OIMMP

Oyster Mapping

Thomas Ries

SCHEDA ECOLOGICAL ASSOCIATES, INC.

www.scheda.com
Florida Oyster Mapping Experience

2001  Suwanee River WMD

2014 & 2016  SWFWMD

2014  Rookery Bay NERR
Aerial Mapping

- Acquire 1 ft. Resolution Digital Aerial Photography
- Photo-Interpretation:
  - Delineate Benthic Features
  - Classify Benthic Features
- Signature Identification
Environmental & WQ Conditions

Growing Season April - Sep

December
Imagery Processing

- Color balancing process
- 2 Step color balancing process
  - Land and water features enhanced separately
- Mosaics of imagery
Required Weather Conditions

- **Tidal Condition**: within +/- 2 hrs of low tide, special attention to outgoing slack tides for inlets/passes

- **Wave Height**: less than 2 ft.

- **Water Clarity**: 2 m or greater (locations poor clarity)

- **Preceding Weather**: wait 72 hr. after a rainfall >1”

- **Cloud Cover**: 0% (over water)
Suwannee River WMD Oyster Results
<table>
<thead>
<tr>
<th>CODE</th>
<th>CLASS NAME</th>
<th>Acres</th>
<th>% Total Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>6540</td>
<td>Oysters</td>
<td>536.04</td>
<td>79%</td>
</tr>
<tr>
<td>6541</td>
<td>Oysters — Patchy</td>
<td>131.82</td>
<td>19%</td>
</tr>
<tr>
<td>6542</td>
<td>Remnant Oyster</td>
<td>11.97</td>
<td>2%</td>
</tr>
<tr>
<td>Total Acres</td>
<td></td>
<td>680.07</td>
<td>100%</td>
</tr>
</tbody>
</table>
Program Boundaries

Approximately 2,539 mi$^2$
2016 Aerial Mapping

- Acquire Imagery:
  - Dec ‘15 – Feb ‘16
  - 1 ft. digital natural color imagery
  - Leica ADS80 – push-broom digital camera

- Photo-Interpretation:
  - Classify & delineate underwater features

- Field Verification:
  - 1,000+ locations visited

- Accuracy Assessment:
  - Achieved 90% or greater
# Thematic Accuracy Assessment Results

<table>
<thead>
<tr>
<th>Water Body</th>
<th>Bay Segment</th>
<th>No - Misclassified</th>
<th>Yes</th>
<th>Total Field Stations Reported</th>
<th>% Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlotte Harbor</td>
<td>EASTERN CHARLOTTE NO</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>MYAKKA RIVER</td>
<td></td>
<td></td>
<td></td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>PEACE RIVER</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>PLACIDA</td>
<td>2</td>
<td>23</td>
<td>25</td>
<td>92.0%</td>
</tr>
<tr>
<td></td>
<td>TURTLE BAY BULL BAY</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>WESTERN CHARLOTTE</td>
<td></td>
<td></td>
<td></td>
<td>100.0%</td>
</tr>
<tr>
<td>Lemon Bay</td>
<td>LEMON BAY</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td>Sarasota Bay</td>
<td>BLACKBURN BAY</td>
<td>2</td>
<td>23</td>
<td>25</td>
<td>92.0%</td>
</tr>
<tr>
<td></td>
<td>LITTLE SARASOTA BAY</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>ROBERTS BAY</td>
<td></td>
<td></td>
<td></td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>UPPER SARASOTA BAY-M</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>UPPER SARASOTA BAY-S</td>
<td></td>
<td></td>
<td></td>
<td>100.0%</td>
</tr>
<tr>
<td>SJS/CWH</td>
<td>CLEARWATER NORTH</td>
<td>2</td>
<td>16</td>
<td>18</td>
<td>88.9%</td>
</tr>
<tr>
<td></td>
<td>CLEARWATER SOUTH</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>ST JOSEPH SOUND</td>
<td></td>
<td></td>
<td></td>
<td>100.0%</td>
</tr>
<tr>
<td>Tampa Bay</td>
<td>HILLSBOROUGH BAY</td>
<td>2</td>
<td>23</td>
<td>25</td>
<td>92.0%</td>
</tr>
<tr>
<td></td>
<td>LOWER TAMPA BAY</td>
<td>2</td>
<td>23</td>
<td>25</td>
<td>92.0%</td>
</tr>
<tr>
<td></td>
<td>MANATEE RIVER</td>
<td>3</td>
<td>22</td>
<td>25</td>
<td>88.0%</td>
</tr>
<tr>
<td></td>
<td>MIDDLE TAMPA BAY</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>OLD TAMPA BAY</td>
<td>1</td>
<td>24</td>
<td>25</td>
<td>96.0%</td>
</tr>
<tr>
<td></td>
<td>TERRA CIEA BAY</td>
<td>1</td>
<td>23</td>
<td>24</td>
<td>95.8%</td>
</tr>
<tr>
<td></td>
<td>BOCA CIEGA BAY</td>
<td>2</td>
<td>22</td>
<td>24</td>
<td>91.7%</td>
</tr>
<tr>
<td>Overall Map</td>
<td></td>
<td>25</td>
<td>515</td>
<td>540</td>
<td>95.4%</td>
</tr>
</tbody>
</table>
Hypothesize increases likely due to:

