

2012 Biennial Seagrass Mapping

Kris Kaufman, SWFWMD SWIM Program



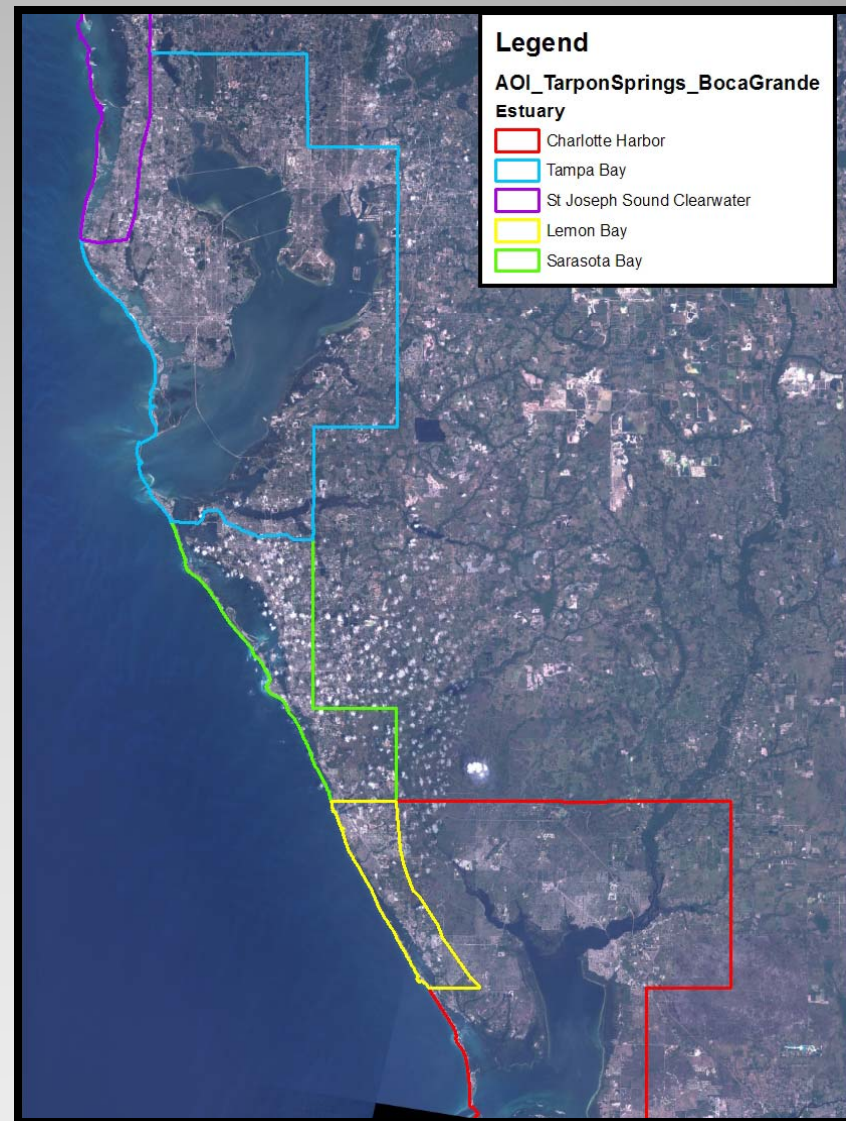
Overview

- **Mapping Methods**
 - Challenges
 - Updates
- **Imagery Examples**
- **Results by Waterbody**



Project Extent

2,539 square miles

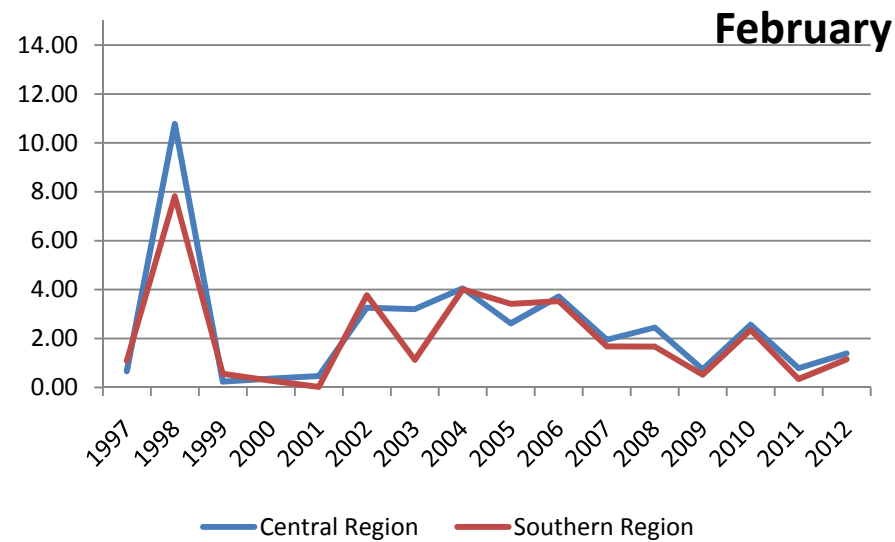
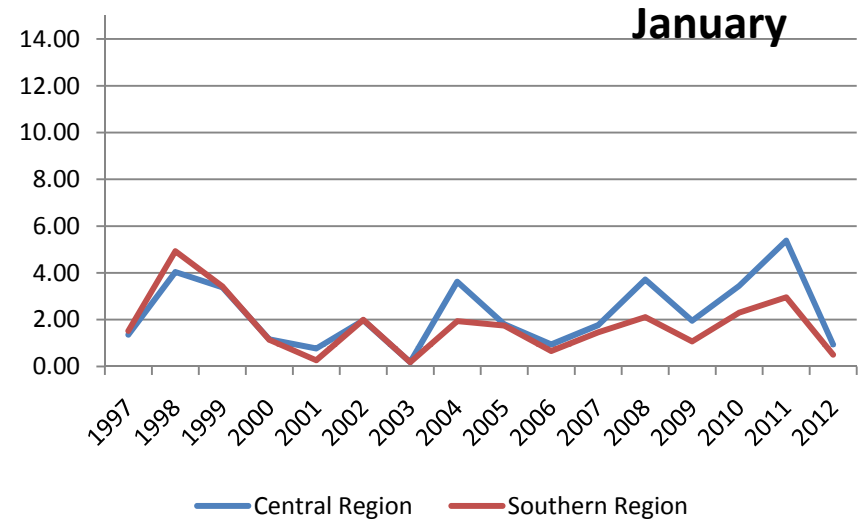
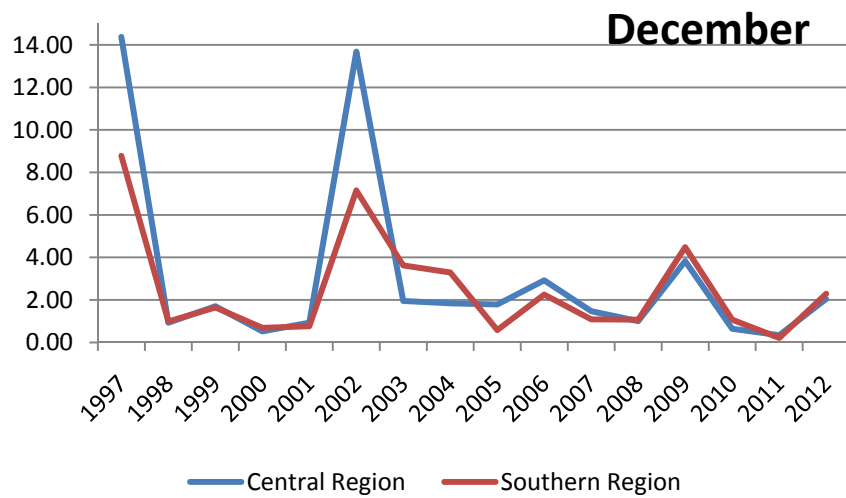


Imagery Acquisition



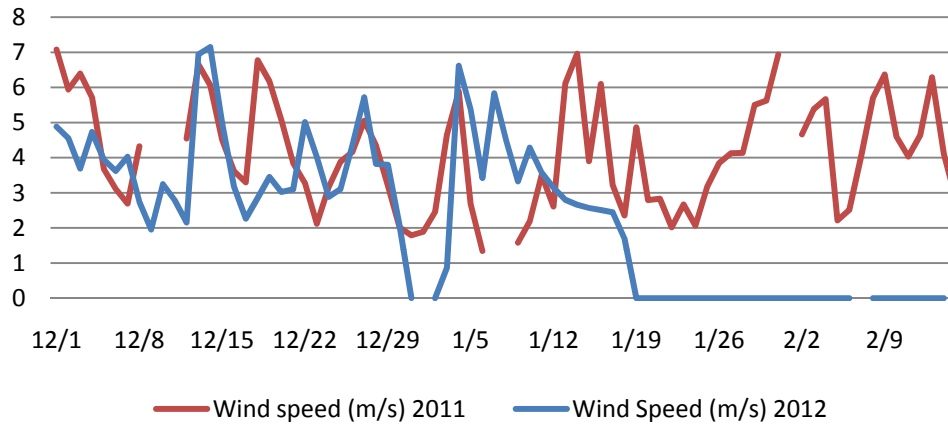
- **1 ft. Digital Imagery**
- **Flight Window:**
Dec 1st – Feb. 15th
- **Data Capture:**
 - Dec. 19th,
 - Jan. 4, 5, 17, 19, 20, 21, 28

Flight Season Rainfall

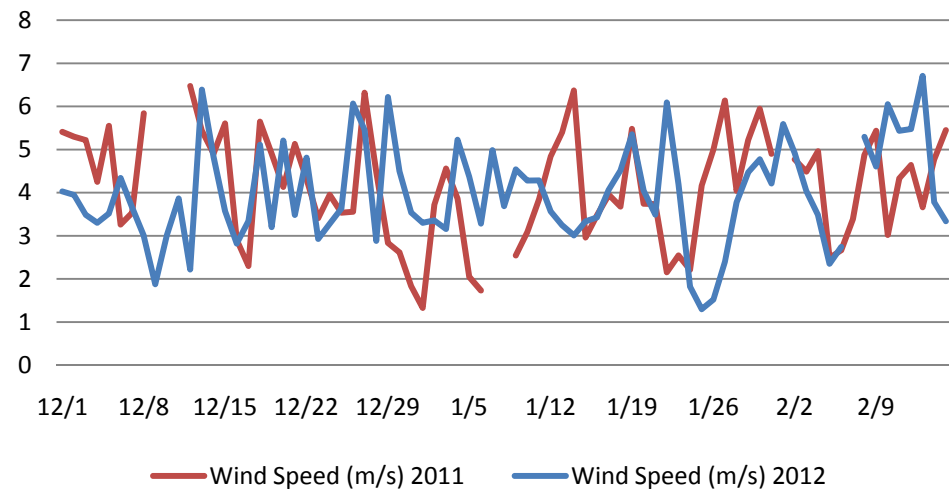


Flight Season Wind

Anna Maria Island



Fred Howard Park



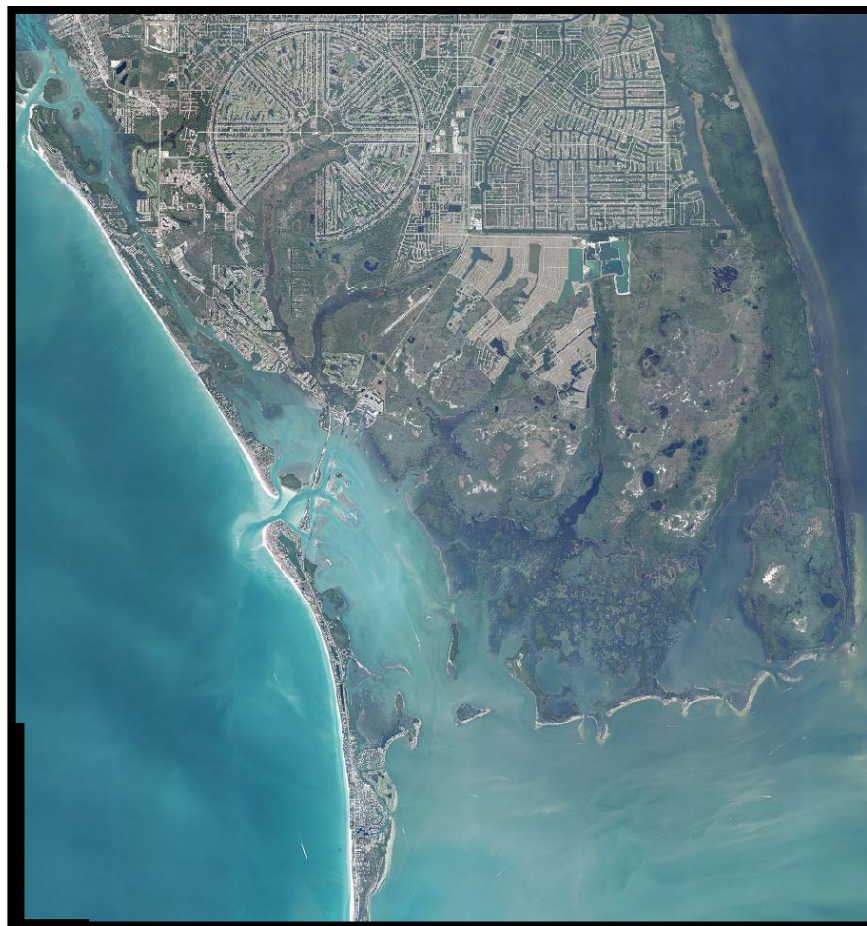
Imagery Results

- **Turbidity obscurities along ICW and nearshore**
- **Moderate to Severe Obscurities in:**
 - **11 of the 22 Bay Segments**
- **Overall – estimated obscurities cover approx. 3.7% of 2010 mapped seagrass within the 11 segments**

