6
Kilometers
Data Source:
Coastal Protection and Restoration Authority of LA
Office of Coastal Protection and Restoration Operations
2005 DOQQ
Date: December 4, 2006
Map ID: 2006-TFO-028
TE-48 Project Area
Isle Dernieres Barrier Islands Refuge

Teche Region- 2008 - Percent Composition Sand

Indicated by Particle Size Analysis



LEGEND

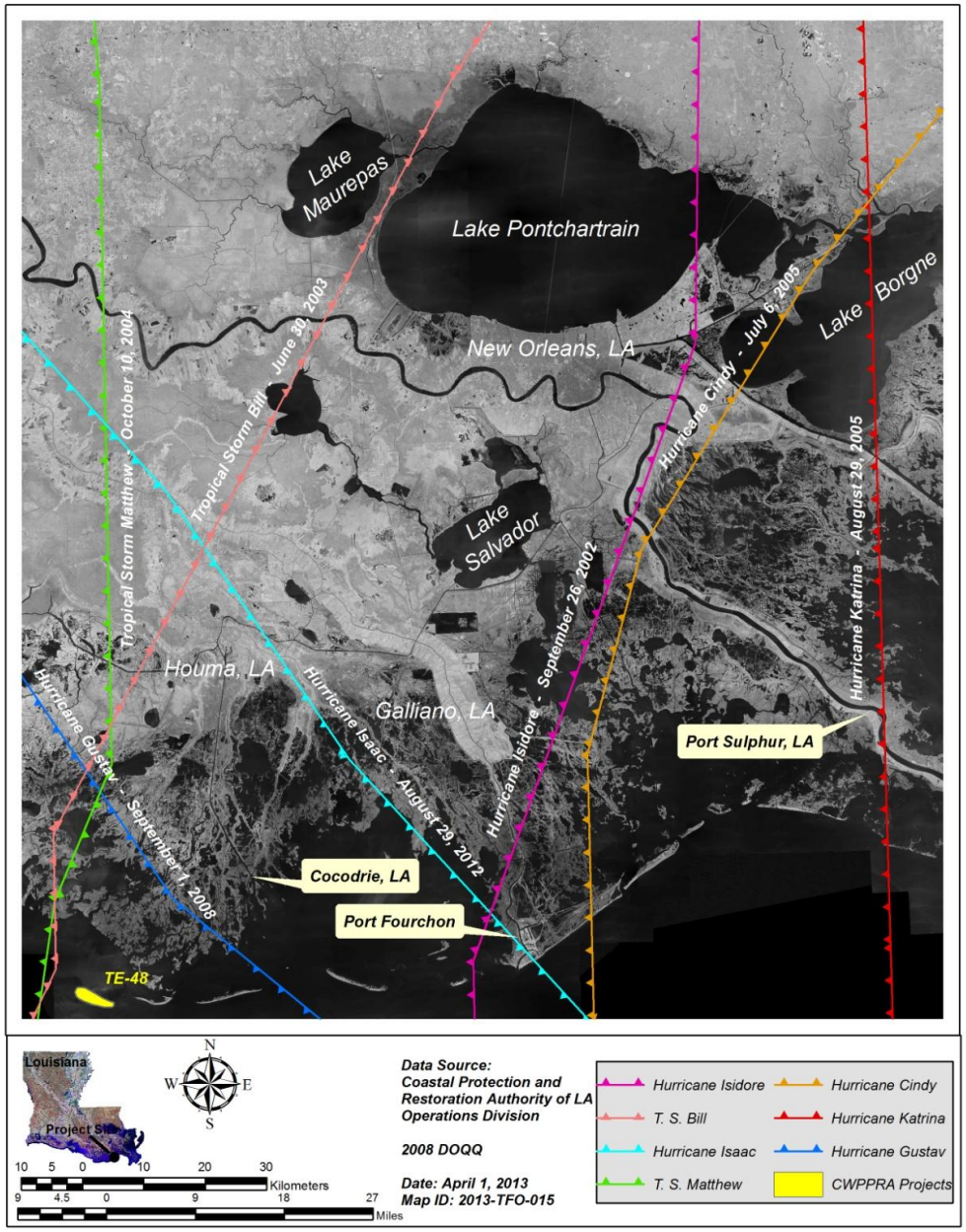
Percent Sand for Visual Estimates of ≥ 70% Sand

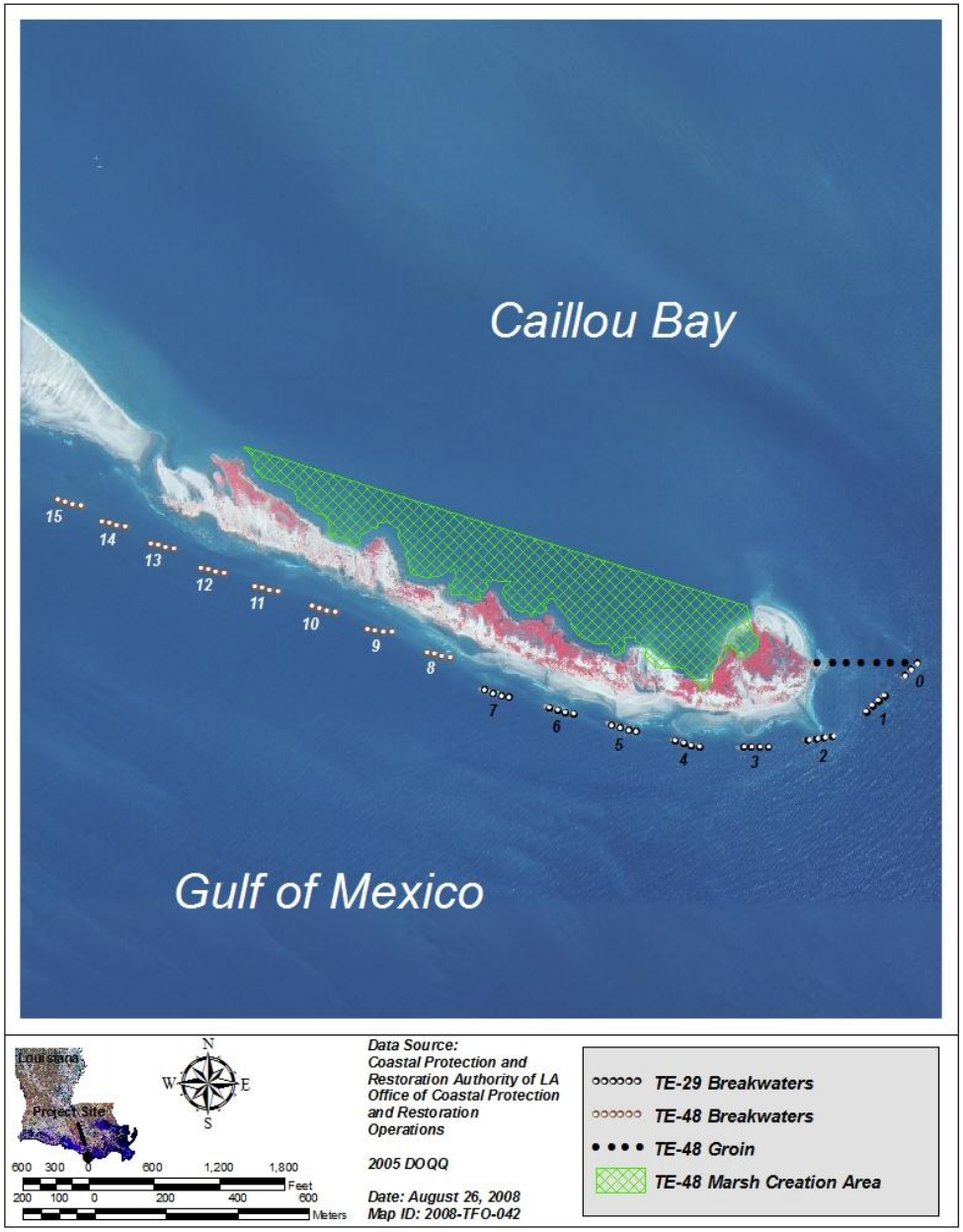
- ≤ 70.0 %
- 70.1 - 80.0 %
- 80.1 - 90.0 %
- 90.1 - 100.0 %

- Visually estimated at < 70 % Sand
(not analyzed with particle size instrument)

Grain Size Analysis

Samples from this location were taken by surface scooping on land and by bottom grab sampling in the water. They were then analyzed visually for percent composition of sand. Samples that were estimated to be greater than 70 percent sand were quantitatively described using laser particle size diffraction methods.


