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

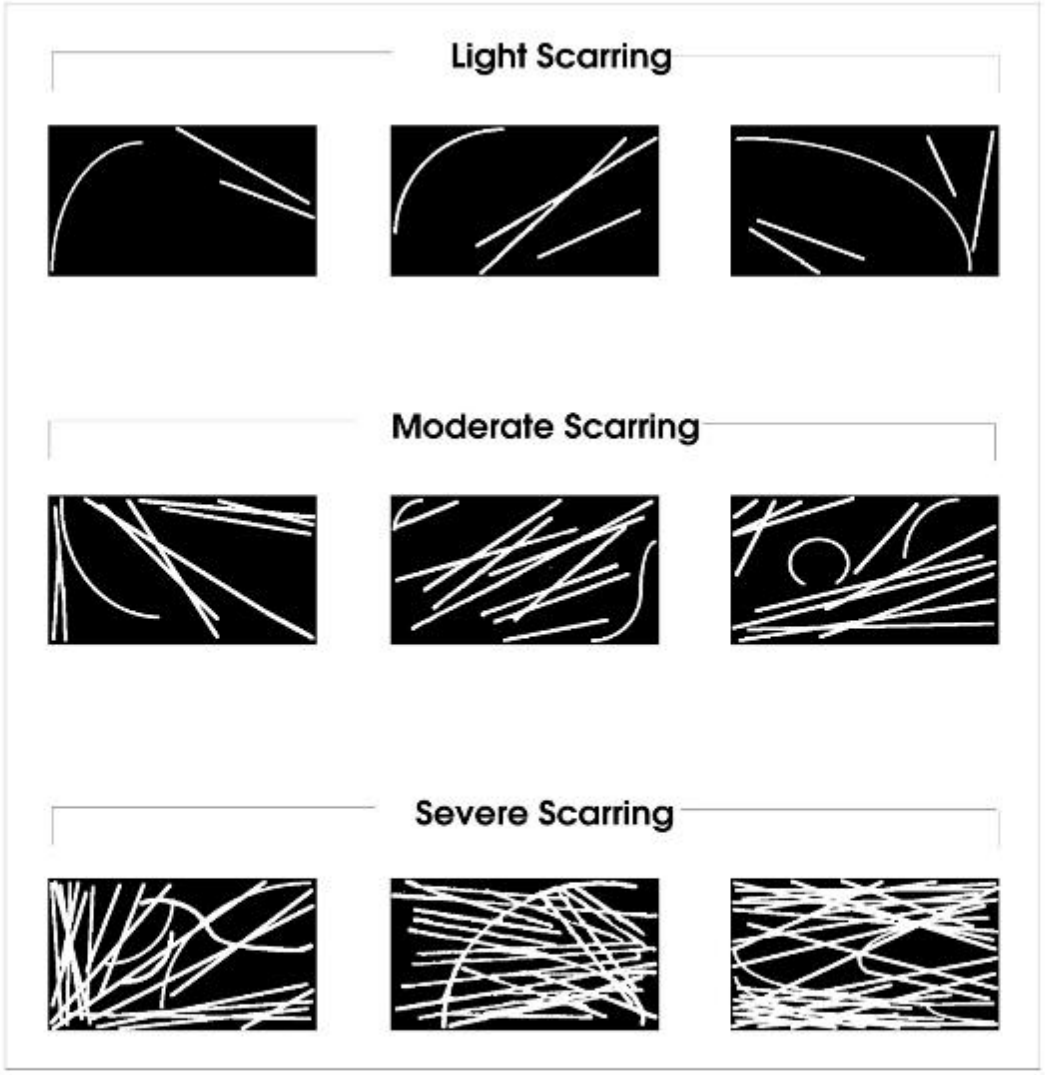


Figure 6. *Diagrammatic representation of the three categories of estimated scarring intensity. Black space within each block represents seagrasses, and white marks represent scarring. Light scarring is defined as the presence of scars in less than 5 percent of the delineated polygon, moderate scarring 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.*