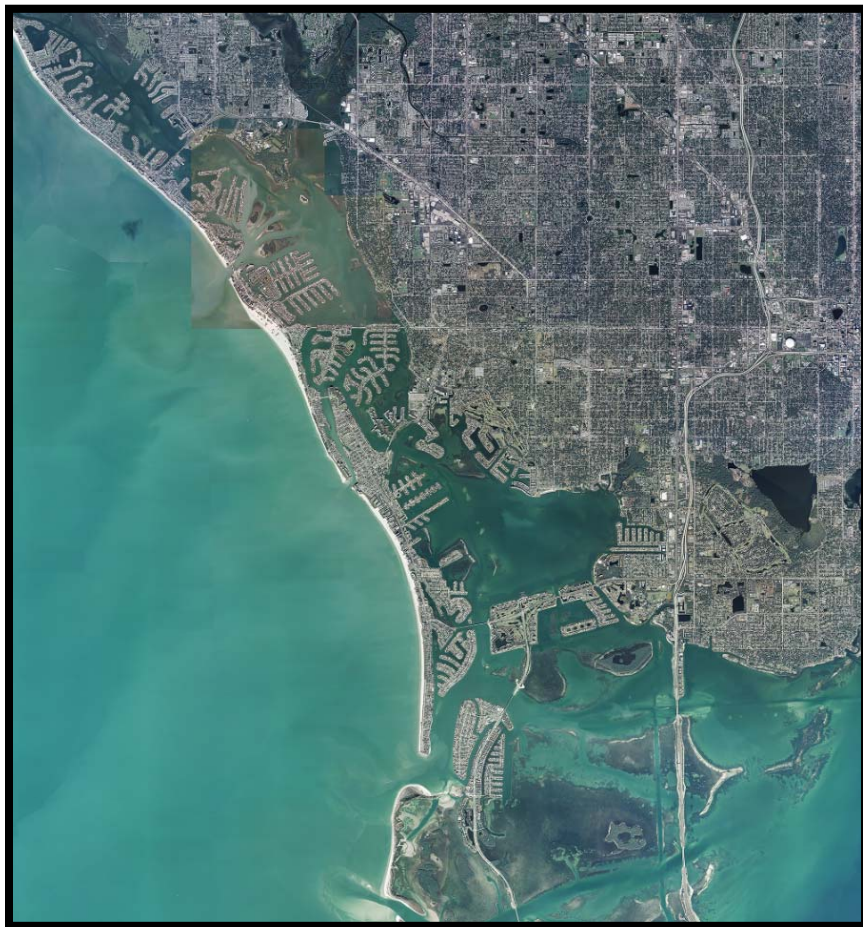
2010



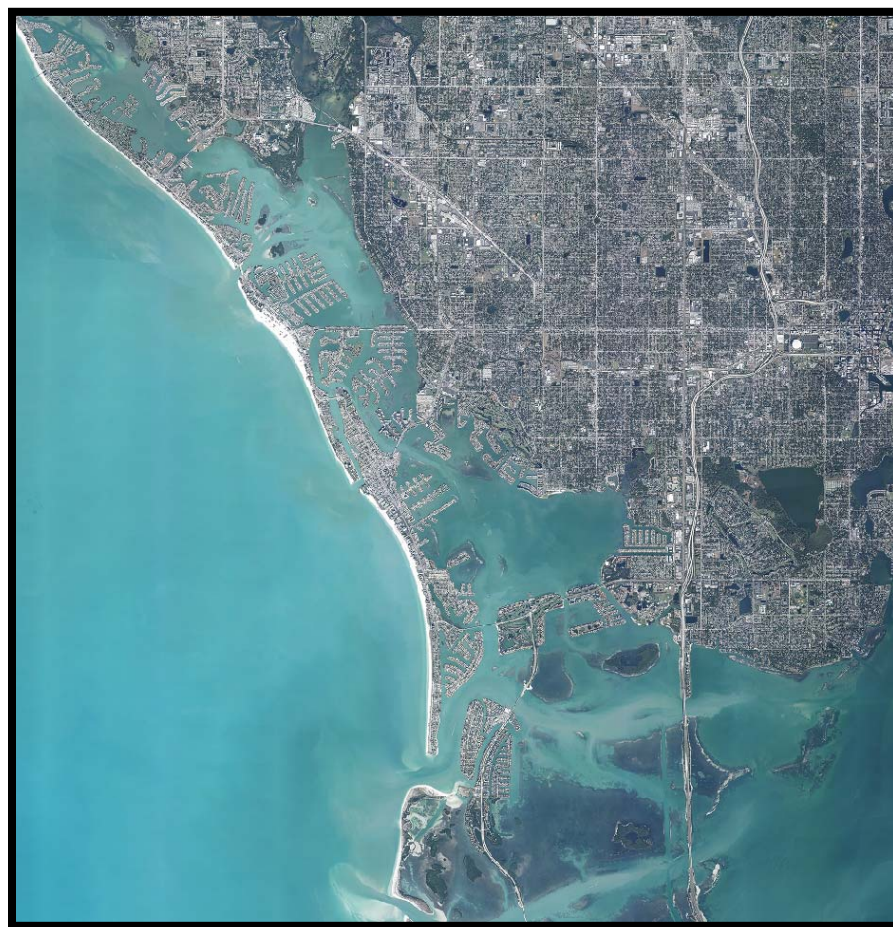
2012

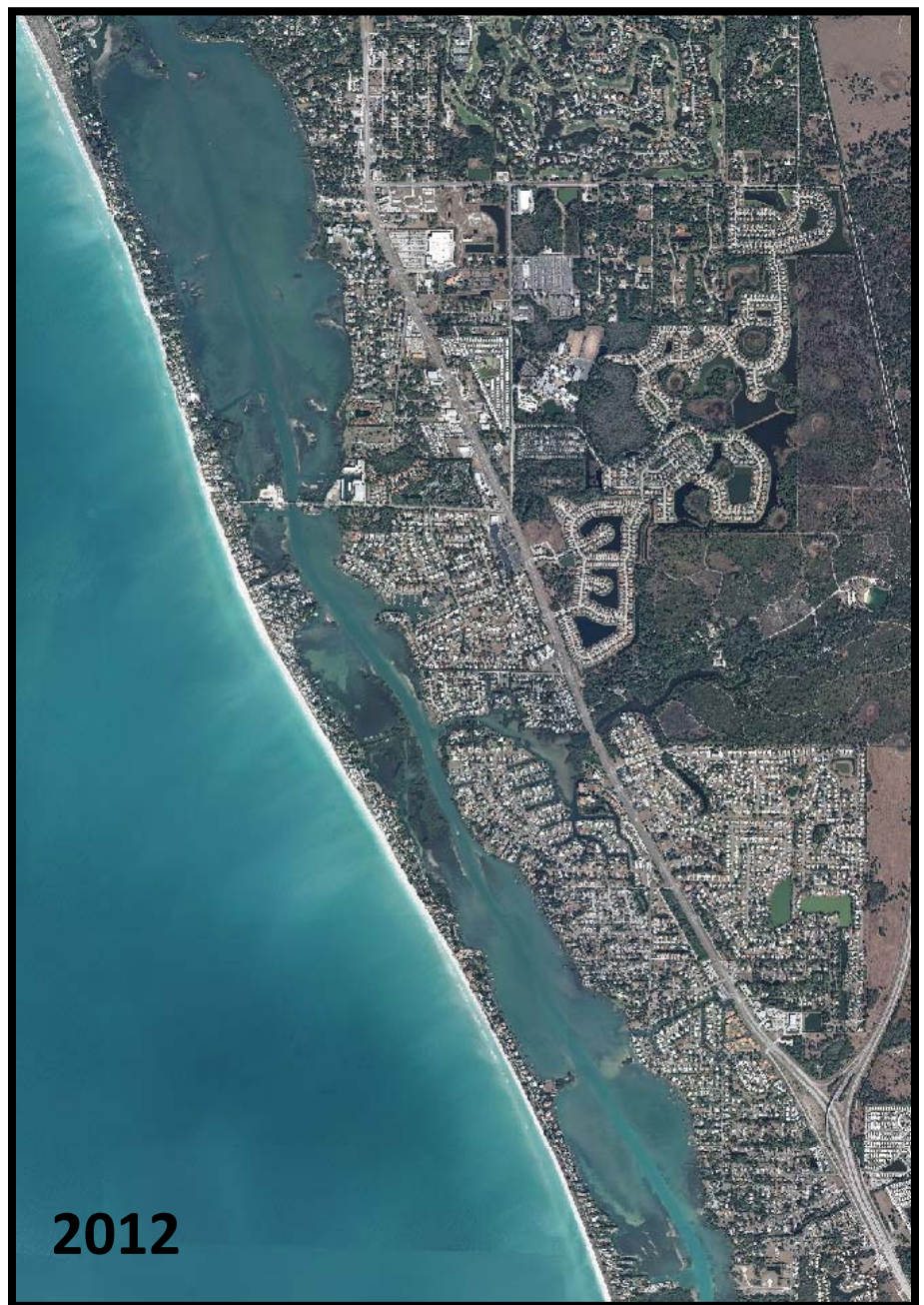
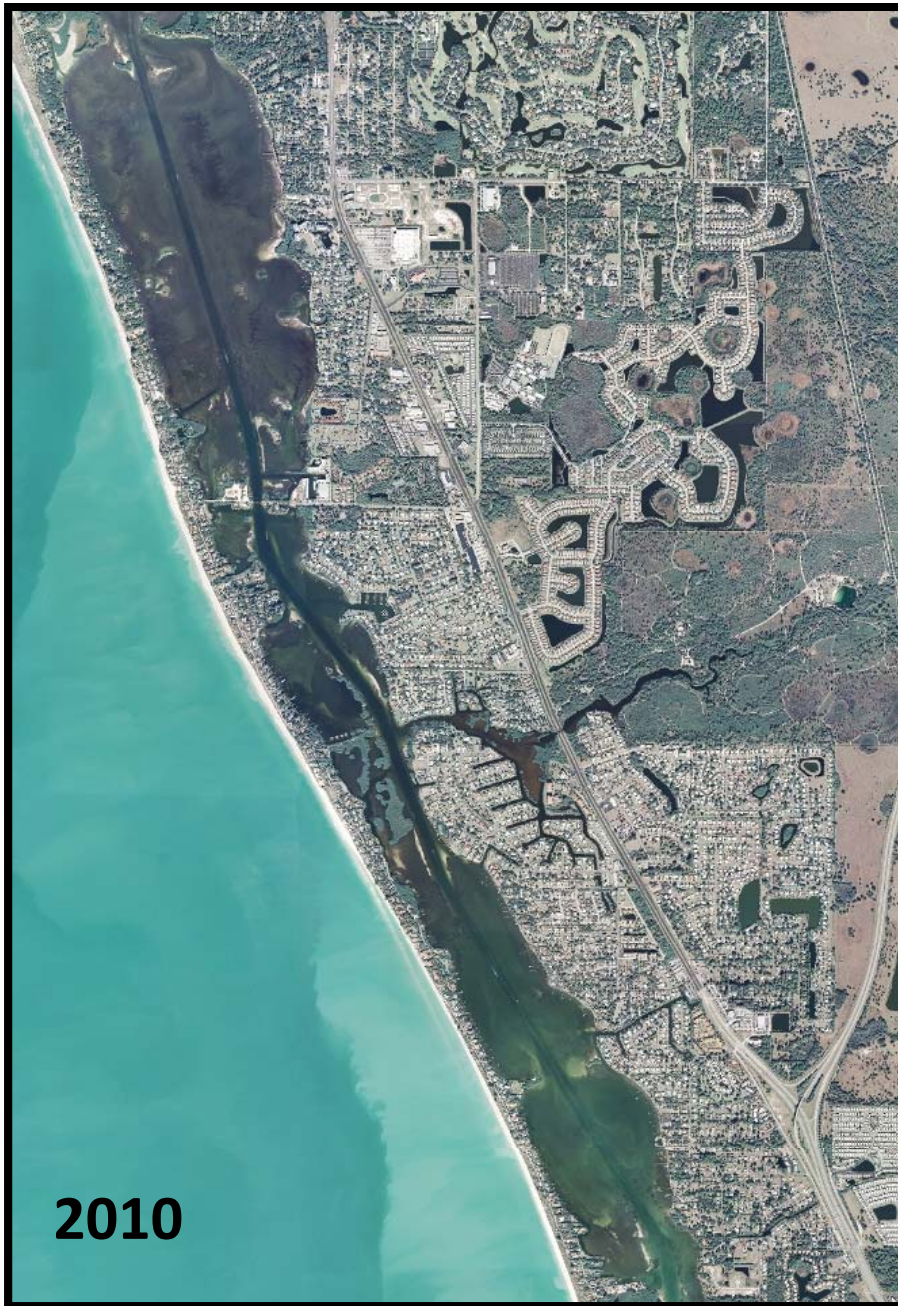