Lake Maurepas
Lake Pontchartrain
Lake Borgne
New Orleans, LA
Lake Salvador
Houma, LA
Galliano, LA
Port Sulphur, LA
Cocodrie, LA
Port Fourchon
TE-48
Tropical Storm Matthew - October 10, 2004
Tropical Storm Bill - June 30, 2003
Hurricane Gustav - September 1, 2008
Hurricane Isaac - August 29, 2012
Hurricane Isidore - September 26, 2002
Hurricane Cindy - July 6, 2005
Hurricane Katrina - August 29, 2005
Louisiana
Project Site
N
W
E
S
10 5 0 10 20 30
Kilometers
9 4.5 0 9 18 27
Miles
Data Source:
Coastal Protection and Restoration Authority of LA
Operations Division
2008 DOQQ
Date: April 1, 2013
Map ID: 2013-TFO-015
Hurricane Isidore
Hurricane Cindy
T. S. Bill
Hurricane Katrina
Hurricane Isaac
Hurricane Gustav
T. S. Matthew
CWPPRA Projects


Caillou Bay
Gulf of Mexico
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Louisiana
Project Site
N
W
E
S
600 300 0 600 1,200 1,800
Feet
200 100 0 200 400 600
Meters
Data Source:
Coastal Protection and Restoration Authority of LA
Office of Coastal Protection and Restoration Operations
2005 DOQQ
Date: August 26, 2008
Map ID: 2008-TFO-042
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
TE-48 Marsh Creation Area

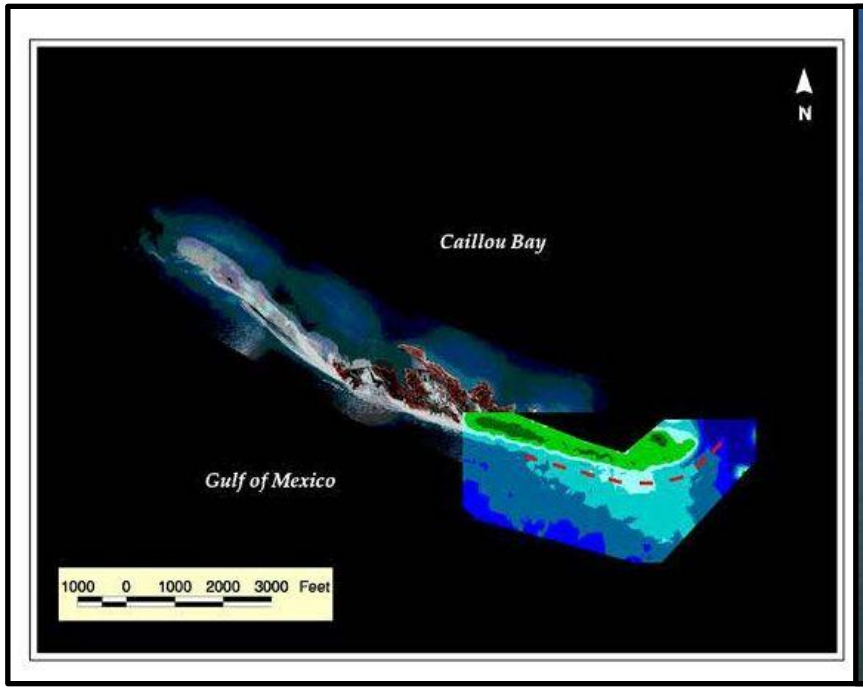
RACCOON ISLAND BREAKWATER PROJECTS

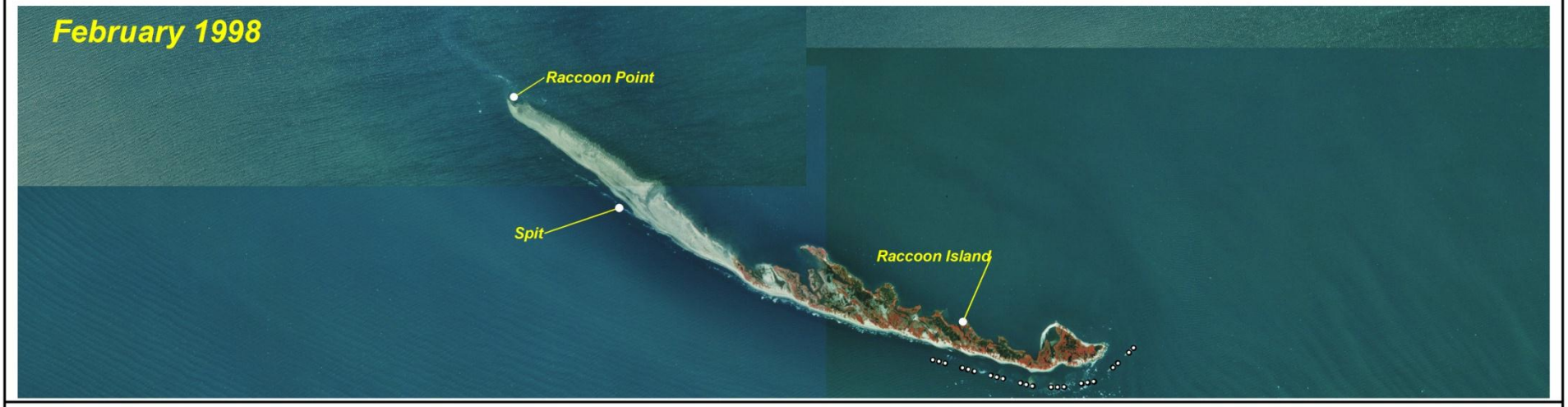
- Raccoon Island Breakwaters Demonstration (TE-29) Project
- PPL 5 Five Year CWPPRA Demonstration Project (NRCS)
- Constructed 8 Segmented Breakwaters from APR 1997-JUL 1997
- Breakwater Dimensions:
- 300 ft from Shoreline (X)
- 300 ft in Length (B)
- 300 ft Gap Widths (G)
- 4.5 ft Crown Elevation
- TE-29 Breakwaters Still Functioning

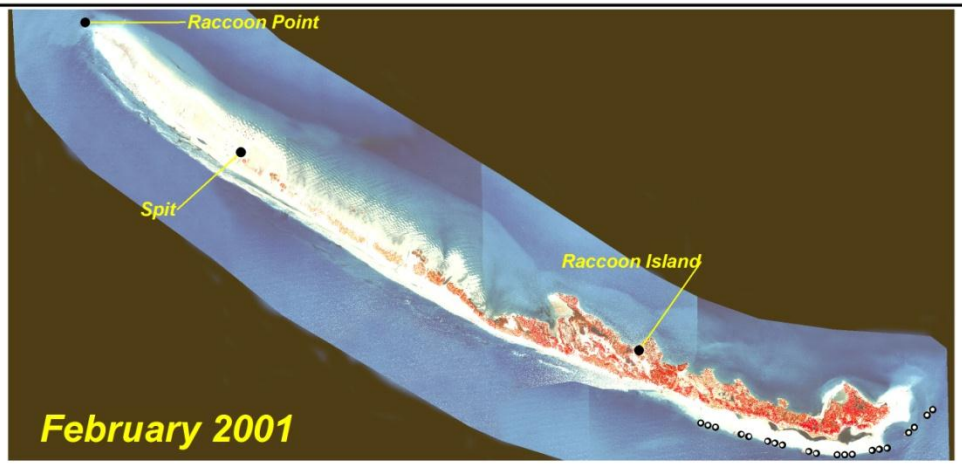
- Raccoon Island Shoreline Protection/Marsh Creation (TE-48) Project
- PPL 11 CWPPRA Project (NRCS)
- Phase A: Constructed 8 Breakwaters & a Groin from JAN 2006-SEP 2007
- Breakwater Dimensions:
- 250 ft from Shoreline (X)
- 300 ft in Length (B)
- 160-300 ft Gap Widths (G)
- 4.5 ft Crown Elevation
- Groin Dimensions: 926 ft in Length and 4.5 ft Crown Elevation
- Phase B: Created 63 Acres of Marsh from SEP 2012-APR 2013

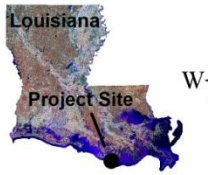
TE-29 CONCLUSIONS

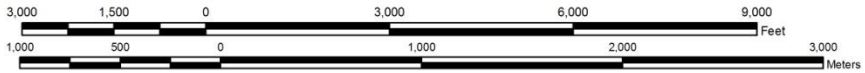
- Successful in Increasing Sediment Volume due to Nearby Sand Shoal
- Deep Channel Formed in Lee of Breakwaters #0 and #1
- Down Drift Impacts to the West









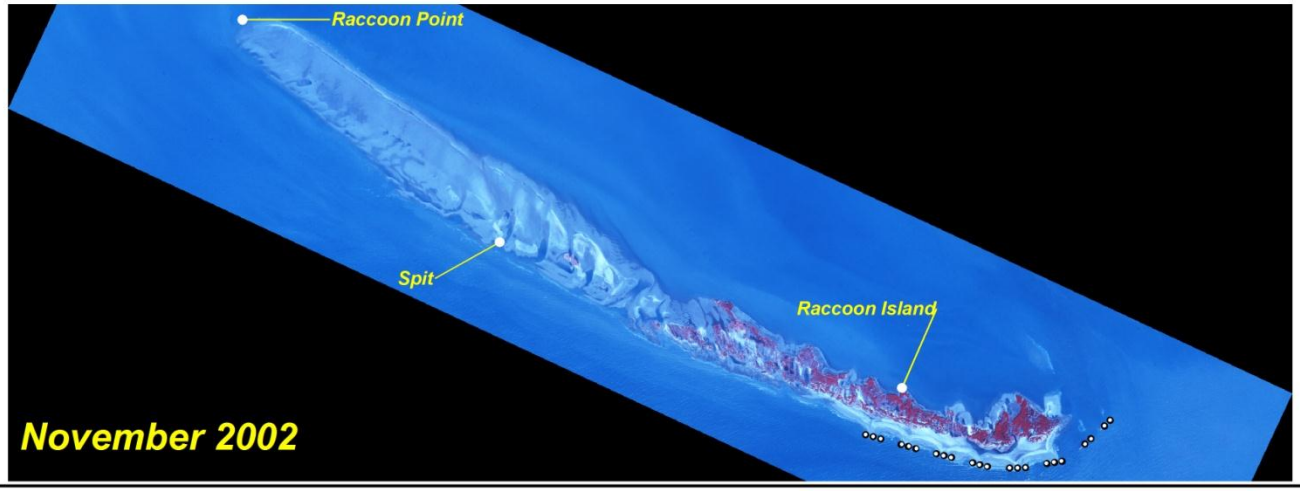


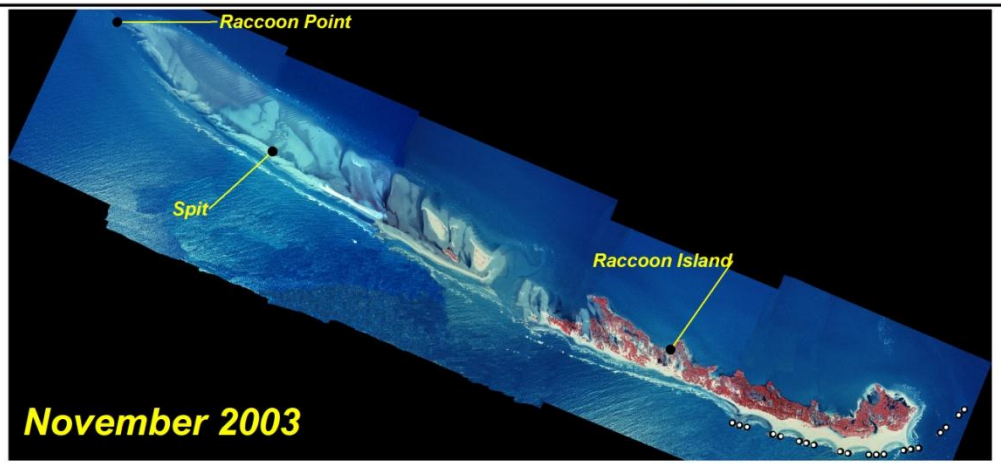
Data Source:
Coastal Protection and Restoration Authority of LA Operations Division