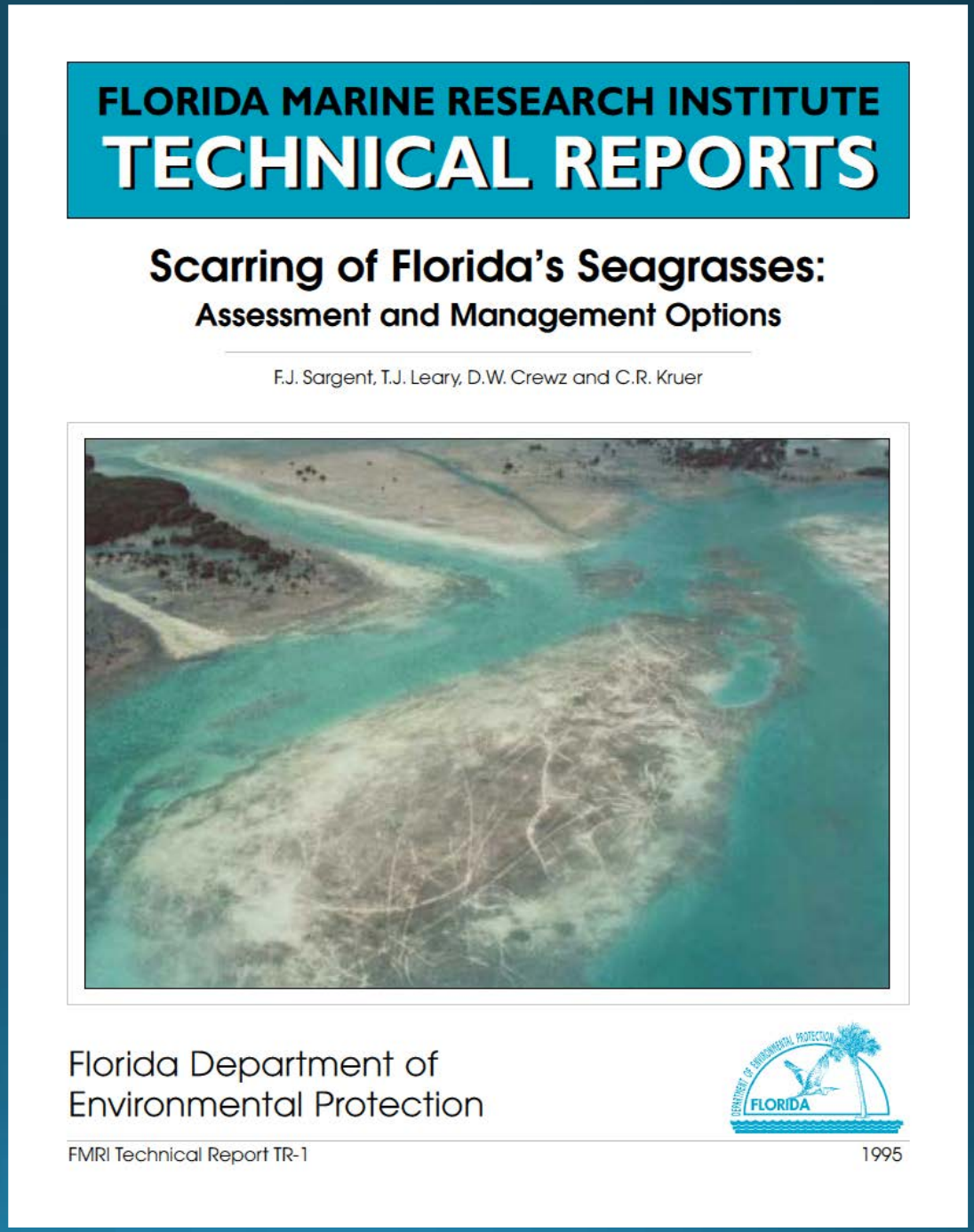
Project Purpose - To create a new, scientifically valid map dataset for the FKNMS to allow a management focus on the location of scarred and impacted shallow benthic habitats; and to allow analyses of trends through comparison to vessel impacts mapped 20 years ago

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

- 1995 Statewide Report documented 30,000 acres of Keys shallow seagrasses impacted by boats as of 1995.