2010



2012





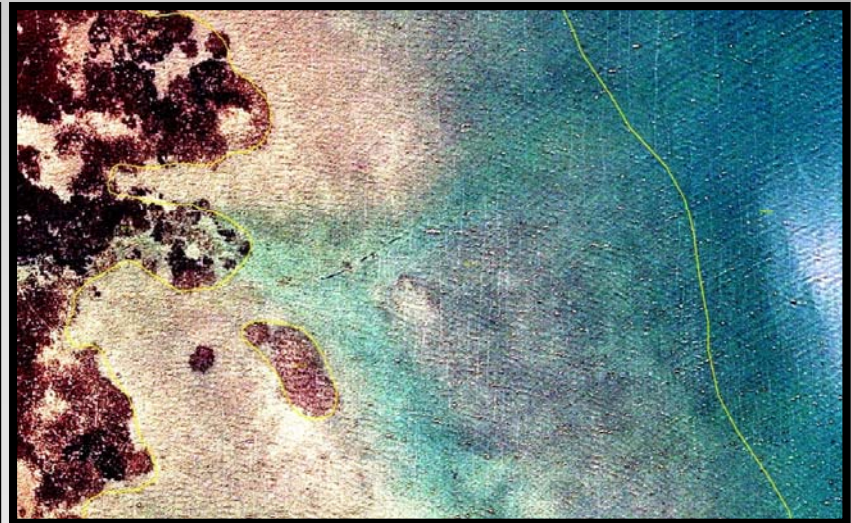
Protocols for Obscurities

- Refer to ancillary imagery
- Refer to ancillary field data
- Modify the image with a histogram stretch
 - Enhance brightness and detail
- “Fuzzy” boundary edges
 - Field visit visible extent
 - Field visit 2010 boundaries

Clearwater Original



Clearwater With Stretch

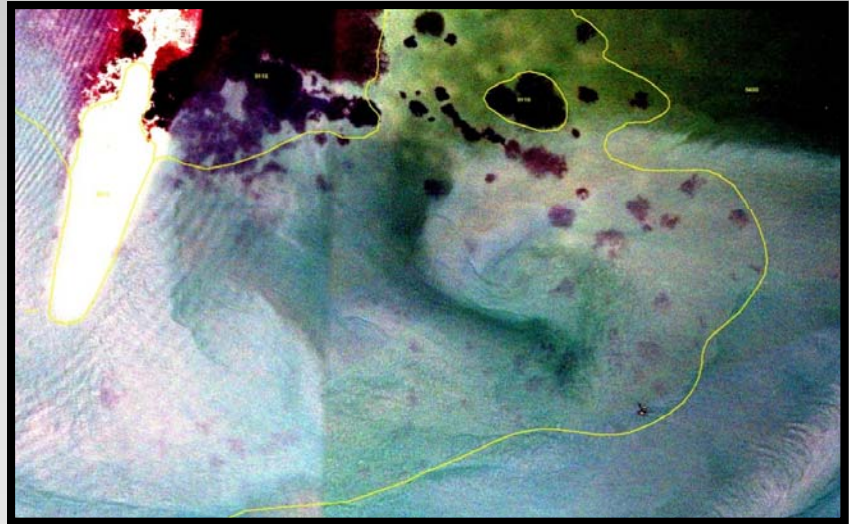


Histogram Stretch

Boca Ciega Bay Original



Boca Ciega Bay With Stretch



Histogram Stretch

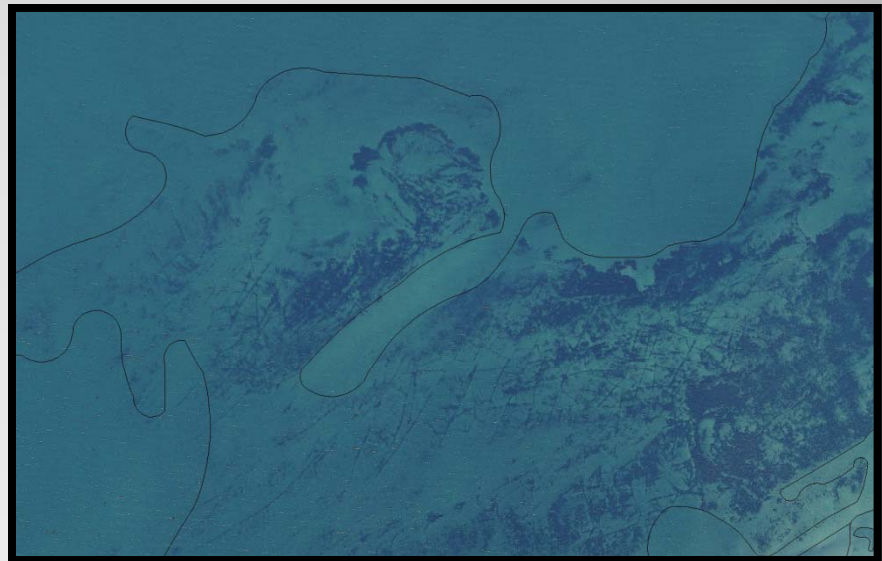


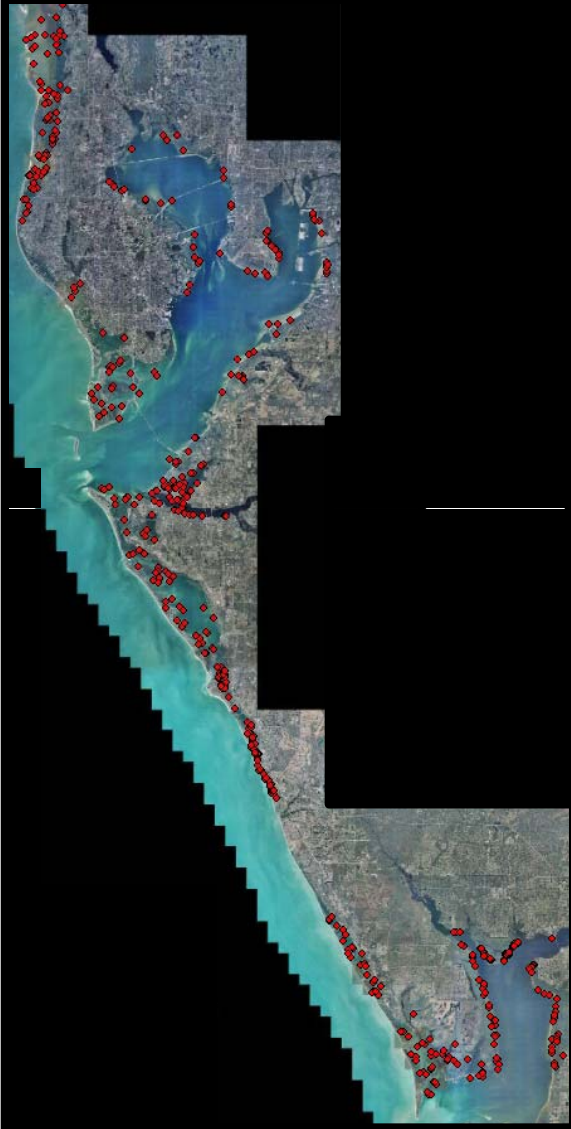
Signature Verification

- 19 Field days
- Groundtruthed 911 sites
- Areas of Special Interest:
 - Roberts Bay, Sarasota
 - Hillsborough Bay, Tampa
 - Placida Harbor, Charlotte
 - Boca Ciega Bay, St. Pete
 - Lower Tampa Bay

Classification

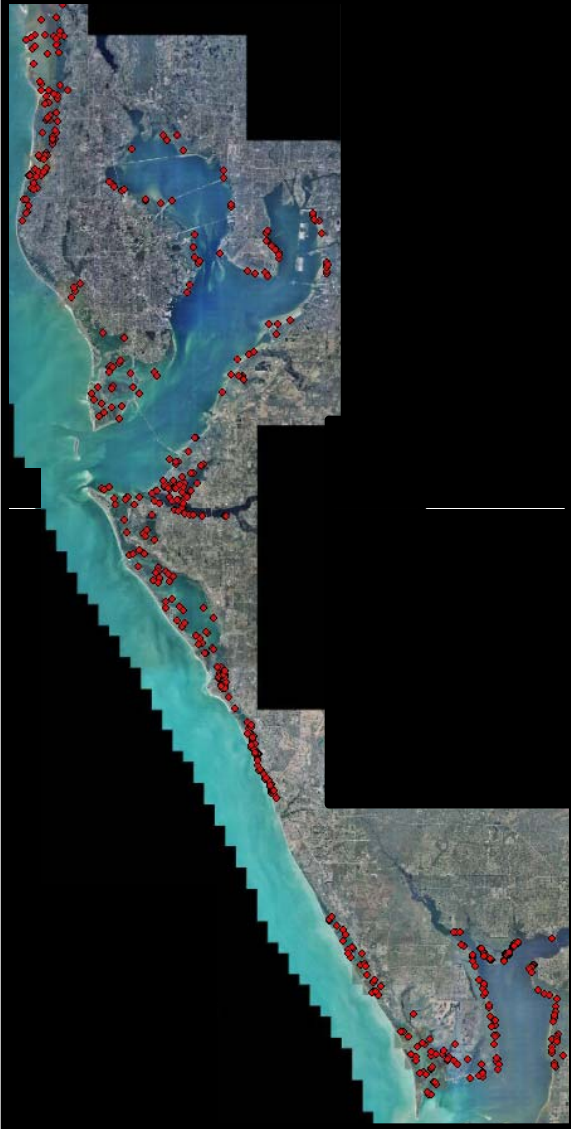
- **FLUCCs Codes**
 - Tidal flats (6510), inclusion of oyster,
 - Attached Algae (9121), to include *Sargassum spp.*





Accuracy Assessment

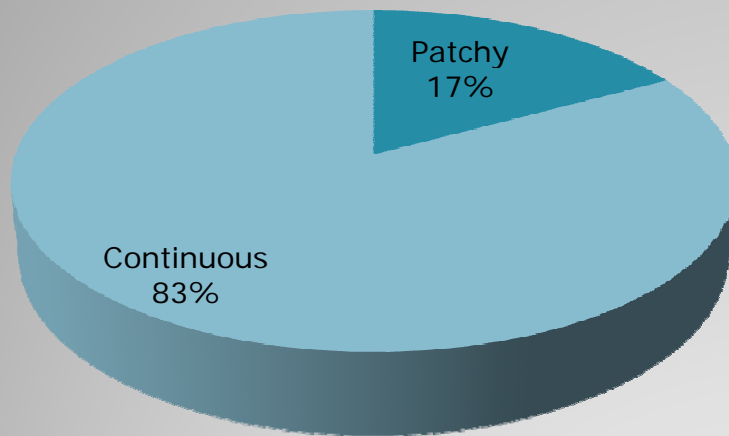
- Assess the *thematic* accuracy of the map
- Consultant must achieve a 90% accuracy for District acceptance of final product
- Sample Design:
 - Stratified random
 - 25 stations in each segment
 - 550 stations total



Accuracy Assessment

- **533 stations sampled**
 - 17 – 27 stations per segment
- **96% Project-wide Accuracy**
- **Highest Misclassifications:**
 - Hillsborough Bay &
 - Roberts Bay

St. Joseph Sound/Clearwater Harbor

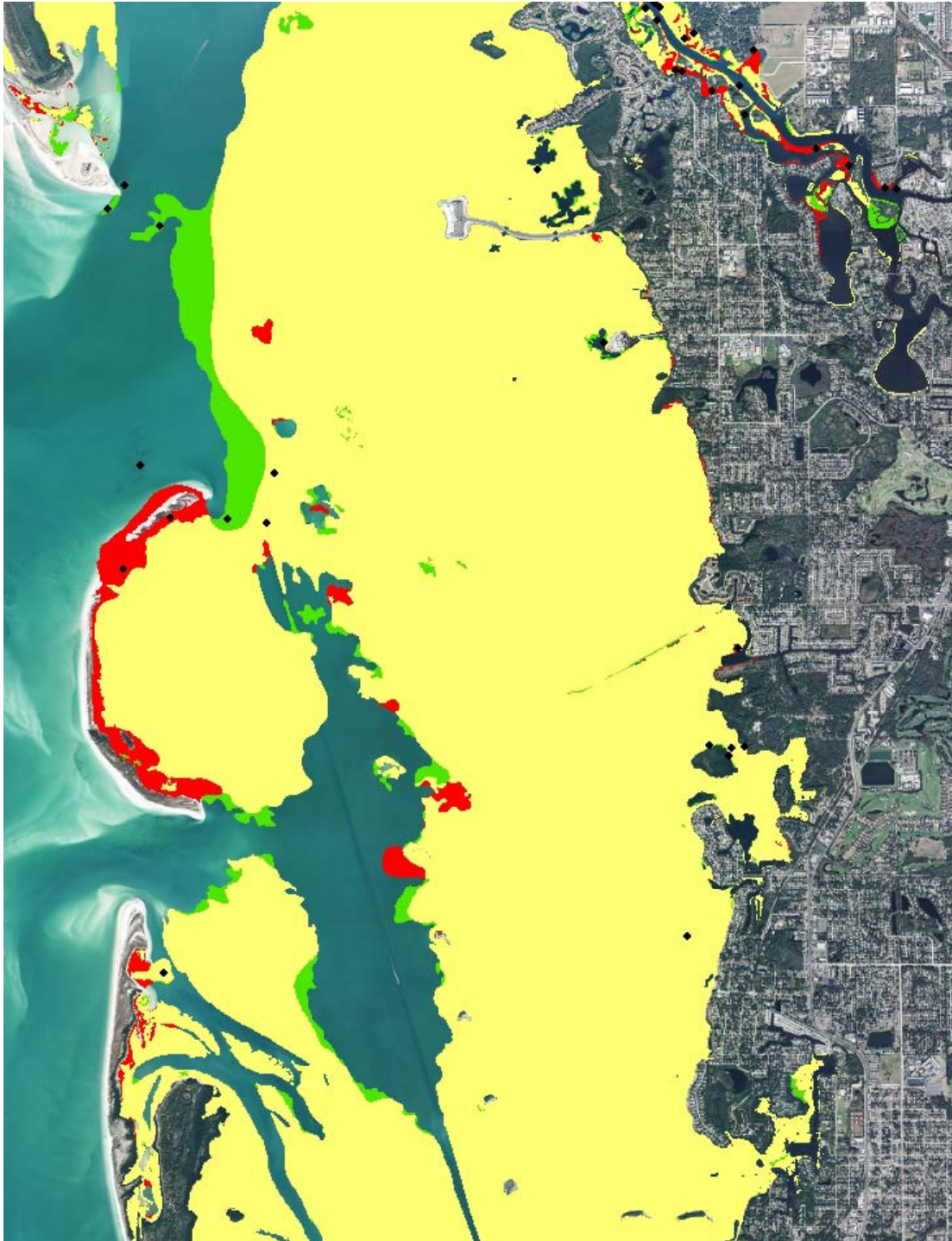


Seagrass	% Change 2010-2012	
Patchy	-0.68%	↓
Continuous	-1.93%	↓

Clearwater/St. Joseph Sound	2006	2008	2010	2012	Change in Acreage 2010 to 2012	% Change
Clearwater North	3,522	3,784	3,759	3,526.22	-232	-6.2%
Clearwater South	914	1,000	907	743.21	-164	-18.1%
St. Joseph's Sound	10,546	12,639	12,819	12,914.47	96	0.7%
Clearwater/SJS Totals:	14,981	17,422	17,485	17,184	-301	-1.7%