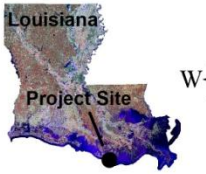
1998 DOQQ
2001 Aerial Imagery

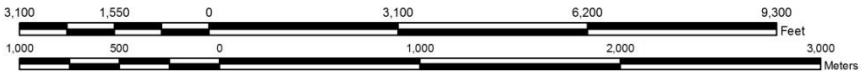
Date: May 28, 2013
Map ID: 2013-TFO-038

oooooooo ***TE-29 Breakwaters***







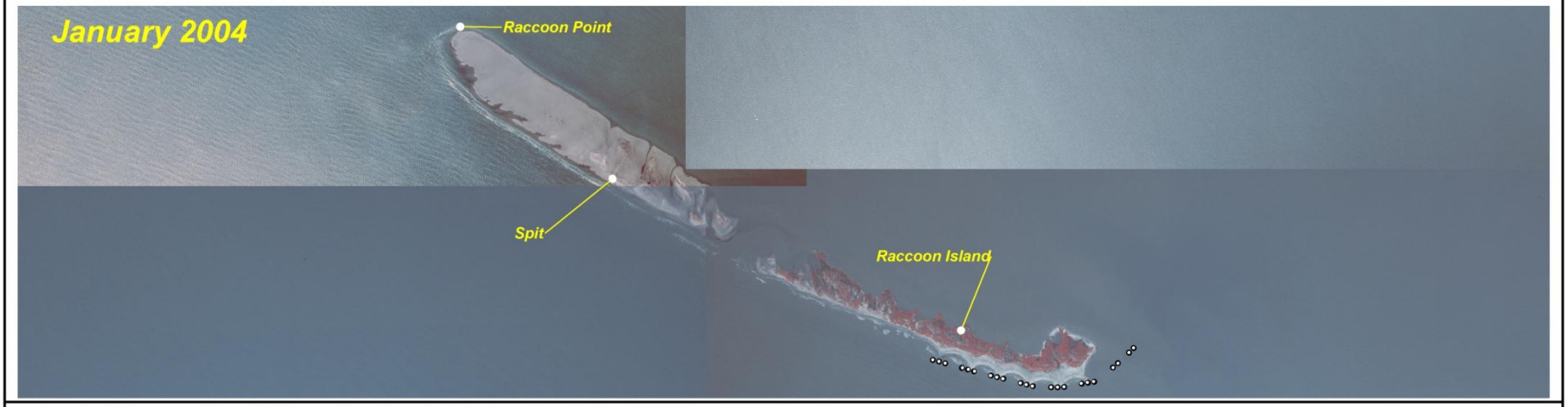


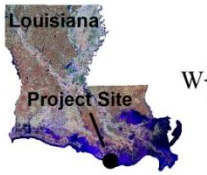
Data Source:
Coastal Protection and Restoration Authority of LA
Operations Division

2002 Aerial Imagery
2003 Aerial Imagery

Date: May 28, 2013
Map ID: 2013-TFO-037

oooooooo *TE-29 Breakwaters*





3,100 1,550 0 3,100 6,200 9,300 Feet

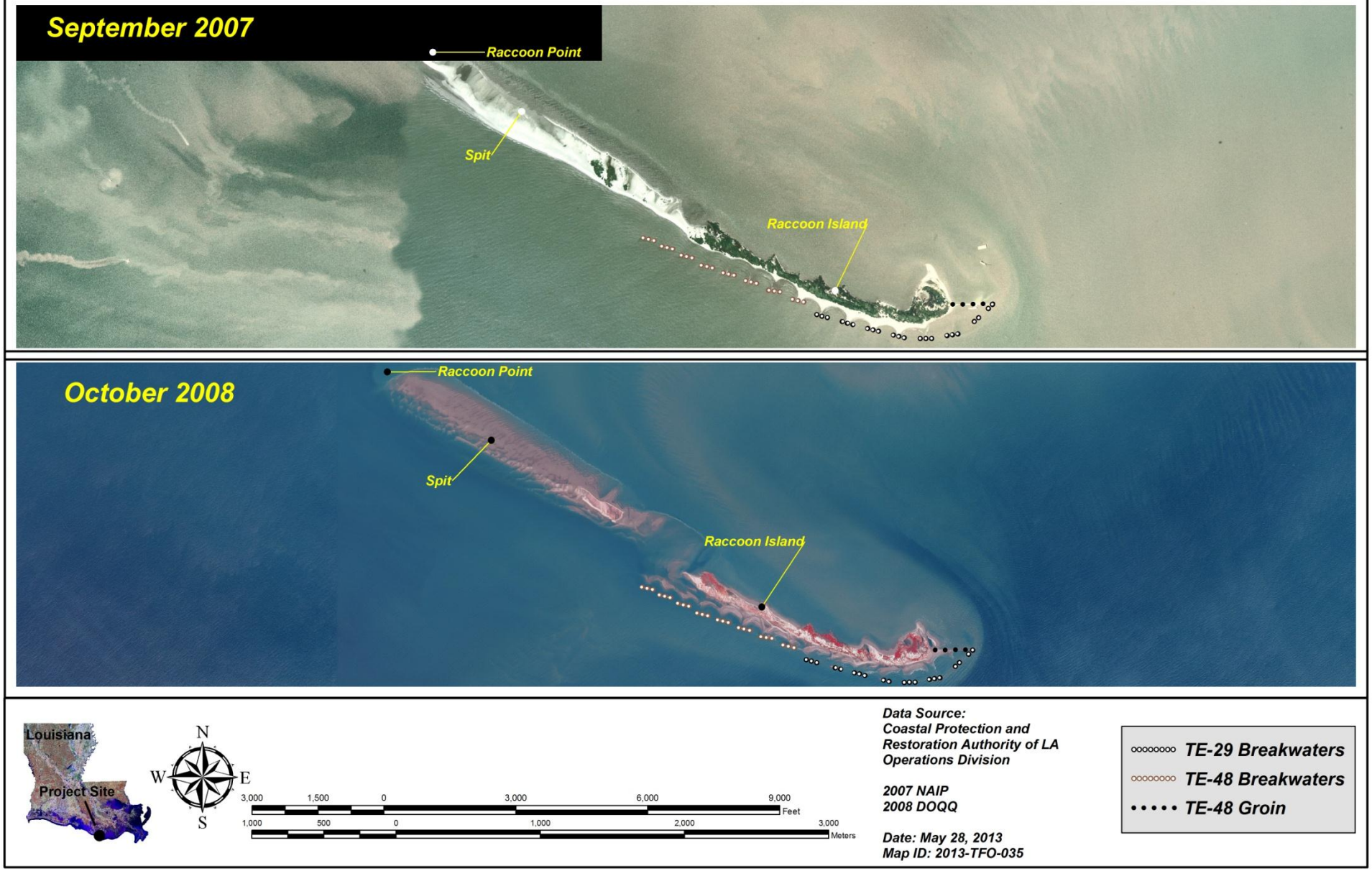
1,000 500 0 1,000 2,000 3,000 Meters

Data Source:
Coastal Protection and Restoration Authority of LA Operations Division