- Additional effort interpreting
- Additional fieldwork
- Clarity of images and different tide stages in 2016 data capture
Rookery Bay NERR
SAV/Oyster Mapping
Figure A - CARL Boundary Map

Martin County, Florida

Legend

- CARL Boundary

Scale:

0 4,000 8,000 12,000 Feet

Coordinate System: WGS 1984 State Plane North Florida 2000 feet

Source:

United States Geological Survey 1:100,000-scale digital data

SCHEDA ECOCLOGICAL ASSOCIATES

www.scheda.com
Data Sources 1953
1928 Imagery

Figure X - Seagrass Location Map
Henderson Creek
Collier County, Florida

Legend
- CARL Boundary
Actual Imagery (1928)
Figure 2 - Historic Conditions SAV Limits Map
Gulliver County, Florida

Legend
- OASL Boundary
- Historic SAV Limits [917 Acs]
<table>
<thead>
<tr>
<th>Year</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>855 acres</td>
</tr>
<tr>
<td>1940</td>
<td>62 acres</td>
</tr>
<tr>
<td>Historic</td>
<td>917 acres</td>
</tr>
</tbody>
</table>
Photo-Interpretation

Update Shoreline Mapping Unit = 0.5 acre SAV/Seagrass

Modified FDOT - FLUCCS

- 6510 Submerged Un-vegetated Bottom
- 6540 Oyster Beds = 0.25 acre
- 6560 Hard Bottom = 0.25 acre
- 9100 Submerged Aquatic Vegetation (SAV)
- 9113 Discontinuous Seagrass
- 9116 Continuous Seagrass
Signature Verification WC-FL

West Central FL
- 2,539 sq miles
  - 530 sites
    1 site/4.8 sq miles

Rookery Bay
- 248 sq miles
  - 51 Sites
  - 160 Sites Contracted
  - 218 Sites Field Verified
    1 site/1.1 sq miles
Signature Verification RB-NEER

- Field Verified 218 sites
- Photo-interpreter key areas of interest:
  - Henderson Creek
  - CARL Boundaries
  - 10,000 Islands
- Difficult to access:
  - 10,000 Isles
  - Extremely Shallow Areas
Field Verification Points
Shoreline Updates
Hard Bottom Areas
Example Line Work - SAV Map
2014 Resource Conditions

Figure 6 - 2014 Conditions Resource Map

Collier County, Florida
Carl Boundary 2014 Results

- 6510  Tidal Flats       4,221.7
- 6540  Oyster Beds       30.1
- 6560  Hard Bottom       0
- 9100  SAV                 527.6
- 9113/6  Seagrass       247.1
2014 Natural Resource Map - 10,000 Islands

Legend
- Project Boundary (248 sq mi)

FLUCCS Code, Description:
- 6510, Tidal Flats (79,591.7 Ac.)
- 6540, Oyster Beds (140.0 Ac.)
- 6560, Hard Bottom (212.6 Ac.)
- 9100, SAV (3,549.1 Ac.)
- 9113, Seagrass Discontinuous (1,392.8 Ac.)
- 9116, Seagrass Continuous (91.9 Ac.)

Figure D - Rookery Bay - 10,000 Islands SAV Mapping

Rookery Bay
Collier County, Florida
2014 Natural Resource Map - 10,000 Islands
Rookery Bay Overall Results

- 6510  Tidal Flats    79,581.7
- 6540  Oyster Beds    149.0
- 6560  Hard Bottom    212.5
- 9100  SAV            3,548.1
- 9113  Seagrass Discontinuous  1,392.8
- 9116  Seagrass Continuous    91.9

2,187 polygons
Map with Hyperlinks
Hyperlinked Dialog Options
Hyperlinked Field Data Sheet

<table>
<thead>
<tr>
<th>STATION NAME</th>
<th>SEAGRASS (P/A)</th>
<th>ALGAE (P/A)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gomez Point</td>
<td>P Dom_SG_SPC</td>
<td>Drift Algae</td>
<td>sponges dominant; Caleurpa feathergrass; Thal in sand; tunicates</td>
</tr>
<tr>
<td></td>
<td>H_w Thal Syr Rup</td>
<td>Rooted MacroAlgae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H_d Thal Syr Rup</td>
<td>Other: worm rock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H_e</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATION NAME</th>
<th>SEAGRASS (P/A)</th>
<th>ALGAE (P/A)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gomez Point</td>
<td>P Dom_SG_SPC</td>
<td>Drift Algae</td>
<td>sponges dominant; Caleurpa feathergrass; Thal in sand; tunicates</td>
</tr>
<tr>
<td></td>
<td>H_w Thal Syr Rup</td>
<td>Rooted MacroAlgae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H_d Thal Syr Rup</td>
<td>Other: worm rock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H_e</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DATE: 2/12/2015
GPS Model: Hummingbird 797c
Hyperlinked Dialog Options
Site Specific Underwater Video
QUESTIONS?

SCHEDA ECOLOGICAL ASSOCIATES, INC.
www.scheda.com
Only SAV Survey