Mapped Changes 2010 - 2012

St. Joseph Sound

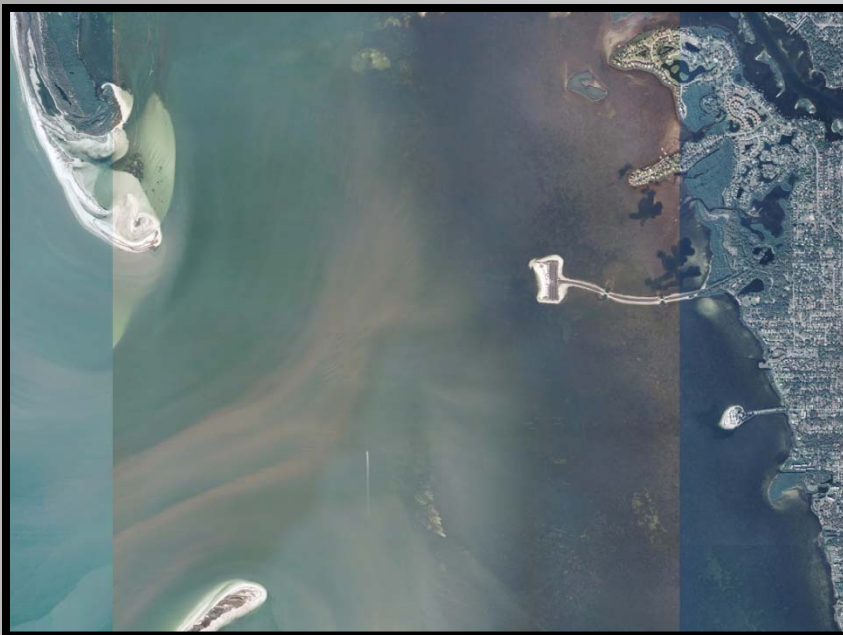


Legend

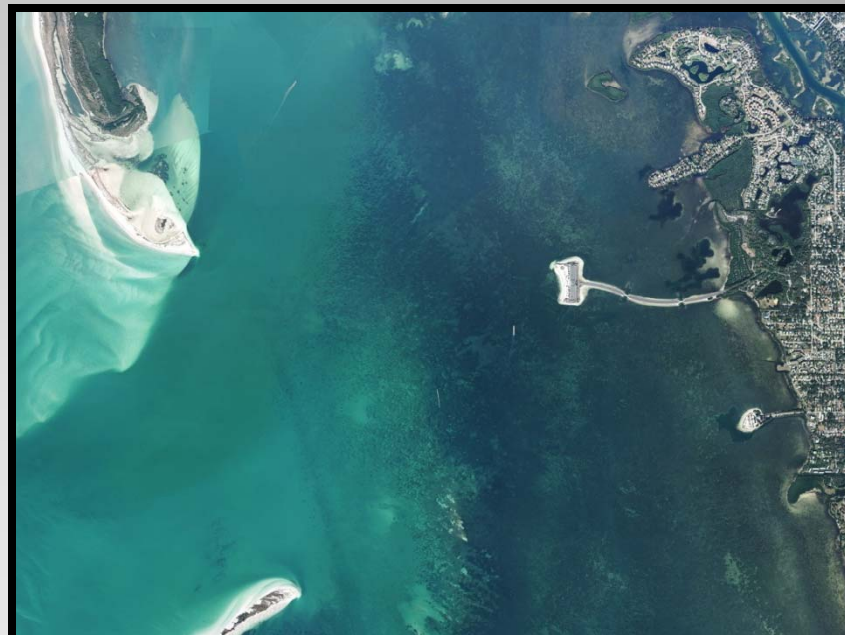
Change_Analysis Analysis

- Decrease
- Increase
- No Change

2010

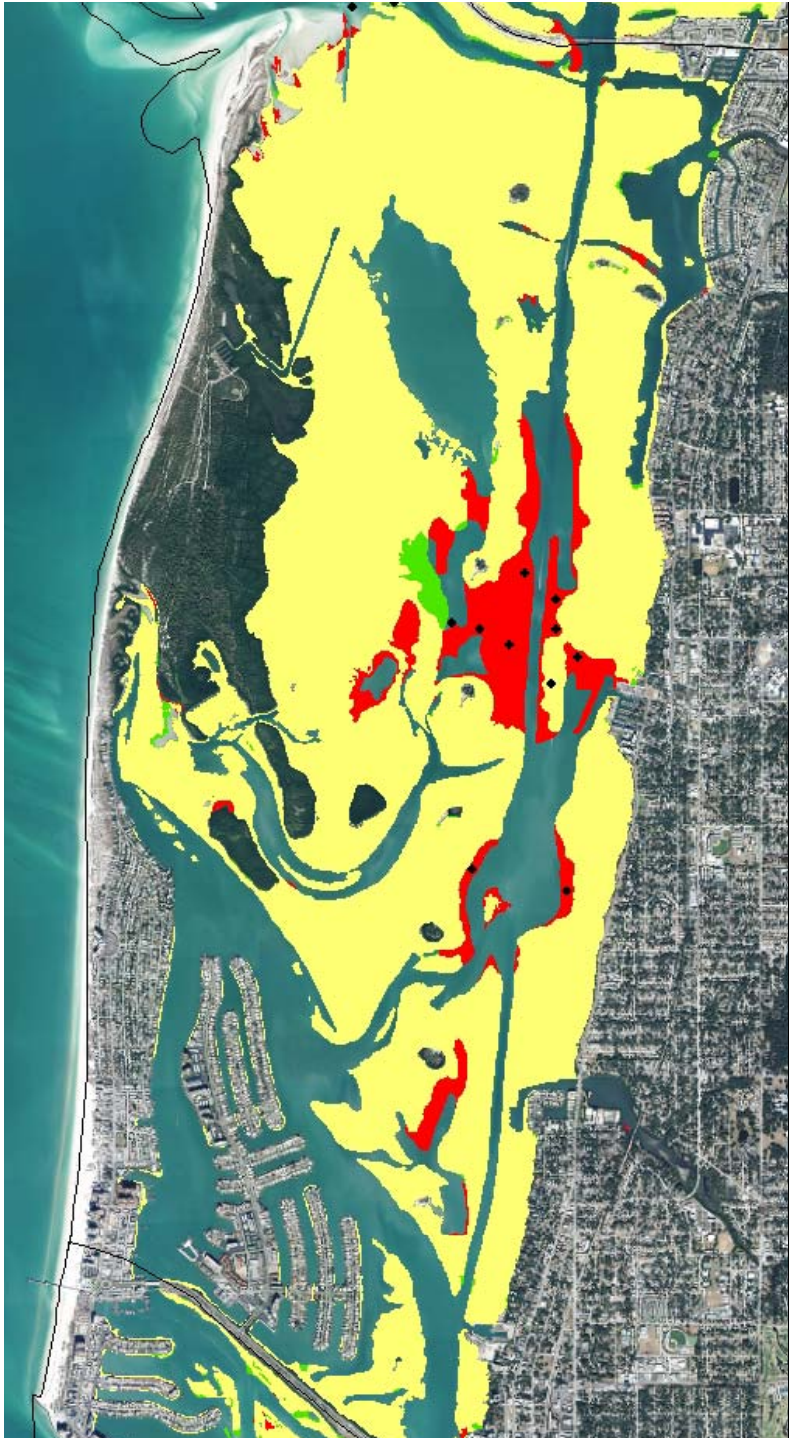


2012



Mapped Changes 2010 - 2012

Clearwater Harbor North



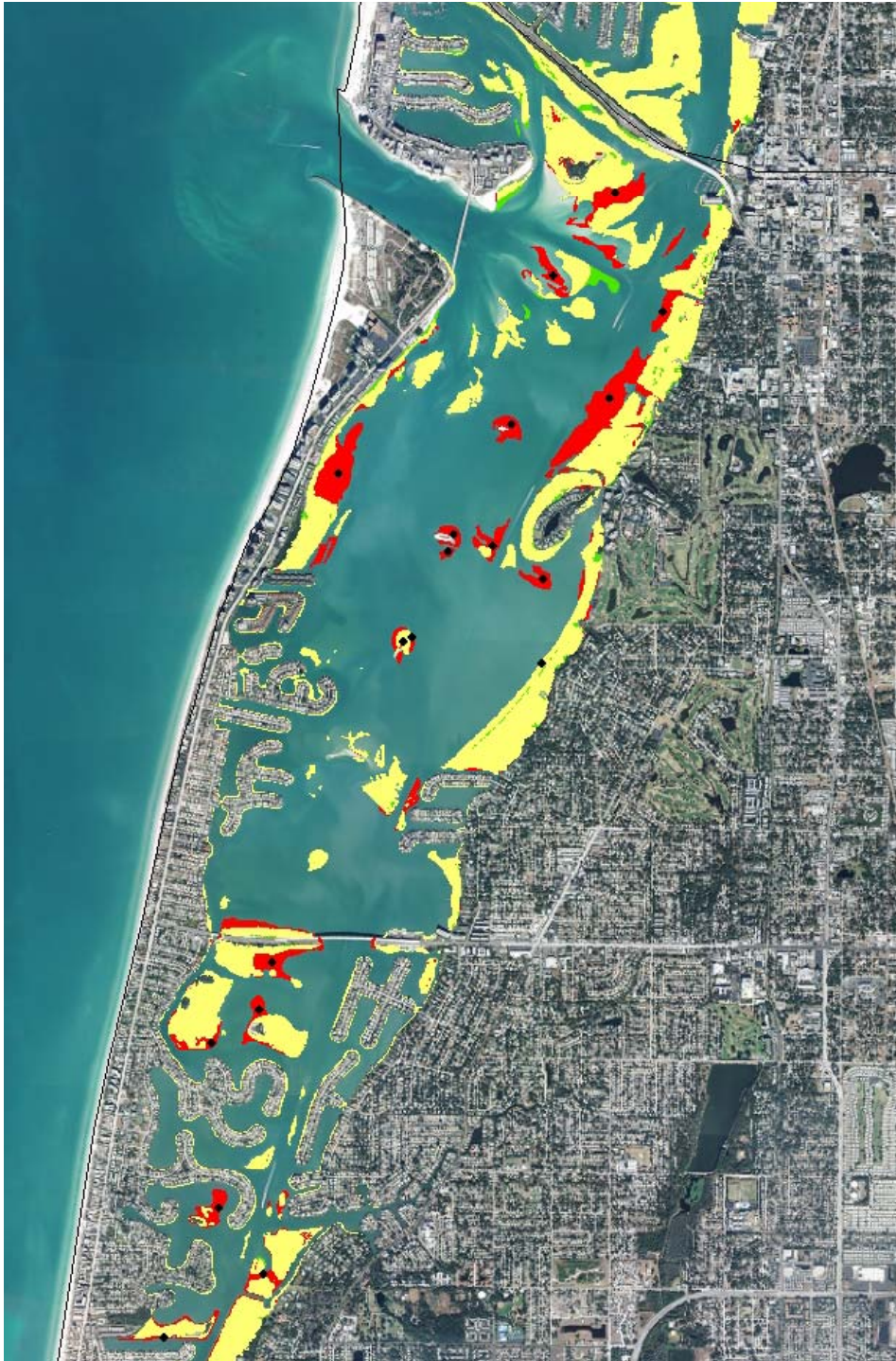
Legend

Change_Analysis Analysis

- Decrease
- Increase
- No Change

Mapped Changes 2010 - 2012

Clearwater Harbor South

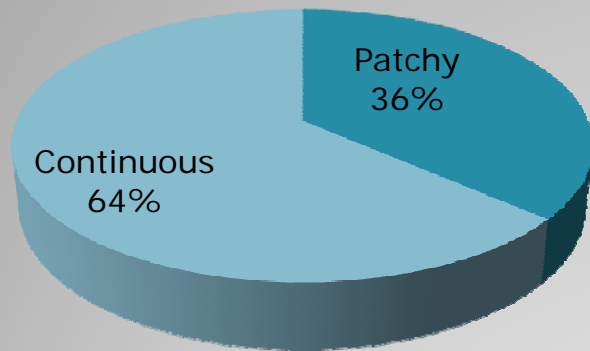




Legend

Change_Analysis Analysis

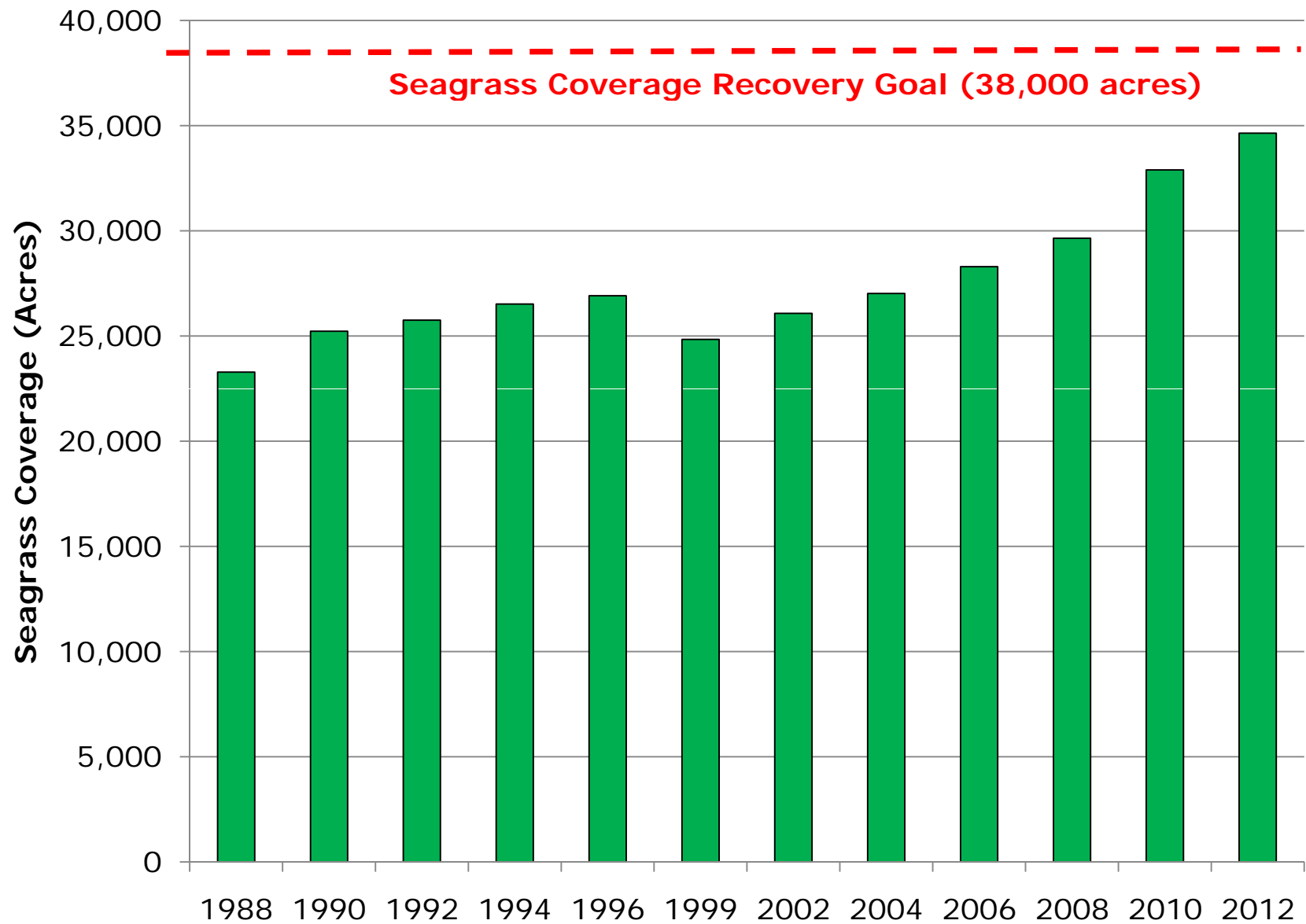
- Decrease
- Increase