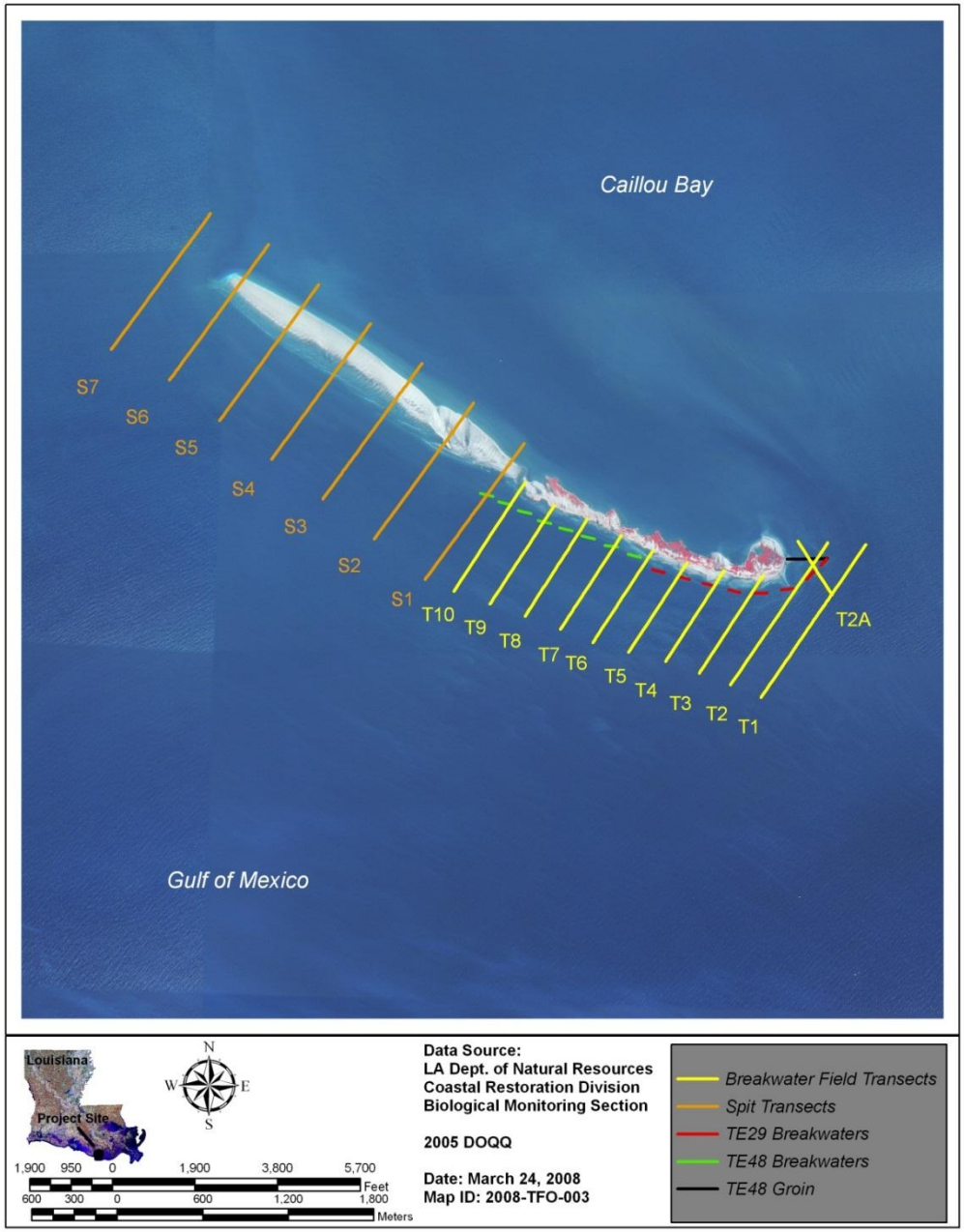
2004 DOQQ
2005 DOQQ

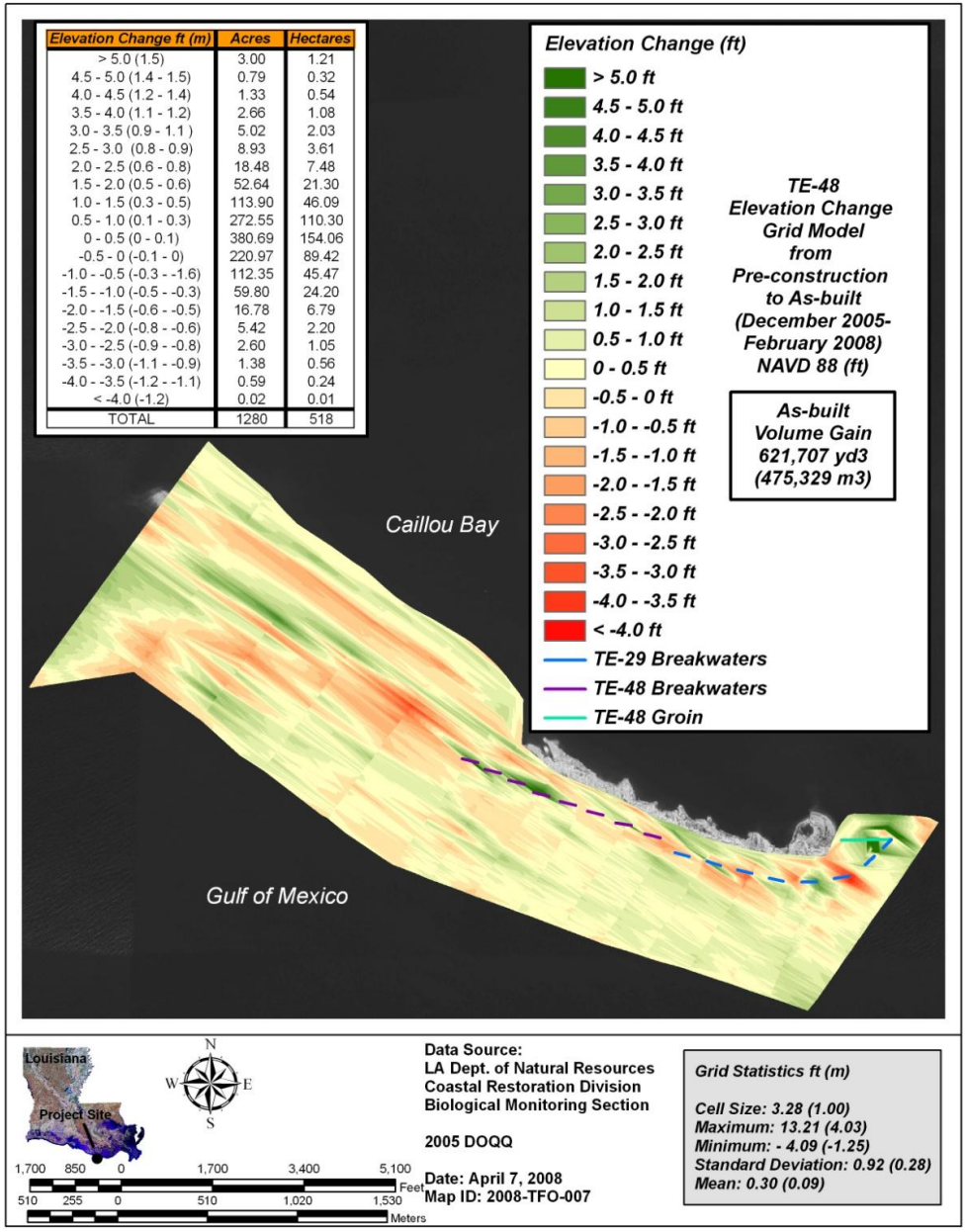
Date: May 28, 2013
Map ID: 2013-TFO-036

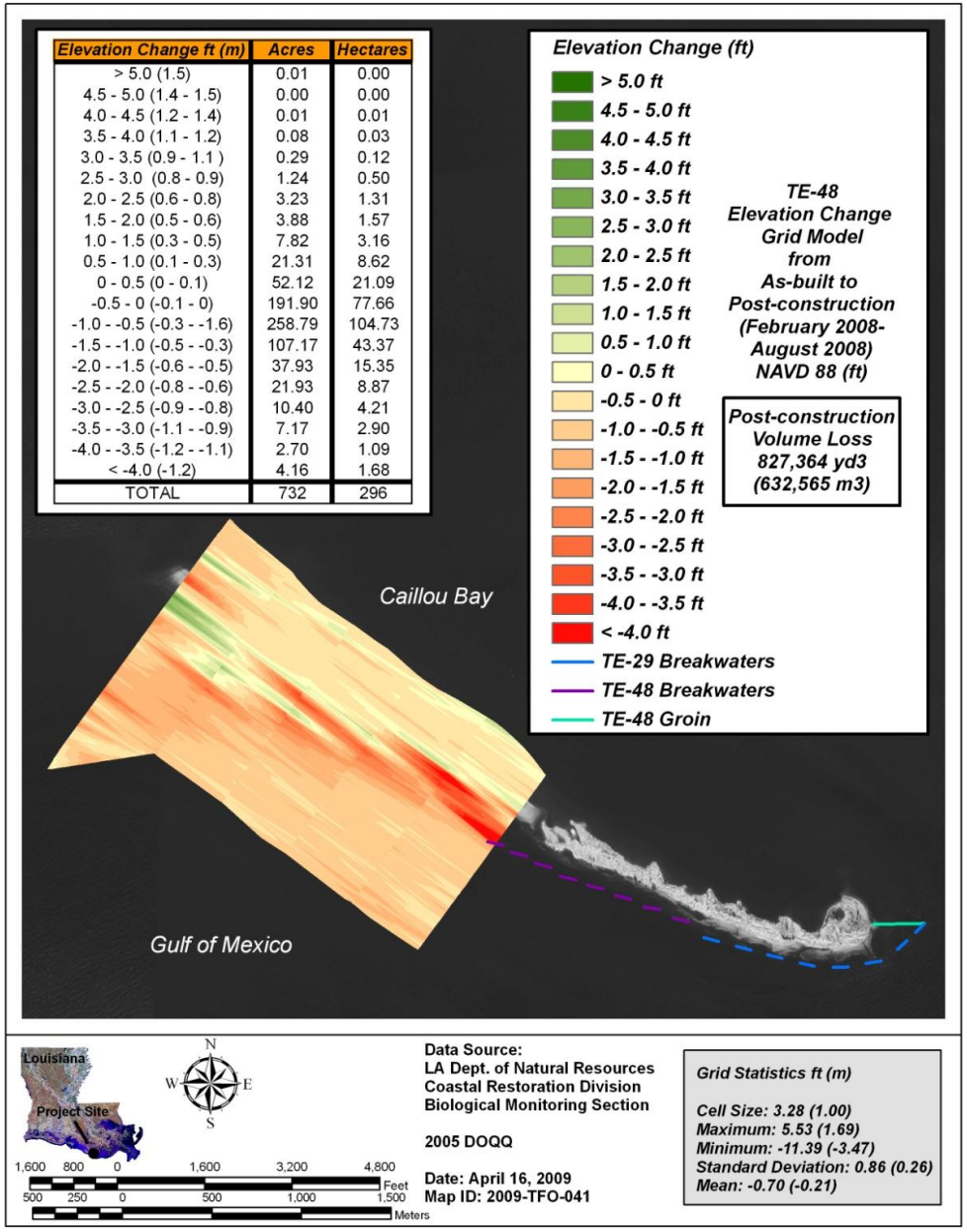
oooooooo ***TE-29 Breakwaters***

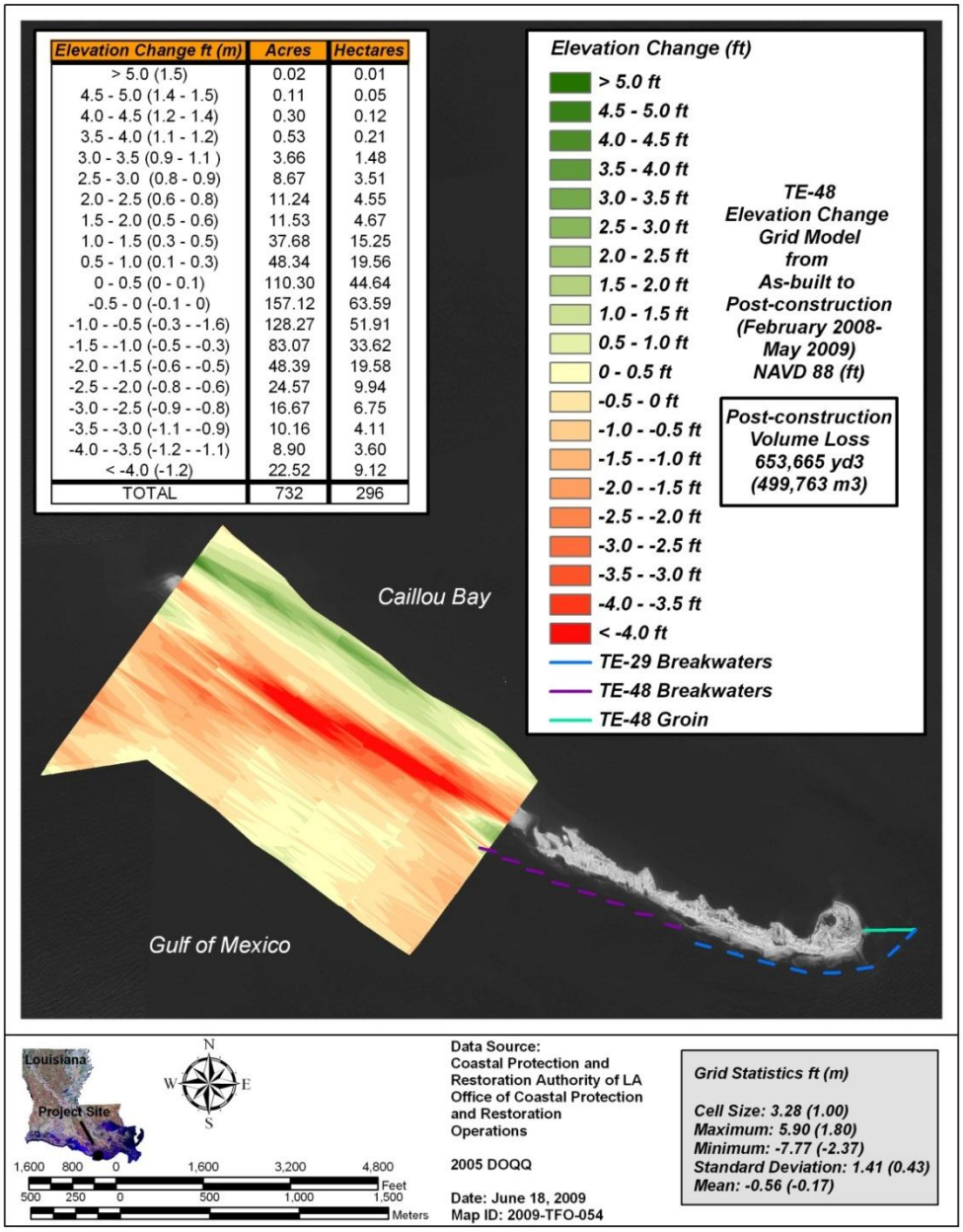

September 2007
Raccoon Point
Spit
Raccoon Island
October 2008
Raccoon Point
Spit
Raccoon Island
Louisiana
Project Site
N
W
E
S
3,000 1,500 0 3,000 6,000 9,000
Feet
1,000 500 0 1,000 2,000 3,000
Meters
Data Source:
Coastal Protection and
Restoration Authority of LA
Operations Division
2007 NAIP
2008 DOQQ
Date: May 28, 2013
Map ID: 2013-TFO-035
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin

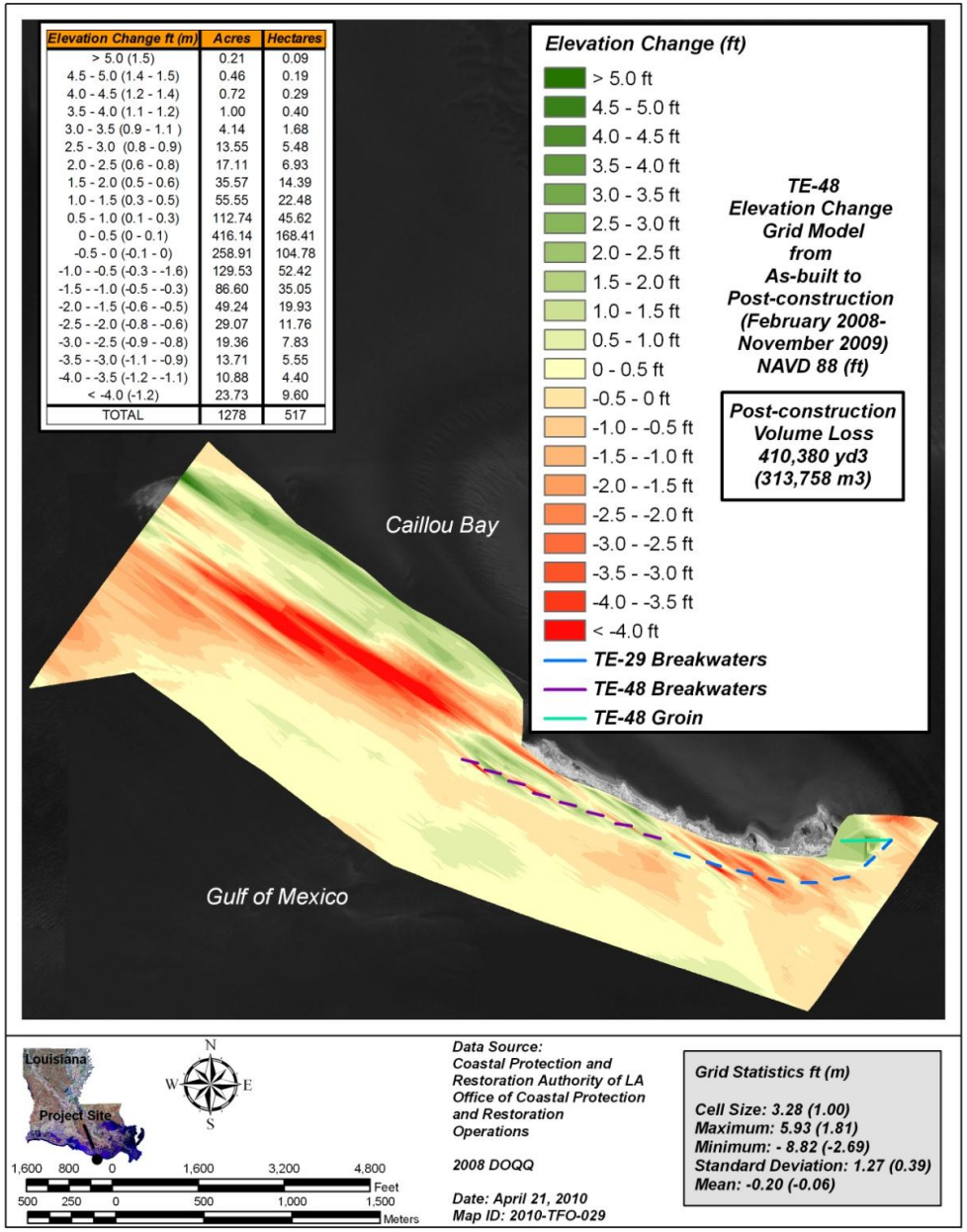

Panel A
Panel B
09/13/2005
11/20/2008

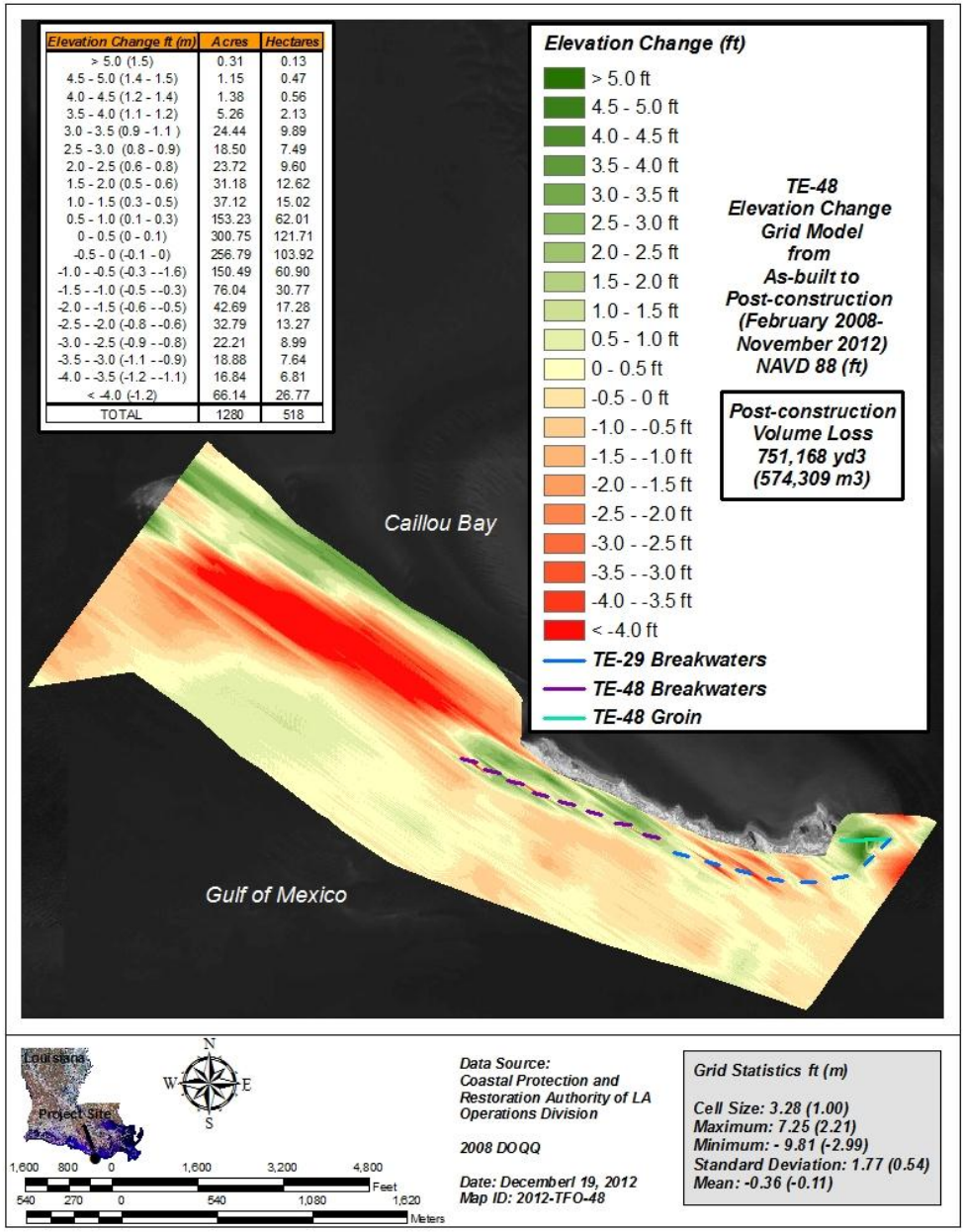

Caillou Bay
Gulf of Mexico
S7
S6
S5
S4
S3
S2
S1
T10
T9
T8
T7
T6
T5
T4
T3
T2
T1
T2A
Louisiana
Project Site
N
W
E
S
1,900 950 0 1,900 3,800 5,700
Feet
600 300 0 600 1,200 1,800
Meters
Data Source:
LA Dept. of Natural Resources
Coastal Restoration Division
Biological Monitoring Section
2005 DOQQ
Date: March 24, 2008
Map ID: 2008-TFO-003
Breakwater Field Transects
Spit Transects
TE29 Breakwaters
TE48 Breakwaters
TE48 Groin

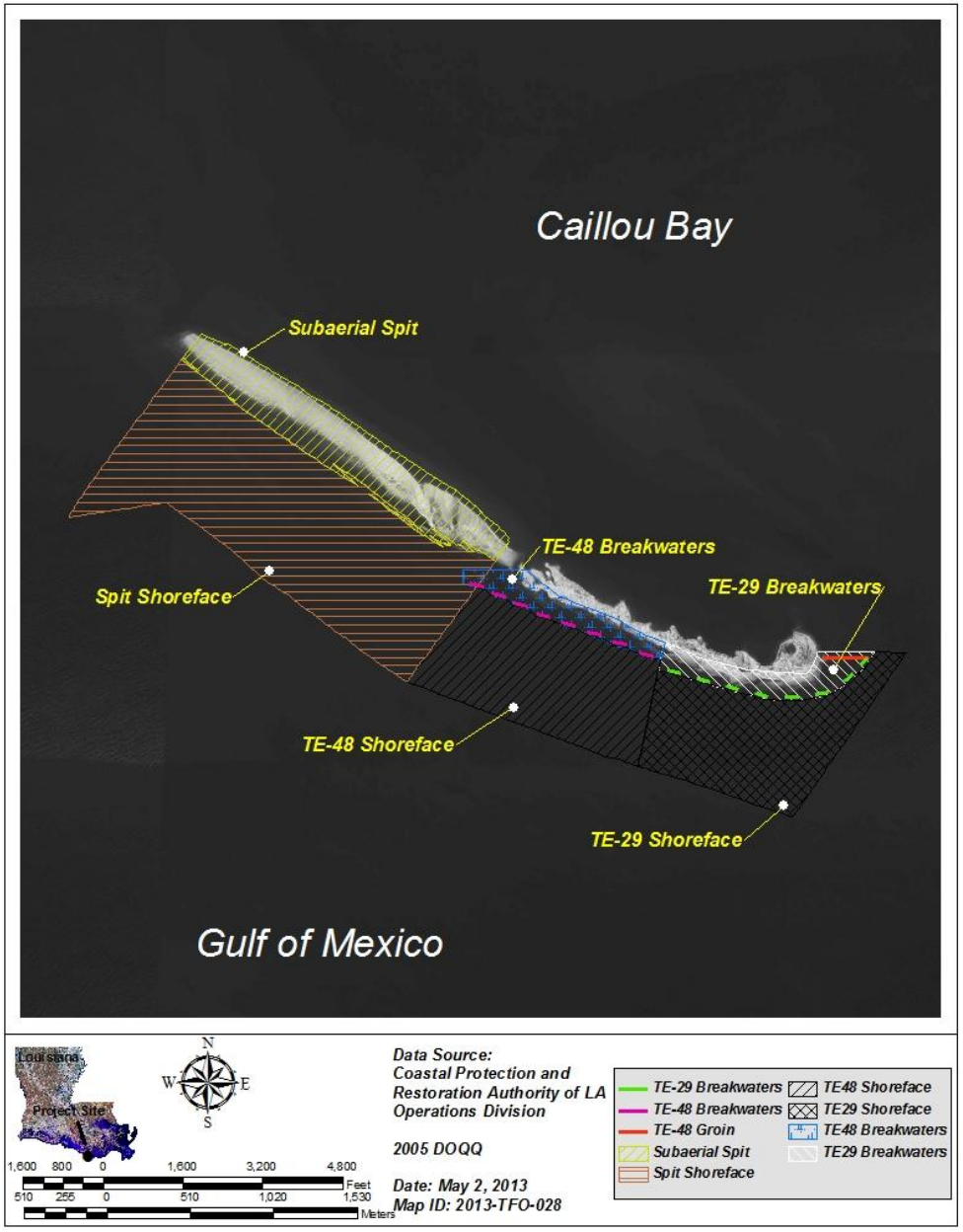

Elevation Change ft (m) | Acres | Hectares
> 5.0 (1.5) | 3.00 | 1.21
4.5 - 5.0 (1.4 - 1.5) | 0.79 | 0.32
4.0 - 4.5 (1.2 - 1.4) | 1.33 | 0.54
3.5 - 4.0 (1.1 - 1.2) | 2.66 | 1.08
3.0 - 3.5 (0.9 - 1.1) | 5.02 | 2.03
2.5 - 3.0 (0.8 - 0.9) | 8.93 | 3.61
2.0 - 2.5 (0.6 - 0.8) | 18.48 | 7.48
1.5 - 2.0 (0.5 - 0.6) | 52.64 | 21.30
1.0 - 1.5 (0.3 - 0.5) | 113.90 | 46.09
0.5 - 1.0 (0.1 - 0.3) | 272.55 | 110.30
0 - 0.5 (0 - 0.1) | 380.69 | 154.06
-0.5 - 0 (-0.1 - 0) | 220.97 | 89.42
-1.0 - -0.5 (-0.3 - -1.6) | 112.35 | 45.47
-1.5 - -1.0 (-0.5 - -0.3) | 59.80 | 24.20
-2.0 - -1.5 (-0.6 - -0.5) | 16.78 | 6.79
-2.5 - -2.0 (-0.8 - -0.6) | 5.42 | 2.20
-3.0 - -2.5 (-0.9 - -0.8) | 2.60 | 1.05
-3.5 - -3.0 (-1.1 - -0.9) | 1.38 | 0.56
-4.0 - -3.5 (-1.2 - -1.1) | 0.59 | 0.24
< -4.0 (-1.2) | 0.02 | 0.01
TOTAL | 1280 | 518
Elevation Change (ft)
> 5.0 ft
4.5 - 5.0 ft
4.0 - 4.5 ft
3.5 - 4.0 ft
3.0 - 3.5 ft
2.5 - 3.0 ft
2.0 - 2.5 ft
1.5 - 2.0 ft
1.0 - 1.5 ft
0.5 - 1.0 ft
0 - 0.5 ft
-0.5 - 0 ft
-1.0 - -0.5 ft
-1.5 - -1.0 ft
-2.0 - -1.5 ft
-2.5 - -2.0 ft
-3.0 - -2.5 ft
-3.5 - -3.0 ft
-4.0 - -3.5 ft
< -4.0 ft
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
TE-48 Elevation Change Grid Model from Pre-construction to As-built (December 2005-February 2008) NAVD 88 (ft)
As-built Volume Gain 621,707 yd3 (475,329 m3)
Caillou Bay
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1,700 850 0 1,700 3,400 5,100 Feet
510 255 0 510 1,020 1,530 Meters
Data Source:
LA Dept. of Natural Resources
Coastal Restoration Division
Biological Monitoring Section
2005 DOQQ
Date: April 7, 2008
Map ID: 2008-TFO-007
Grid Statistics ft (m)
Cell Size: 3.28 (1.00)
Maximum: 13.21 (4.03)
Minimum: - 4.09 (-1.25)
Standard Deviation: 0.92 (0.28)
Mean: 0.30 (0.09)


