Florida Keys Shallow Water Boating Impact Analysis and Trends Assessment – Preliminary Mapping Results

Sponsored by the Florida Keys Environmental Fund and Monroe County
Presented to the FKNMS Sanctuary Advisory Council
February 21, 2017
Current Mapping Effort

- Keyswide prop scar and vessel impact mapping within the boundaries of the FKNMS, initiated in late 2016
- Based on Sargent et al. (1995) and photointerpretation of current aerials using 2015 (0.5 foot resolution) imagery as the base
- Heads-up digitizing/photointerpretation in ArcGis using 2013, 2014, and 2015 vertical aerial imagery at scales from ~1:1000 to 1:1500
- Both 1995 and 2015 Keys mapping data compiled by Kruer
- Using 3 levels of impact as in 1995 mapping = Light/Moderate/Severe
Figure 6. Diagrammatic representation of the three categories of estimated scarring intensity. Black space within each block represents seagrasses, and white marks represent scarring. Light scarring is defined as the presence of scars in less than 5 percent of the delineated polygon, moderate scarring as the presence of scars in 5 to 20 percent of the polygon, and severe scarring as the presence of scars in more than 20 percent of the polygon.
**Project Purpose** - To create a new, scientifically valid map dataset for the FKNMS to allow a management focus on the location of scarred and impacted shallow benthic habitats; and to allow analyses of trends through comparison to vessel impacts mapped 20 years ago.

**Project Goal** – To provide updated maps to NOAA and others for inclusion in shallow water protection and management strategies in the current FKNMS Marine Zoning and Regulatory Review and the USFWS Backcountry Management Plan Update.

- Concluded that boats are the #2 impact to Florida’s seagrasses behind water quality degradation.

- Incorporated the BIWG 4-Point Plan
Vessel Impacts Mapped

Vessels Under Power – widespread, typical ‘scarring’

Boats at Docks - along many developed shorelines

Groundings - widespread, many mapped by NOAA

Liveaboardss - bayside of Upper Keys, Marathon, and around Key West and Stock Island - anchor, chain, and keel damage

Wake Wave Erosion – edges of major channels with high speed traffic
Docks and Boats
Prop Scar Mapping of FKNMS
Completed as of February 2017

Source: Erdas Imagine, GeoEye, Earthstar Geographics, CNES/Airbus DS, USGS, USGS/EROS, Earthrise, Airsage, USAF, JPL, satellite, and the GIS User Community
Preliminary Results

New high resolution aerial imagery and enhancements in GIS mapping allow for a detailed view of the types and locations of vessel impacts to benthic habitats of the FKNMS.

Acres of various vessel impacts mapped in the Keys:

<table>
<thead>
<tr>
<th>Year</th>
<th>Light</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995 (Sargent et al. 1995)</td>
<td>14,560</td>
<td>10,430</td>
<td>5,060</td>
<td>30,050 acres</td>
</tr>
<tr>
<td>2015 (Kruer, about 80% complete)</td>
<td>17,496</td>
<td>9,529</td>
<td>16,140</td>
<td>43,165 acres (~67 sq. miles)</td>
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Comparison of Impacts from 1995 to 2015

1995 vs. 2015: Boat Impact Severity

- 1995: Light, Moderate, Severe
- 2015: Light, Moderate, Severe

Boca Chica and Cow Key Channels
Middle Keys - ‘Severe’ Impacts Mapped 1995 and 2015
Tavernier Key WMA
Designated in 1997

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Increased Impacts from 1995 to 2015 – bayside of Plantation Key
Increased Impacts from 1995 to 2014 – bayside of Whale Harbor
Next Steps

• Complete mapping and QA/QC

• Provide a report to agencies to include methods, metadata, and results along with a GIS shapefile and kml/kmz format file for use in Google Earth

• Bring a simple and straightforward, but much needed, focus to the location and severity of shallow water habitats impacted by boating activity in the FKNMS