- No Change

Tampa Bay



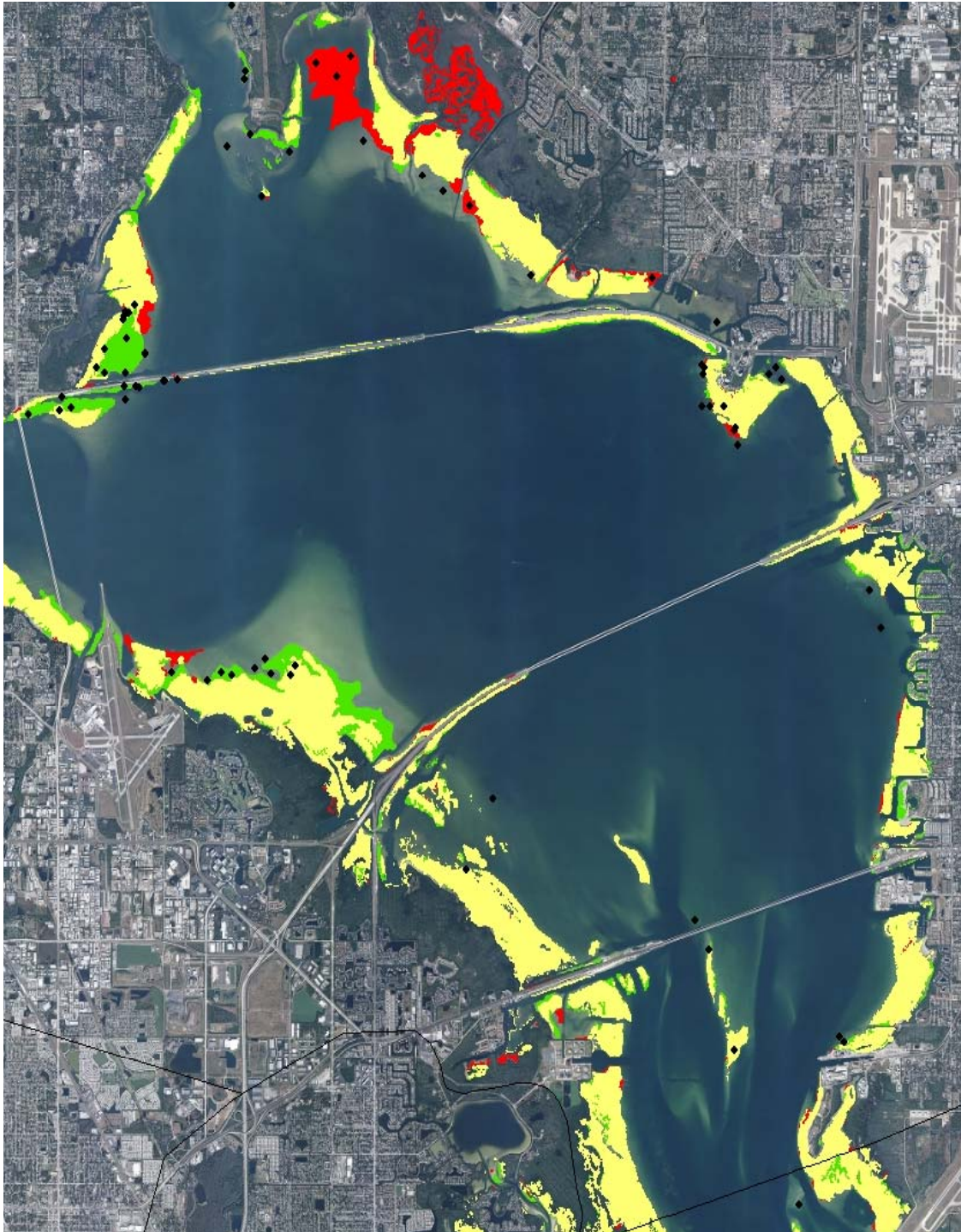
Seagrass	% Change 2010-2012	
Patchy	10.45% 	1,195
Continuous	2.57% 	551

Tampa Bay Segments	2006	2008	2010	2012	Change in Acreage 2010 to 2012	% Change
Boca Ciega Bay	8,961	8,457	8,554	8,544.43	-9	-0.1%
Hillsborough Bay	415	810	836	1,448.39	612	73.2%
Lower Tampa Bay	6,578	6,322	6,862	6,958.93	97	1.4%
Manatee River	814	638	752	654.84	-97	-12.9%
Middle Tampa Bay	5,089	6,659	8,208	9,025.14	817	10.0%
Old Tampa Bay	5,434	5,829	6,687	6,999.32	313	4.7%
Terra Ceia Bay	1,007	932	998	1,011.32	13	1.3%
Tampa Bay Total:	28,299	29,647	32,897	34,642	1,745	5.3%