Elevation Change ft (m) | Acres | Hectares
> 5.0 (1.5) | 0.01 | 0.00
4.5 - 5.0 (1.4 - 1.5) | 0.00 | 0.00
4.0 - 4.5 (1.2 - 1.4) | 0.01 | 0.01
3.5 - 4.0 (1.1 - 1.2) | 0.08 | 0.03
3.0 - 3.5 (0.9 - 1.1) | 0.29 | 0.12
2.5 - 3.0 (0.8 - 0.9) | 1.24 | 0.50
2.0 - 2.5 (0.6 - 0.8) | 3.23 | 1.31
1.5 - 2.0 (0.5 - 0.6) | 3.88 | 1.57
1.0 - 1.5 (0.3 - 0.5) | 7.82 | 3.16
0.5 - 1.0 (0.1 - 0.3) | 21.31 | 8.62
0 - 0.5 (0 - 0.1) | 52.12 | 21.09
-0.5 - 0 (-0.1 - 0) | 191.90 | 77.66
-1.0 - -0.5 (-0.3 - -1.6) | 258.79 | 104.73
-1.5 - -1.0 (-0.5 - -0.3) | 107.17 | 43.37
-2.0 - -1.5 (-0.6 - -0.5) | 37.93 | 15.35
-2.5 - -2.0 (-0.8 - -0.6) | 21.93 | 8.87
-3.0 - -2.5 (-0.9 - -0.8) | 10.40 | 4.21
-3.5 - -3.0 (-1.1 - -0.9) | 7.17 | 2.90
-4.0 - -3.5 (-1.2 - -1.1) | 2.70 | 1.09
< -4.0 (-1.2) | 4.16 | 1.68
TOTAL | 732 | 296
Elevation Change (ft)
> 5.0 ft
4.5 - 5.0 ft
4.0 - 4.5 ft
3.5 - 4.0 ft
3.0 - 3.5 ft
2.5 - 3.0 ft
2.0 - 2.5 ft
1.5 - 2.0 ft
1.0 - 1.5 ft
0.5 - 1.0 ft
0 - 0.5 ft
-0.5 - 0 ft
-1.0 - -0.5 ft
-1.5 - -1.0 ft
-2.0 - -1.5 ft
-2.5 - -2.0 ft
-3.0 - -2.5 ft
-3.5 - -3.0 ft
-4.0 - -3.5 ft
< -4.0 ft
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
TE-48 Elevation Change Grid Model from As-built to Post-construction (February 2008-August 2008) NAVD 88 (ft)
Post-construction Volume Loss 827,364 yd3 (632,565 m3)
Caillou Bay
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1,600 800 0 1,600 3,200 4,800
Feet
500 250 0 500 1,000 1,500
Meters
Data Source:
LA Dept. of Natural Resources
Coastal Restoration Division
Biological Monitoring Section
2005 DOQQ
Date: April 16, 2009
Map ID: 2009-TFO-041
Grid Statistics ft (m)
Cell Size: 3.28 (1.00)
Maximum: 5.53 (1.69)
Minimum: -11.39 (-3.47)
Standard Deviation: 0.86 (0.26)
Mean: -0.70 (-0.21)


Elevation Change ft (m) | Acres | Hectares
> 5.0 (1.5) | 0.02 | 0.01
4.5 - 5.0 (1.4 - 1.5) | 0.11 | 0.05
4.0 - 4.5 (1.2 - 1.4) | 0.30 | 0.12
3.5 - 4.0 (1.1 - 1.2) | 0.53 | 0.21
3.0 - 3.5 (0.9 - 1.1) | 3.66 | 1.48
2.5 - 3.0 (0.8 - 0.9) | 8.67 | 3.51
2.0 - 2.5 (0.6 - 0.8) | 11.24 | 4.55
1.5 - 2.0 (0.5 - 0.6) | 11.53 | 4.67
1.0 - 1.5 (0.3 - 0.5) | 37.68 | 15.25
0.5 - 1.0 (0.1 - 0.3) | 48.34 | 19.56
0 - 0.5 (0 - 0.1) | 110.30 | 44.64
-0.5 - 0 (-0.1 - 0) | 157.12 | 63.59
-1.0 - -0.5 (-0.3 - -1.6) | 128.27 | 51.91
-1.5 - -1.0 (-0.5 - -0.3) | 83.07 | 33.62
-2.0 - -1.5 (-0.6 - -0.5) | 48.39 | 19.58
-2.5 - -2.0 (-0.8 - -0.6) | 24.57 | 9.94
-3.0 - -2.5 (-0.9 - -0.8) | 16.67 | 6.75
-3.5 - -3.0 (-1.1 - -0.9) | 10.16 | 4.11
-4.0 - -3.5 (-1.2 - -1.1) | 8.90 | 3.60
< -4.0 (-1.2) | 22.52 | 9.12
TOTAL | 732 | 296
Elevation Change (ft)
> 5.0 ft
4.5 - 5.0 ft
4.0 - 4.5 ft
3.5 - 4.0 ft
3.0 - 3.5 ft
2.5 - 3.0 ft
2.0 - 2.5 ft
1.5 - 2.0 ft
1.0 - 1.5 ft
0.5 - 1.0 ft
0 - 0.5 ft
-0.5 - 0 ft
-1.0 - -0.5 ft
-1.5 - -1.0 ft
-2.0 - -1.5 ft
-2.5 - -2.0 ft
-3.0 - -2.5 ft
-3.5 - -3.0 ft
-4.0 - -3.5 ft
< -4.0 ft
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
TE-48 Elevation Change Grid Model from As-built to Post-construction (February 2008-May 2009) NAVD 88 (ft)
Post-construction Volume Loss 653,665 yd3 (499,763 m3)
Caillou Bay
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1,600 800 0 1,600 3,200 4,800
Feet
500 250 0 500 1,000 1,500
Meters
Data Source:
Coastal Protection and Restoration Authority of LA
Office of Coastal Protection and Restoration Operations
2005 DOQQ
Date: June 18, 2009
Map ID: 2009-TFO-054
Grid Statistics ft (m)
Cell Size: 3.28 (1.00)
Maximum: 5.90 (1.80)
Minimum: -7.77 (-2.37)
Standard Deviation: 1.41 (0.43)
Mean: -0.56 (-0.17)


Elevation Change ft (m) | Acres | Hectares
> 5.0 (1.5) 0.21 0.09
4.5 - 5.0 (1.4 - 1.5) 0.46 0.19
4.0 - 4.5 (1.2 - 1.4) 0.72 0.29
3.5 - 4.0 (1.1 - 1.2) 1.00 0.40
3.0 - 3.5 (0.9 - 1.1) 4.14 1.68
2.5 - 3.0 (0.8 - 0.9) 13.55 5.48
2.0 - 2.5 (0.6 - 0.8) 17.11 6.93
1.5 - 2.0 (0.5 - 0.6) 35.57 14.39
1.0 - 1.5 (0.3 - 0.5) 55.55 22.48
0.5 - 1.0 (0.1 - 0.3) 112.74 45.62
0 - 0.5 (0 - 0.1) 416.14 168.41
-0.5 - 0 (-0.1 - 0) 258.91 104.78
-1.0 - -0.5 (-0.3 - -1.6) 129.53 52.42
-1.5 - -1.0 (-0.5 - -0.3) 86.60 35.05
-2.0 - -1.5 (-0.6 - -0.5) 49.24 19.93
-2.5 - -2.0 (-0.8 - -0.6) 29.07 11.76
-3.0 - -2.5 (-0.9 - -0.8) 19.36 7.83
-3.5 - -3.0 (-1.1 - -0.9) 13.71 5.55
-4.0 - -3.5 (-1.2 - -1.1) 10.88 4.40
< -4.0 (-1.2) 23.73 9.60
TOTAL 1278 517
Elevation Change (ft)
> 5.0 ft
4.5 - 5.0 ft
4.0 - 4.5 ft
3.5 - 4.0 ft
3.0 - 3.5 ft
2.5 - 3.0 ft
2.0 - 2.5 ft
1.5 - 2.0 ft
1.0 - 1.5 ft
0.5 - 1.0 ft
0 - 0.5 ft
-0.5 - 0 ft
-1.0 - -0.5 ft
-1.5 - -1.0 ft
-2.0 - -1.5 ft
-2.5 - -2.0 ft
-3.0 - -2.5 ft
-3.5 - -3.0 ft
-4.0 - -3.5 ft
< -4.0 ft
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
TE-48 Elevation Change Grid Model from As-built to Post-construction (February 2008-November 2009) NAVD 88 (ft)
Post-construction Volume Loss 410,380 yd3 (313,758 m3)
Caillou Bay
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1,600 800 0 1,600 3,200 4,800
Feet
500 250 0 500 1,000 1,500
Meters
Data Source: Coastal Protection and Restoration Authority of LA Office of Coastal Protection and Restoration Operations
2008 DOQQ
Date: April 21, 2010
Map ID: 2010-TFO-029
Grid Statistics ft (m)
Cell Size: 3.28 (1.00)
Maximum: 5.93 (1.81)
Minimum: - 8.82 (-2.69)
Standard Deviation: 1.27 (0.39)
Mean: -0.20 (-0.06)