Mapped Changes 2010 - 2012

Old Tampa Bay



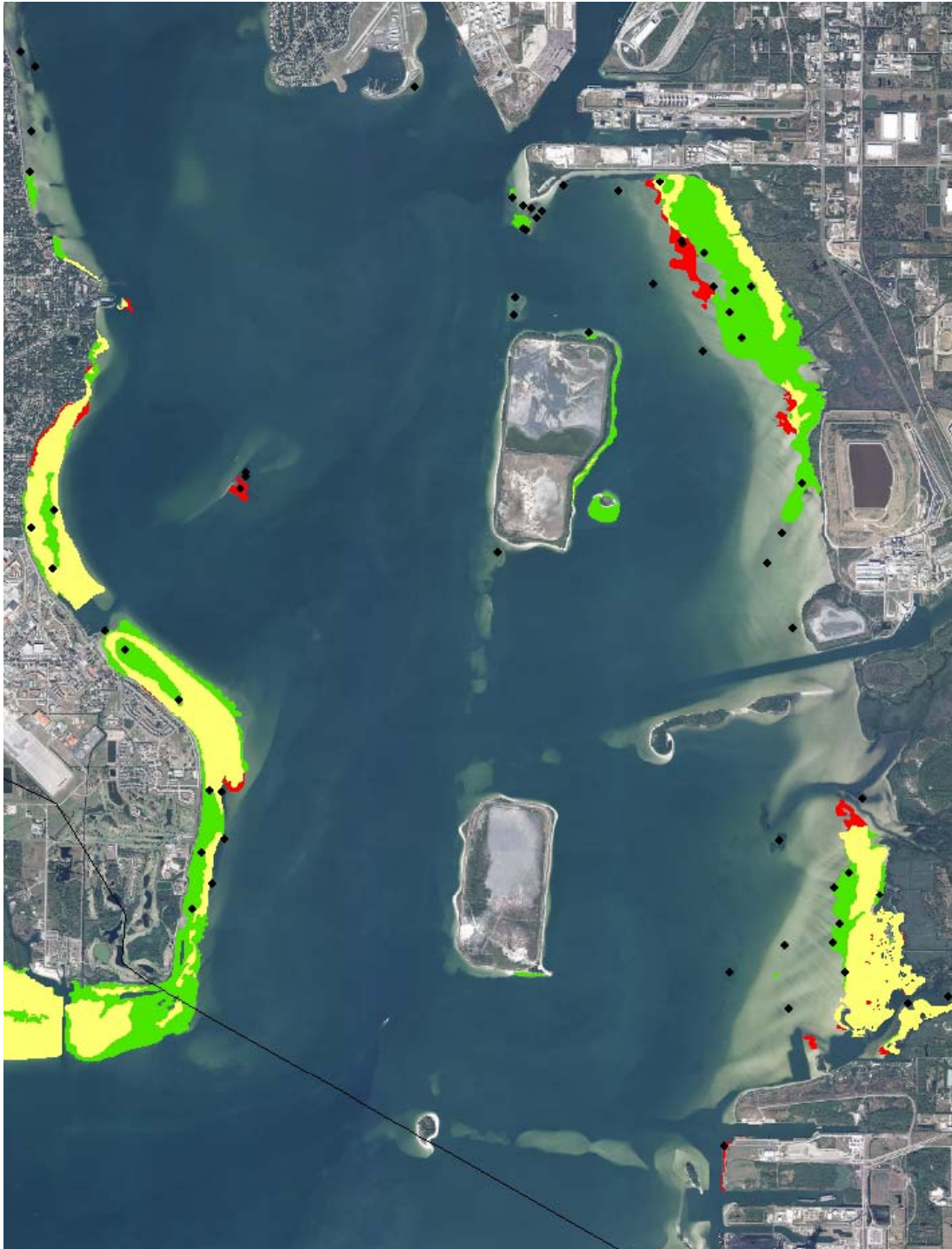
Legend

Change_Analysis Analysis

- Decrease
- Increase
- No Change

Mapped Changes 2010 - 2012

Hillsborough Bay

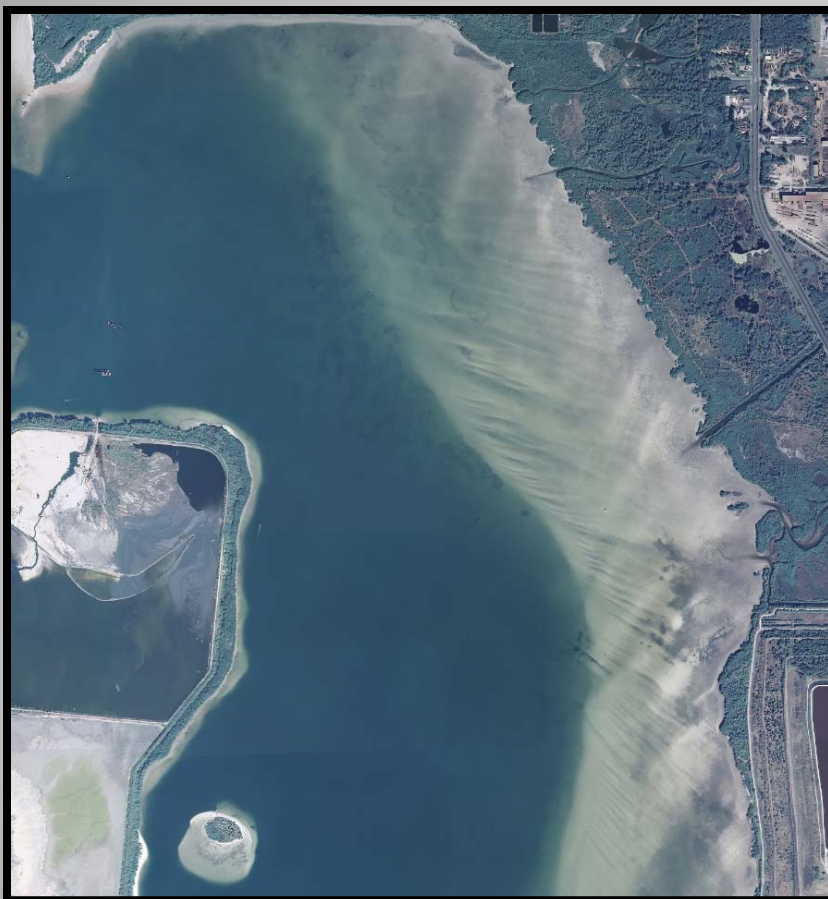


Legend

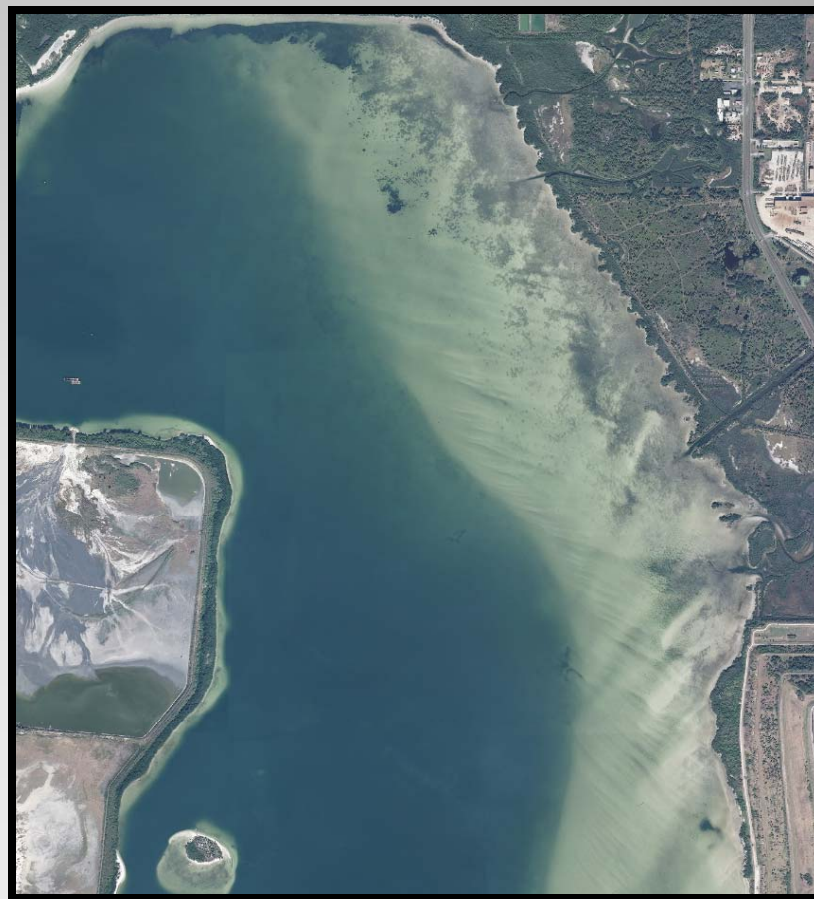
Change_Analysis Analysis

- Decrease
- Increase
- No Change

2010



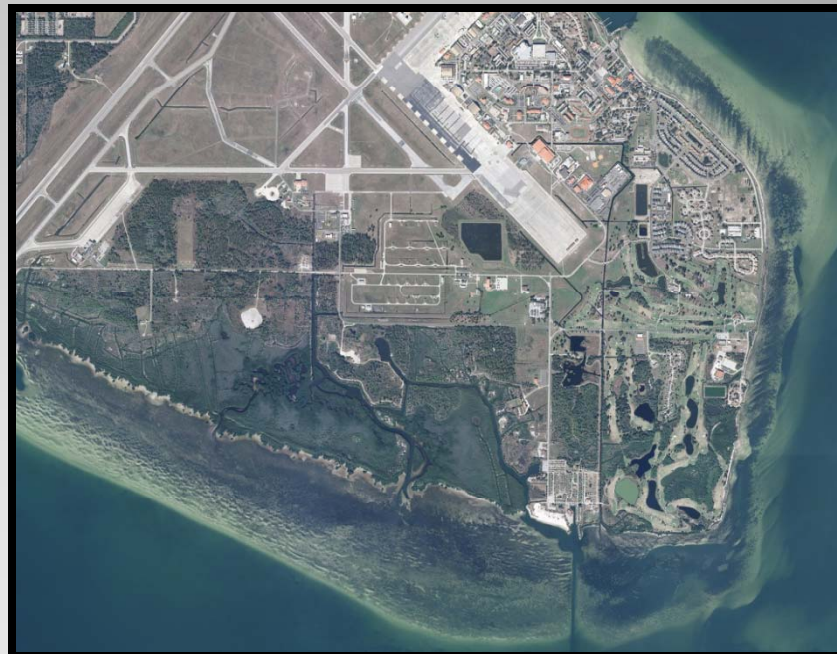
2012



2010



2012



Mapped Changes 2010 - 2012



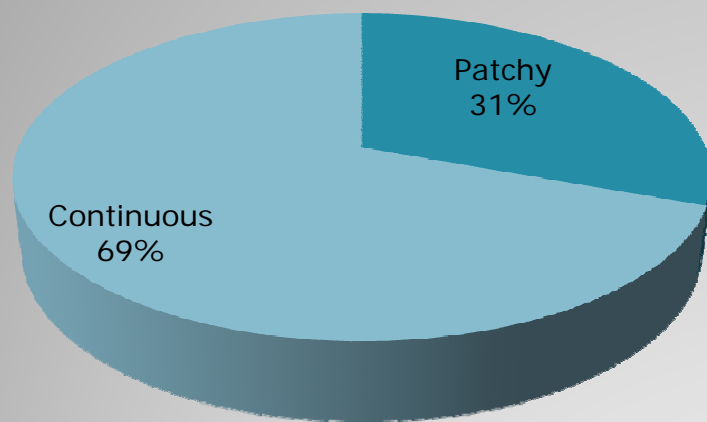
**Lower Tampa Bay
Manatee River**

Legend

**Change_Analysis
Analysis**

- Decrease
- Increase
- No Change

Sarasota Bay



Seagrass	% Change 2010-2012		
Patchy	-3.58%	↓	-143
Continuous	0.44%	↑	38

Sarasota Bay Segments	2006	2008	2010	2012	Change in Acreage 2010 to 2012	% Change
Blackburn Bay	424	345	382	398.05	16	4.3%
Little Sarasota Bay	640	837	891	902.62	11	1.3%
Roberts Bay	324	299	326	305.21	-21	-6.4%
Upper Sarasota Bay N	5,829	7,673	7,930	7,930.32	0	0.0%
Upper Sarasota Bay S	2,637	3,487	3,162	3,051.28	-111	-3.5%
Sarasota Total:	9,855	12,641	12,692	12,587	-105	-0.8%

Sarasota Bay Estuary Program

Annual seagrass coverage (acreages) in the SBEP.											
Bay Segment	1950	Restorable	1988	1994	1999	2001	2004	2006	2008	2010	2012
Palma Sola	1,087	1,031	1,111	1,089	1,025	1,046	1,002	1,028	1,164	1,177	1,185
Sarasota	7,557	7,269	6,323	6,910	6,750	6,862	6,646	7,436	9,997	9,917	9,798
Roberts	342	282	334	347	332	273	371	325	302	329	307
Little Sarasota	958	883	533	592	770	699	763	640	837	891	902
Blackburn	302	273	411	411	374	301	468	425	346	382	399
<i>Total</i>	<i>10,246</i>	<i>9,739</i>	<i>8,712</i>	<i>9,349</i>	<i>9,251</i>	<i>9,181</i>	<i>9,250</i>	<i>9,854</i>	<i>12,646</i>	<i>12,696</i>	<i>12,591</i>

Mapped Changes 2010 - 2012

Roberts Bay



Legend

Change_Analysis
Analysis

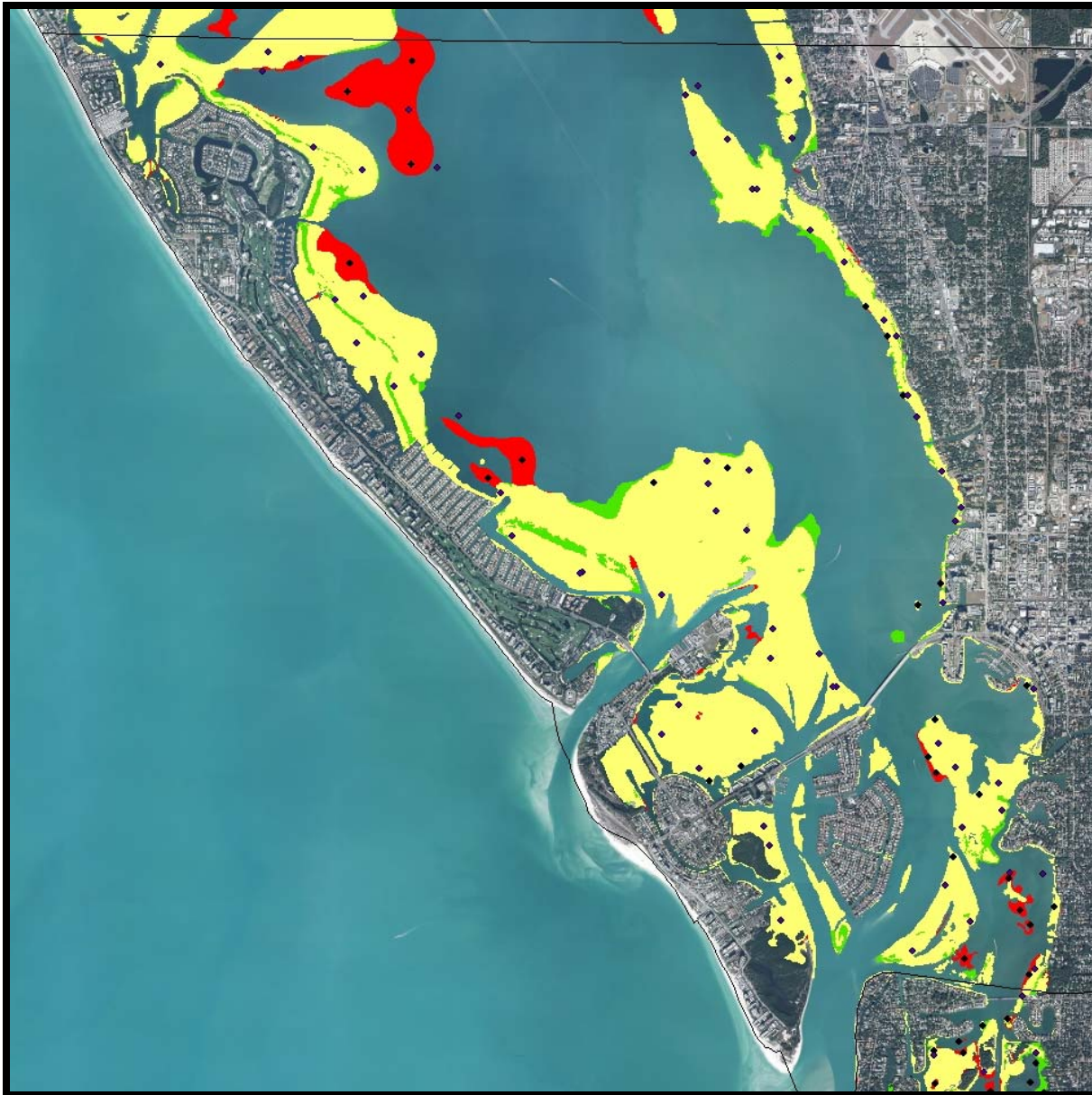
- Decrease
- Increase
- No Change

2012



Mapped Changes 2010 - 2012

Upper Sarasota Bay

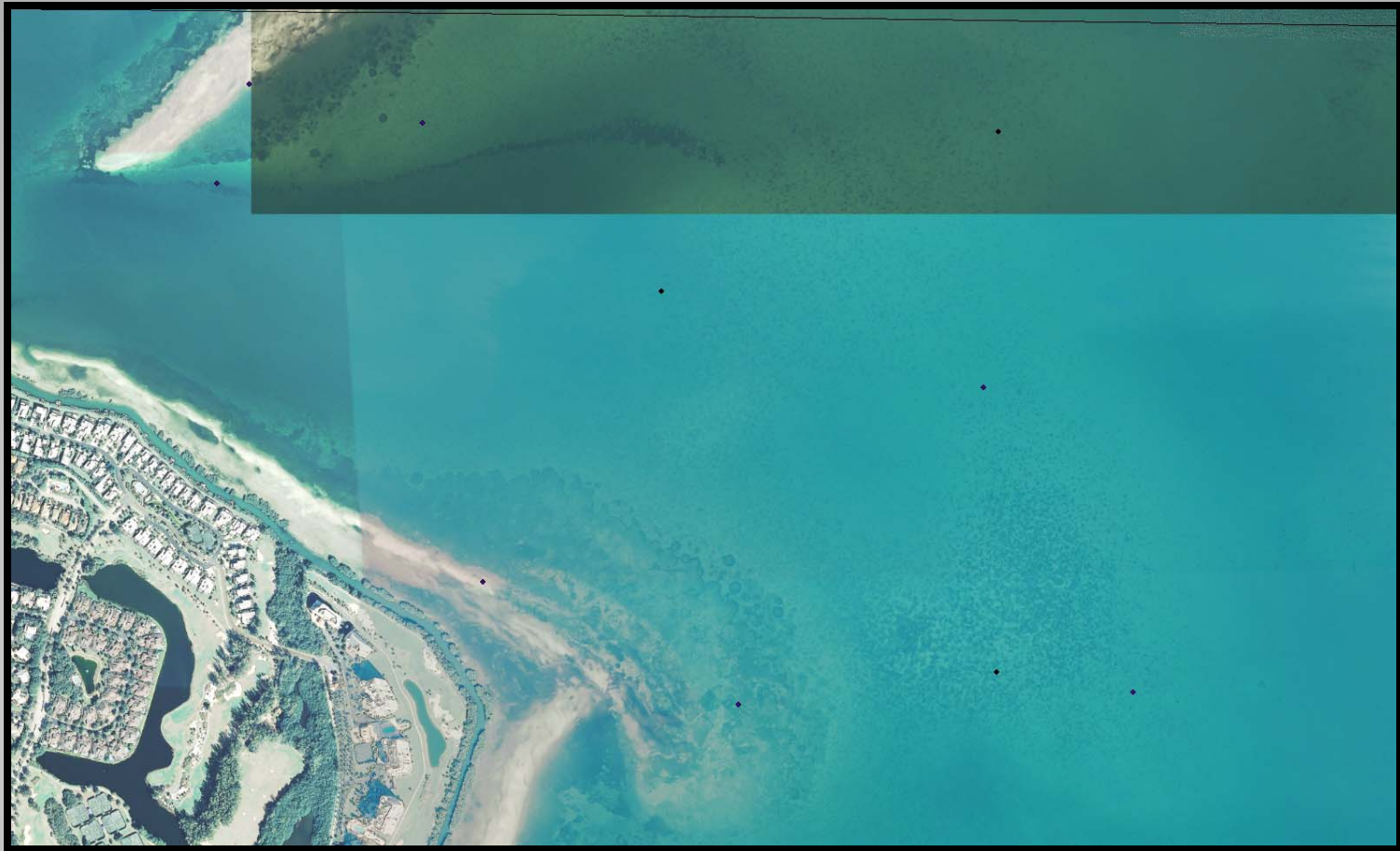


Legend

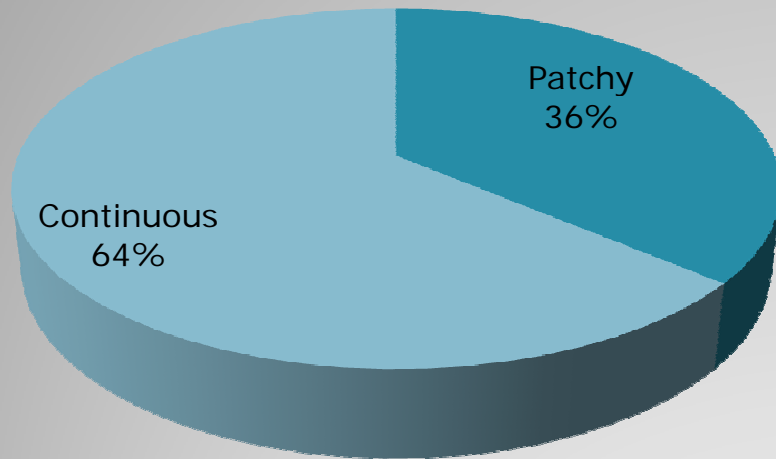
Change_Analysis Analysis

- Decrease
- Increase
- No Change

2008



Lemon Bay

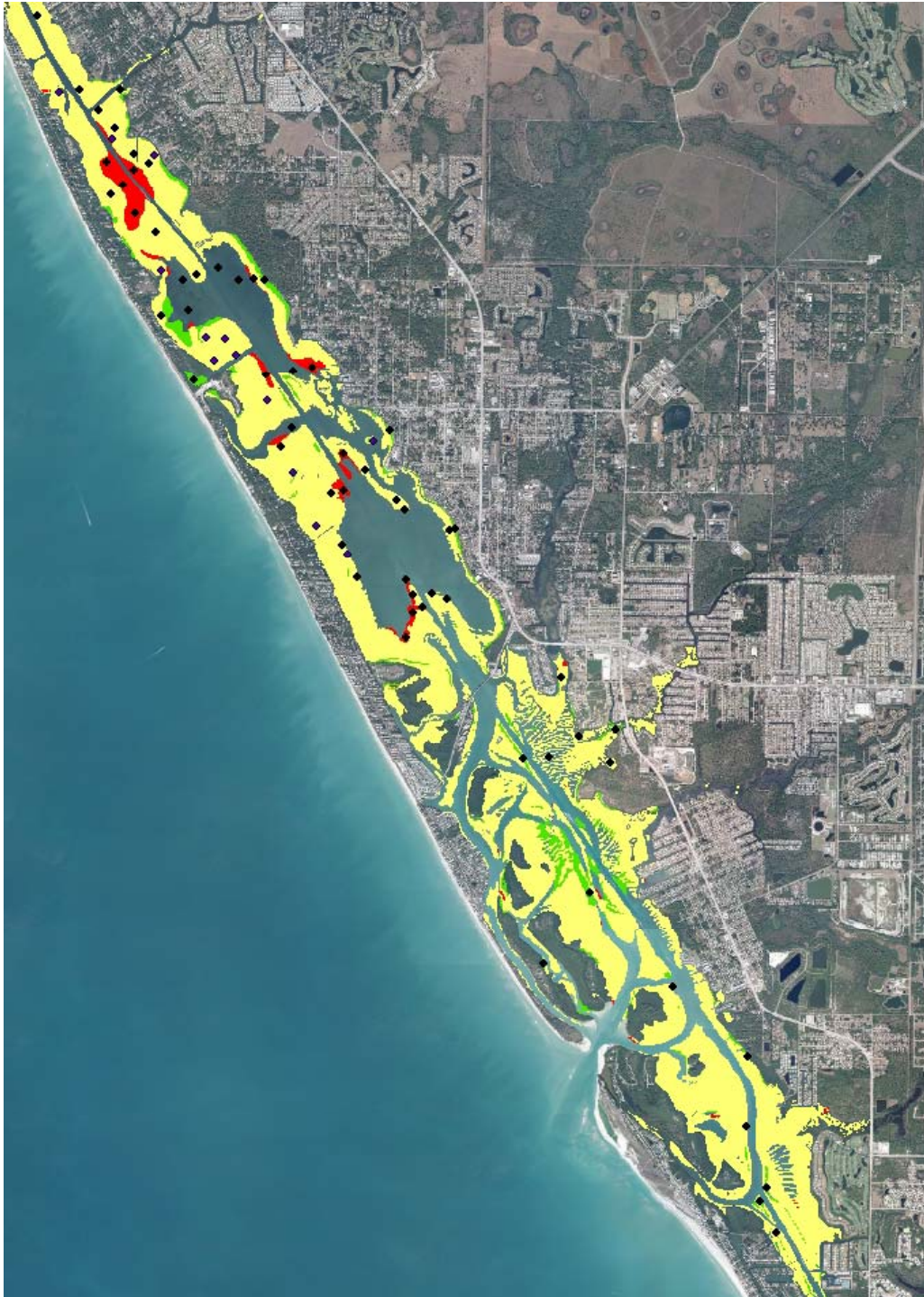


Seagrass	% Change 2010-2012		
Patchy	23.09%	↑	208
Continuous	-6.59%	↓	-141

Lemon Bay		2006	2008	2010	2012	Change in Acreage 2010 to 2012	% Change
		2,714	2,863	3,039	3,106	67	2.2%

Mapped Changes 2010 - 2012

Lemon Bay

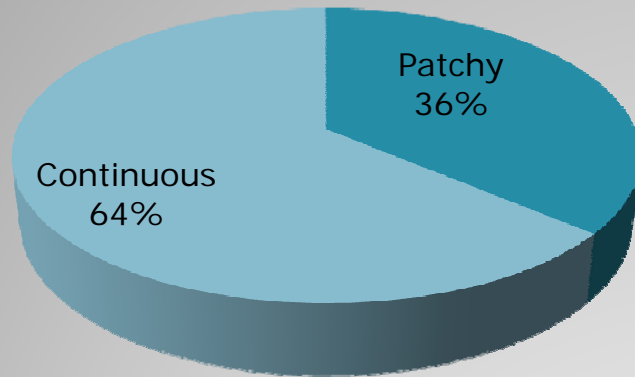


Legend

Change_Analysis Analysis

- Decrease
- Increase
- No Change

Charlotte Harbor



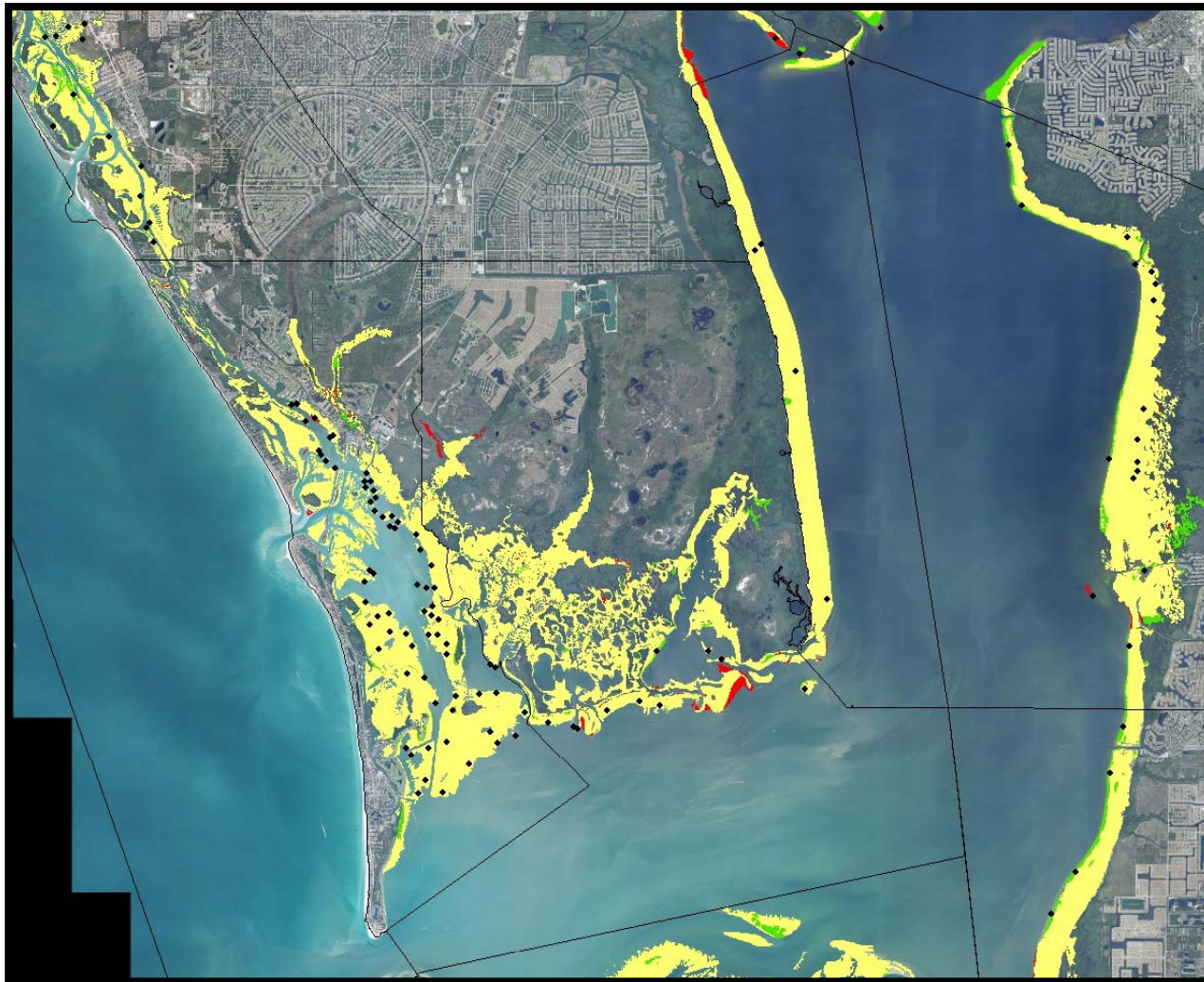
Seagrass	% Change 2010-2012		
Patchy	3.77%	↑	249
Continuous	4.82%	↑	554