Elevation Change ft (m) | Acres | Hectares
> 5.0 (1.5) | 0.31 | 0.13
4.5 - 5.0 (1.4 - 1.5) | 1.15 | 0.47
4.0 - 4.5 (1.2 - 1.4) | 1.38 | 0.56
3.5 - 4.0 (1.1 - 1.2) | 5.26 | 2.13
3.0 - 3.5 (0.9 - 1.1) | 24.44 | 9.89
2.5 - 3.0 (0.8 - 0.9) | 18.50 | 7.49
2.0 - 2.5 (0.6 - 0.8) | 23.72 | 9.60
1.5 - 2.0 (0.5 - 0.6) | 31.18 | 12.62
1.0 - 1.5 (0.3 - 0.5) | 37.12 | 15.02
0.5 - 1.0 (0.1 - 0.3) | 153.23 | 62.01
0 - 0.5 (0 - 0.1) | 300.75 | 121.71
-0.5 - 0 (-0.1 - 0) | 256.79 | 103.92
-1.0 - -0.5 (-0.3 - -1.6) | 150.49 | 60.90
-1.5 - -1.0 (-0.5 - -0.3) | 76.04 | 30.77
-2.0 - -1.5 (-0.6 - -0.5) | 42.69 | 17.28
-2.5 - -2.0 (-0.8 - -0.6) | 32.79 | 13.27
-3.0 - -2.5 (-0.9 - -0.8) | 22.21 | 8.99
-3.5 - -3.0 (-1.1 - -0.9) | 18.88 | 7.64
-4.0 - -3.5 (-1.2 - -1.1) | 16.84 | 6.81
< -4.0 (-1.2) | 66.14 | 26.77
TOTAL | 1280 | 518
Elevation Change (ft)
> 5.0 ft
4.5 - 5.0 ft
4.0 - 4.5 ft
3.5 - 4.0 ft
3.0 - 3.5 ft
2.5 - 3.0 ft
2.0 - 2.5 ft
1.5 - 2.0 ft
1.0 - 1.5 ft
0.5 - 1.0 ft
0 - 0.5 ft
-0.5 - 0 ft
-1.0 - -0.5 ft
-1.5 - -1.0 ft
-2.0 - -1.5 ft
-2.5 - -2.0 ft
-3.0 - -2.5 ft
-3.5 - -3.0 ft
-4.0 - -3.5 ft
< -4.0 ft
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
TE-48 Elevation Change Grid Model from As-built to Post-construction (February 2008-November 2012) NAVD 88 (ft)
Post-construction Volume Loss 751,168 yd3 (574,309 m3)
Caillou Bay
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1,600 800 0 1,600 3,200 4,800
Feet
540 270 0 540 1,080 1,620
Meters
Data Source:
Coastal Protection and Restoration Authority of LA
Operations Division
2008 DOQQ
Date: December 19, 2012
Map ID: 2012-TFO-48
Grid Statistics ft (m)
Cell Size: 3.28 (1.00)
Maximum: 7.25 (2.21)
Minimum: - 9.81 (-2.99)
Standard Deviation: 1.77 (0.54)
Mean: -0.36 (-0.11)


Caillou Bay
Subaerial Spit
TE-48 Breakwaters
TE-29 Breakwaters
Spit Shoreface
TE-48 Shoreface
TE-29 Shoreface
Gulf of Mexico
Louisiana
Project Site
N
W
E
S
1,600 800 0 1,600 3,200 4,800
Feet
510 255 0 510 1,020 1,530
Meters
Data Source:
Coastal Protection and
Restoration Authority of LA
Operations Division
2005 DOQQ
Date: May 2, 2013
Map ID: 2013-TFO-028
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin
Subaerial Spit
Spit Shoreface
TE48 Shoreface
TE29 Shoreface
TE48 Breakwaters
TE29 Breakwaters

RESULTS OF ELEVATION CHANGE SUBDIVISION ANALYSIS

Volume Change (yd3)	Dec 2005-Feb 2008	Feb 2008-Aug 2008	Feb 2008-May 2009	Feb 2008-Nov 2009	Feb 2008-Nov 2012
Subaerial Spit	-20,572	-116,576	-312,276	-254,986	-655,075
Spit Shoreface	149,960	-684,441	-568,721	-409,990	-398,444
TE-48 Shoreface	115,027	N/A	N/A	46,049	-26,390
TE-29 Shoreface	150,367	N/A	N/A	-50,302	-35,806
TE-48 Breakwaters	52,002	N/A	N/A	41,011	107,781
TE-29 Breakwaters	40,082	N/A	N/A	-17,925	19,015

RACCOON ISLAND BREAKWATER FIELD SHORELINE CHANGE RATE OVER TIME

Breakwater Field Shoreline Change	Dec 2005-Feb 2008	Feb 2008-Nov 2009	Nov 2009-Nov 2012
Gulf of Mexico Change Rate (ft/yr)	-8.31	22.56	22.70

RACCOON ISLAND SPIT SHORELINE CHANGE RATE OVER TIME

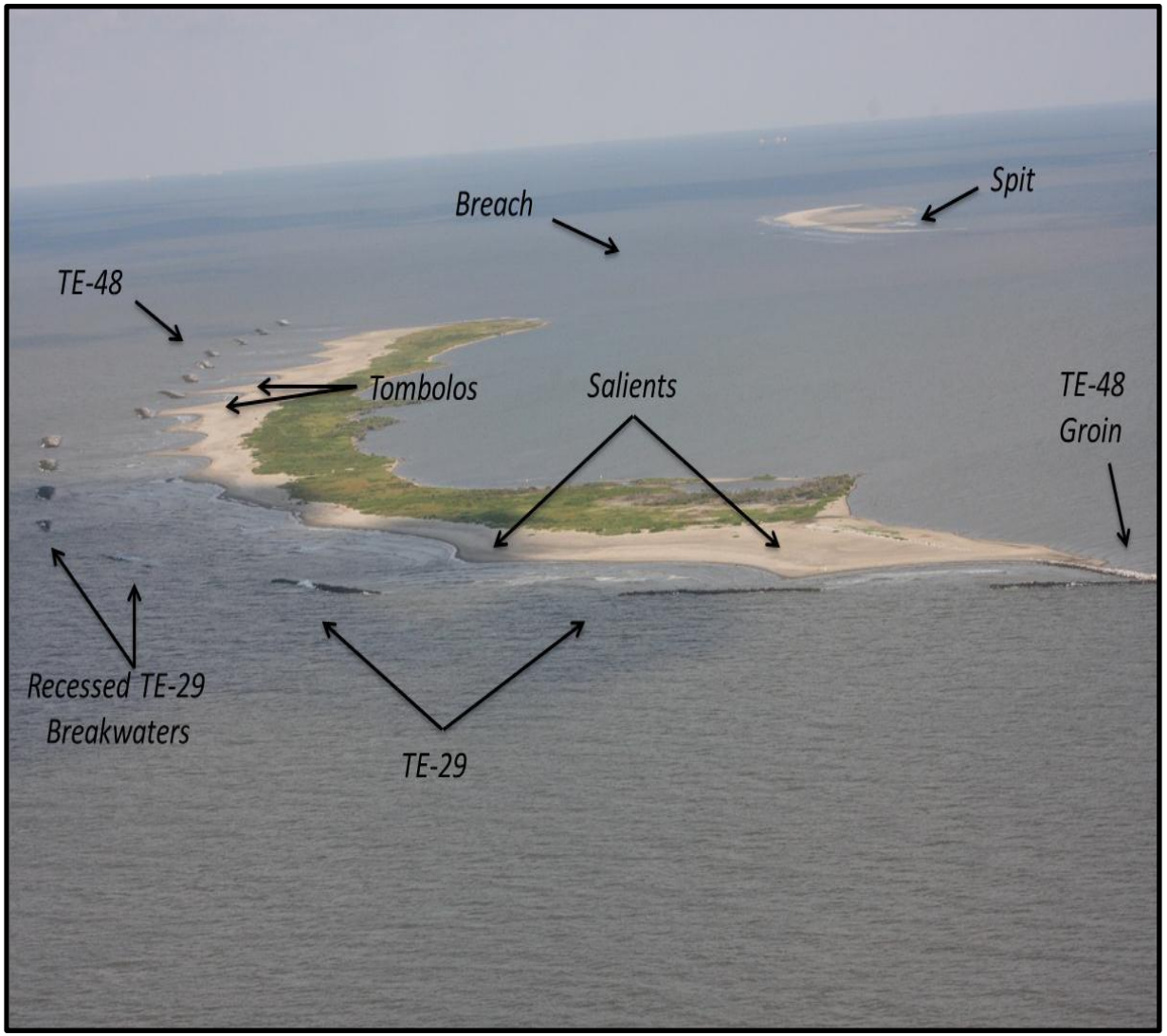
Subaerial Spit Shoreline Change	Dec 2005-Feb 2008	Feb 2008-Aug 2008	Aug 2008-May 2009	May 2009-Nov 2009	Nov 2009-Nov 2012
Gulf of Mexico Change Rate (ft/yr)	13.99	-72.43	-440.40	86.86	-71.39
Caillou Bay Change Rate (ft/yr)	6.49	-163.44	369.18	-2.32	-7.34

RACCOON ISLAND SPIT SUMMARY STATISTICS OVER TIME

Subaerial Spit Summary Statistics	Dec-2005	Feb-2008	Aug-2008	May-2009	Nov-2009	Nov-2012
Mean Width (ft)	849	929	803	776	813	772
Length (ft)	7465	7432	7490	7456	7303	3929
Area (Acres)	157	167	147	137	149	65


July 2010
Raccoon Point
Spit
Raccoon Island
November 2012
Raccoon Point
Spit
Raccoon Island
Louisiana
Project Site
N
W
E
S
3,100 1,550 0 3,100 6,200 9,300
Feet
1,000 500 0 1,000 2,000 3,000
Meters
Data Source:
Coastal Protection and Restoration Authority of LA
Operations Division
2010 NAIP
2012 DOQQ
Date: May 28, 2013
Map ID: 2013-TFO-034
TE-29 Breakwaters
TE-48 Breakwaters
TE-48 Groin

Post Hurricane Isaac Oblique Aerial Photograph of Raccoon Island (Sep 2012)



ESTIMATED BREACH FILL VOLUMES & DEPTHS

Fill Elevation	Fill Volume	Fill Depth
NAVD88 ft	yd^3	ft
0.00	476,808	2.36
1.00	678,710	3.36
1.54	786,693	3.90
2.00	880,612	4.36
2.50	981,583	4.86
3.00	1,082,514	5.36

TE-48 CONCLUSIONS AND RECOMMENDATIONS

- TE-48 Breakwaters have Raised Shoreline Contours in Their lee
- Groin has Increased Volumes and Extended Shoreline Positions
- Raccoon Island Spit has Recorded Sediment Deficits Since TE-48 Construction
- TE-29 Breakwaters #3-#6 have Recorded Sediment Deficits Since TE-48 Construction
- Raccoon Island Substantially Impacted by Tropical Storms During Study
- Recommend Comprehensive Sediment Budget Study
- Recommend Closing Breach and Reconnecting Spit
- Recommend Creating Marsh Behind Spit to Increase Width
- Recommend Beach Nourishment Event
- Recommend Western Terminal Groin

ACKNOWLEDGEMENTS

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Cindy Steyer
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