Charlotte Harbor Bay Segments	2006	2008	2010	2012	Change in Acreage 2010 to 2012	% Change
Eastern Charlotte N	3,358	2,672	3,194	3,489.04	295	9.2%
Eastern Charlotte S	1,461	1,166	1,246	1,372.04	126	10.1%
Myakka	340	277	256	254.40	-2	-0.6%
Peace River	346	194	199	381.98	183	91.6%
Placida	3,877	4,473	4,546	4,639.60	94	2.1%
Sothorn Charlotte	2,270	2,294	2,280	2,358.06	78	3.4%
Turtle Bay Bull Bay	4,739	4,274	4,380	4,385.46	5	0.1%
West Charlotte	1,975	2,023	2,006	2,030.31	25	1.2%
Charlotte Total:	18,364	17,374	18,107	18,911	804	4.4%

Charlotte Harbor National Estuary Program

Segment	Baseline Acres (historical, adjusted)	Mean Annual Acres (1988-2006)	Protective Target (highest acres)	Restoration Target (difference in acres)	Total Seagrass Target Acres	2012 Acres
<i>Dona and Roberts Bay</i>	112	91	91	21	112	180.67
<i>Upper Lemon Bay</i>	880	1,009	1,009		1,009	1,276.14
Lower Lemon Bay	2,882	2,502	2,502	380	2,882	2,784.65
Tidal Myakka	344	456	456		456	287.03
Tidal Peace	975	384	384	591	975	389.31
<i>West Wall</i>	2,106	1,907	1,907	199	2,106	2,150.08
East Wall	3,898	3,465	3,465	433	3,898	3,498.65
Cape Haze	5,670	6,998	6,998		6,998	6,849.46
<i>Lower Charlotte Harbor</i>	2,964	3,342	3,342		3,342	3,940.86

Mapped Changes 2010 - 2012



Charlotte Harbor

Legend

Change_Analysis Analysis

- Decrease
- Increase
- No Change

Mapped Changes 2010 - 2012



Peace River

Legend

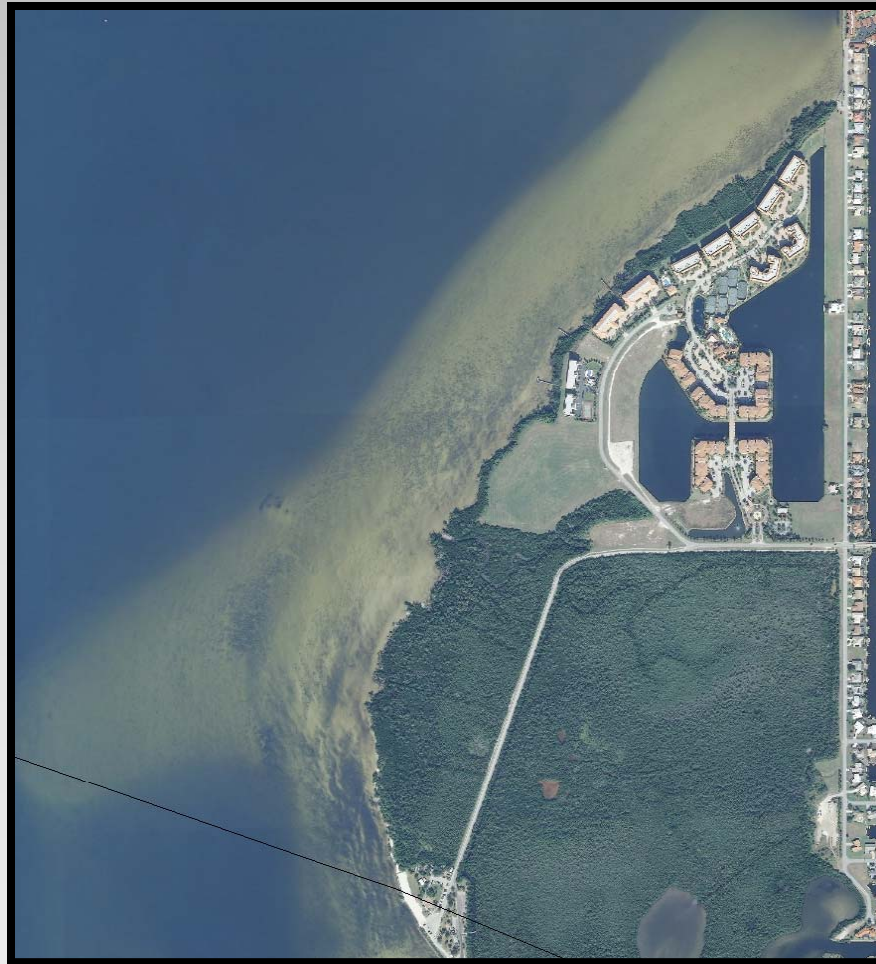
Change_Analysis Analysis

- Decrease
- Increase
- No Change

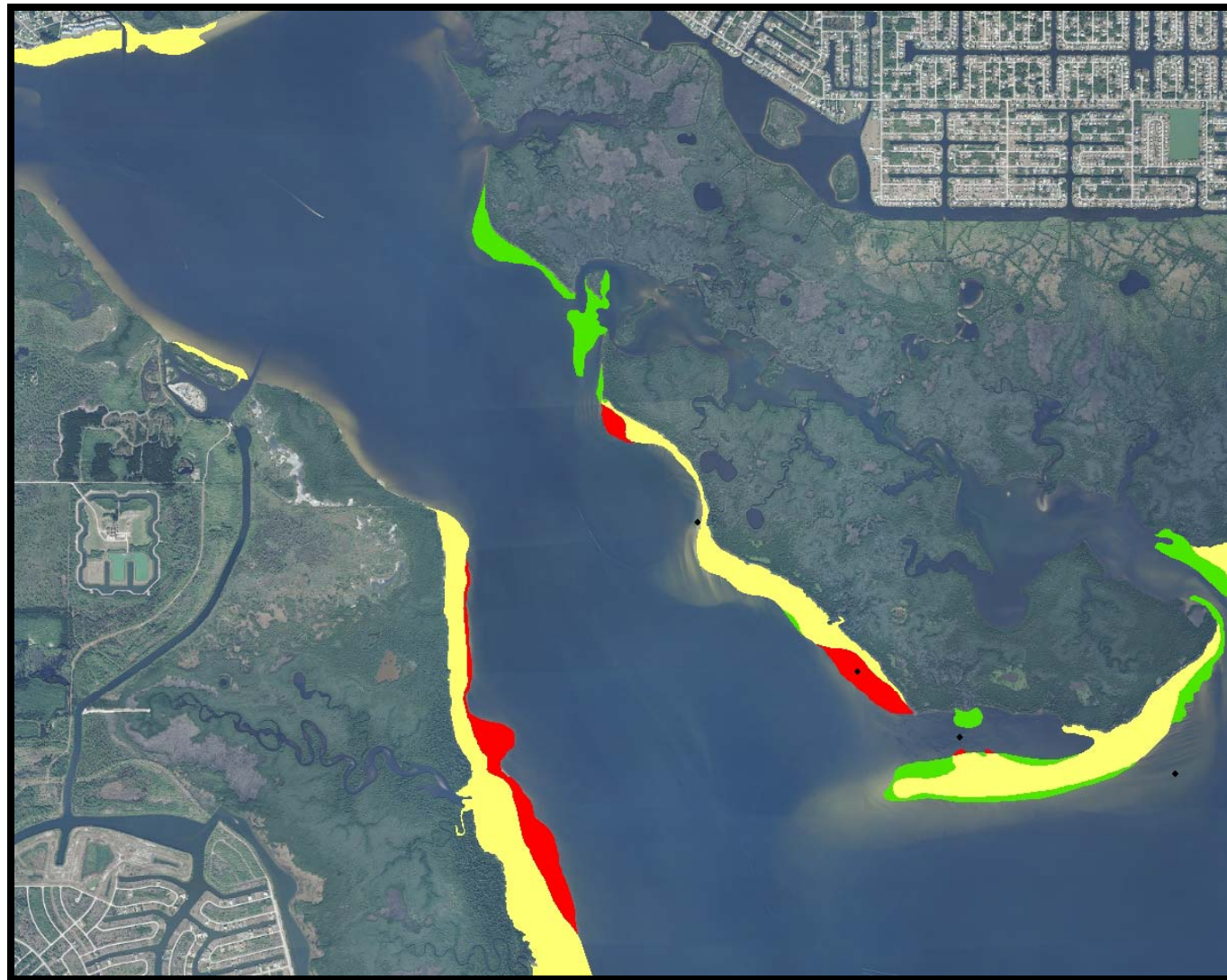
2008



2012



Mapped Changes 2010 - 2012



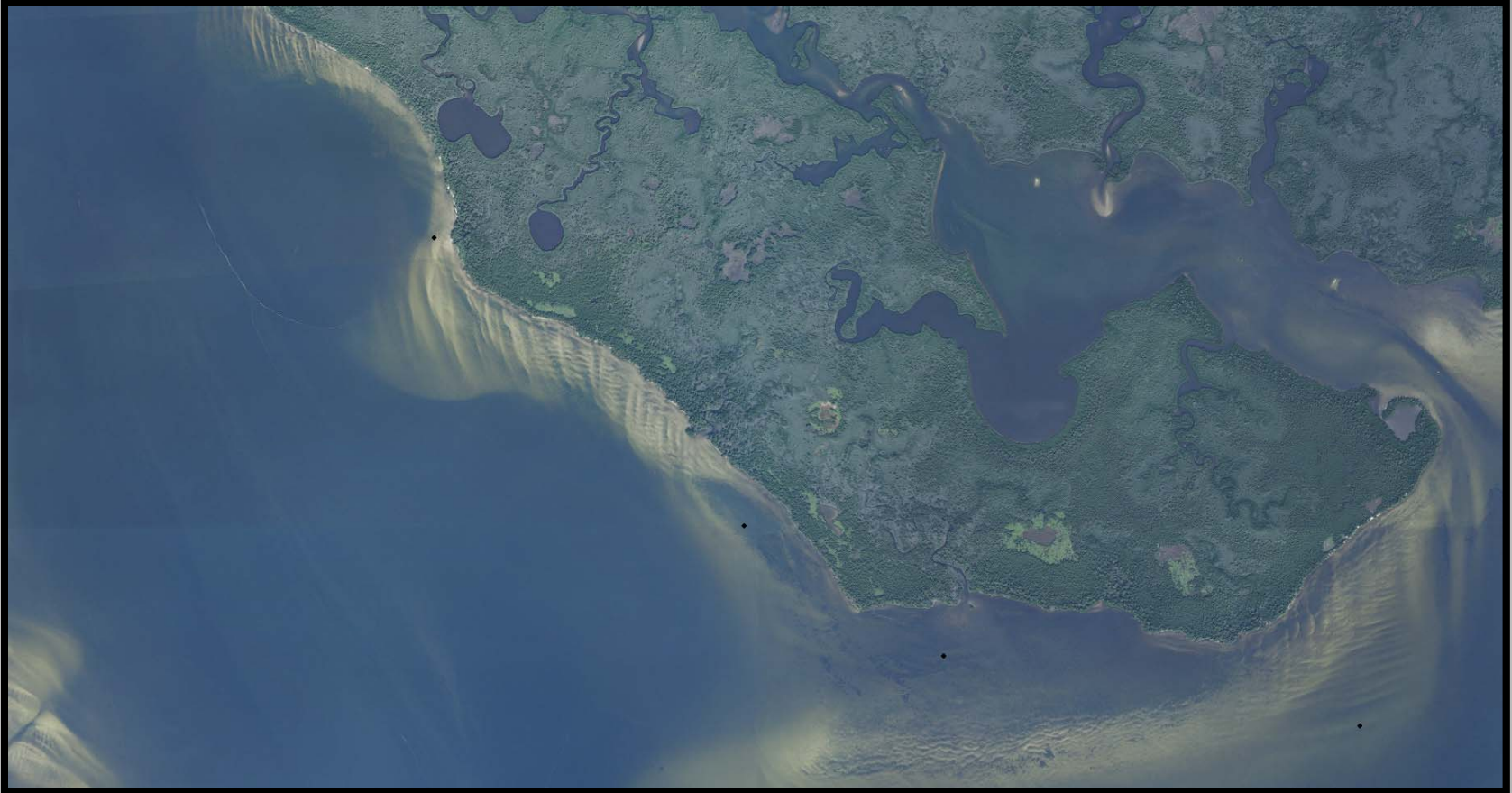
Myakka River

Legend

Change_Analysis Analysis

- Decrease
- Increase
- No Change

2012



Thank You!!

**Sechhi Disk Volunteers:
Amanda, Melissa, Judy,**

**Sarasota County:
Jon & Amanda**



Data Requests

- Questions: kristen.kaufman@watermatters.org
- Imagery: Jessica Hendrix
jessica.hendrix@watermatters.org
- GIS Geodatabase / Shapefiles:
<http://ftp.swfwmd.state.fl.us/pub/outgoing>
http://www.swfwmd.state.fl.us/data/gis/layer_library/category/swim