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

- Incorporated the BIWG 4-Point Plan



Vessel Impacts Mapped

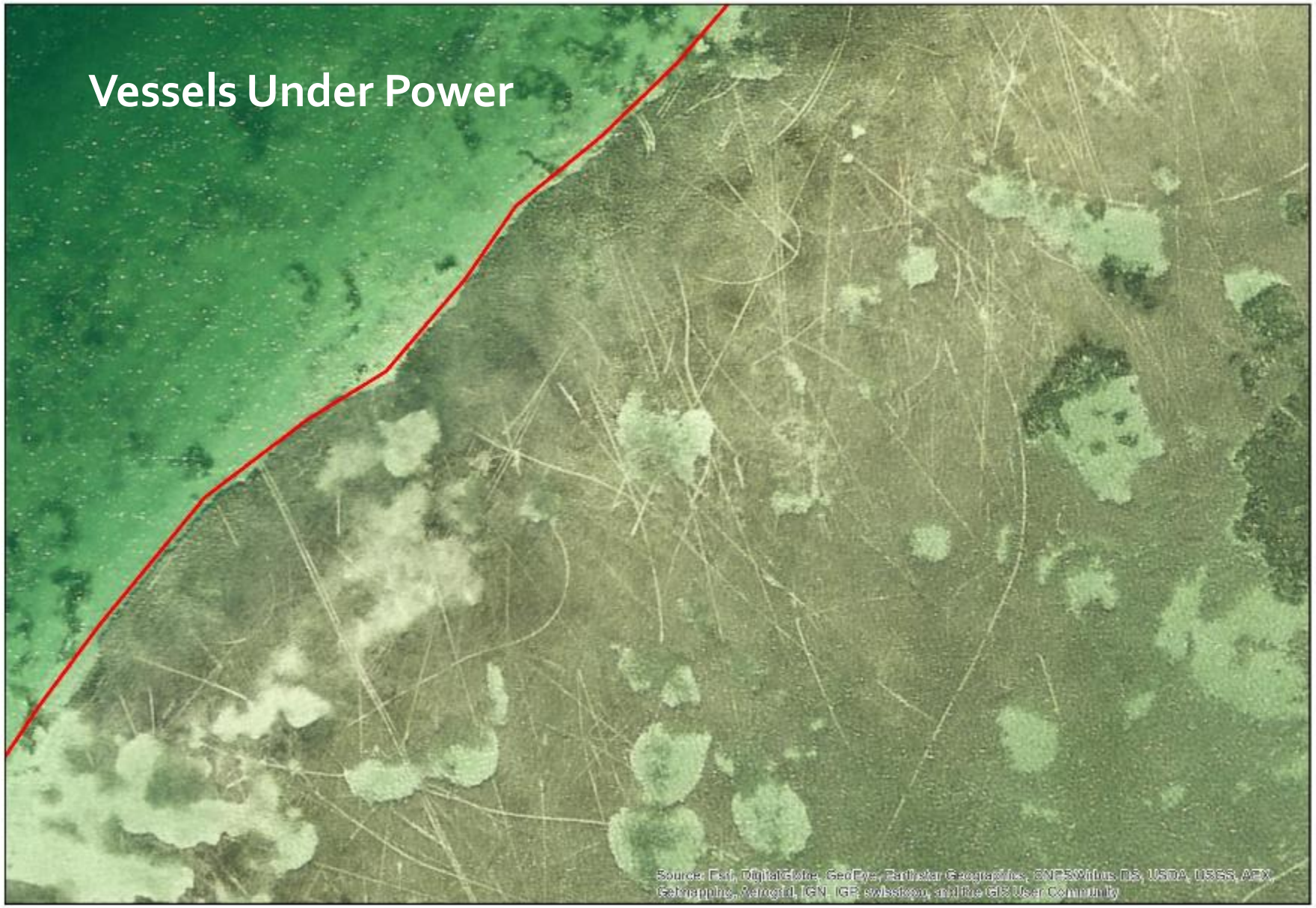
Vessels Under Power – widespread, typical 'scarring'

Boats at Docks - along many developed shorelines

Groundings - widespread, many mapped by NOAA

Liveaboards - 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


Vessels Under Power
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
0
62.5
125
250 Feet
Newfound Harbor Channel

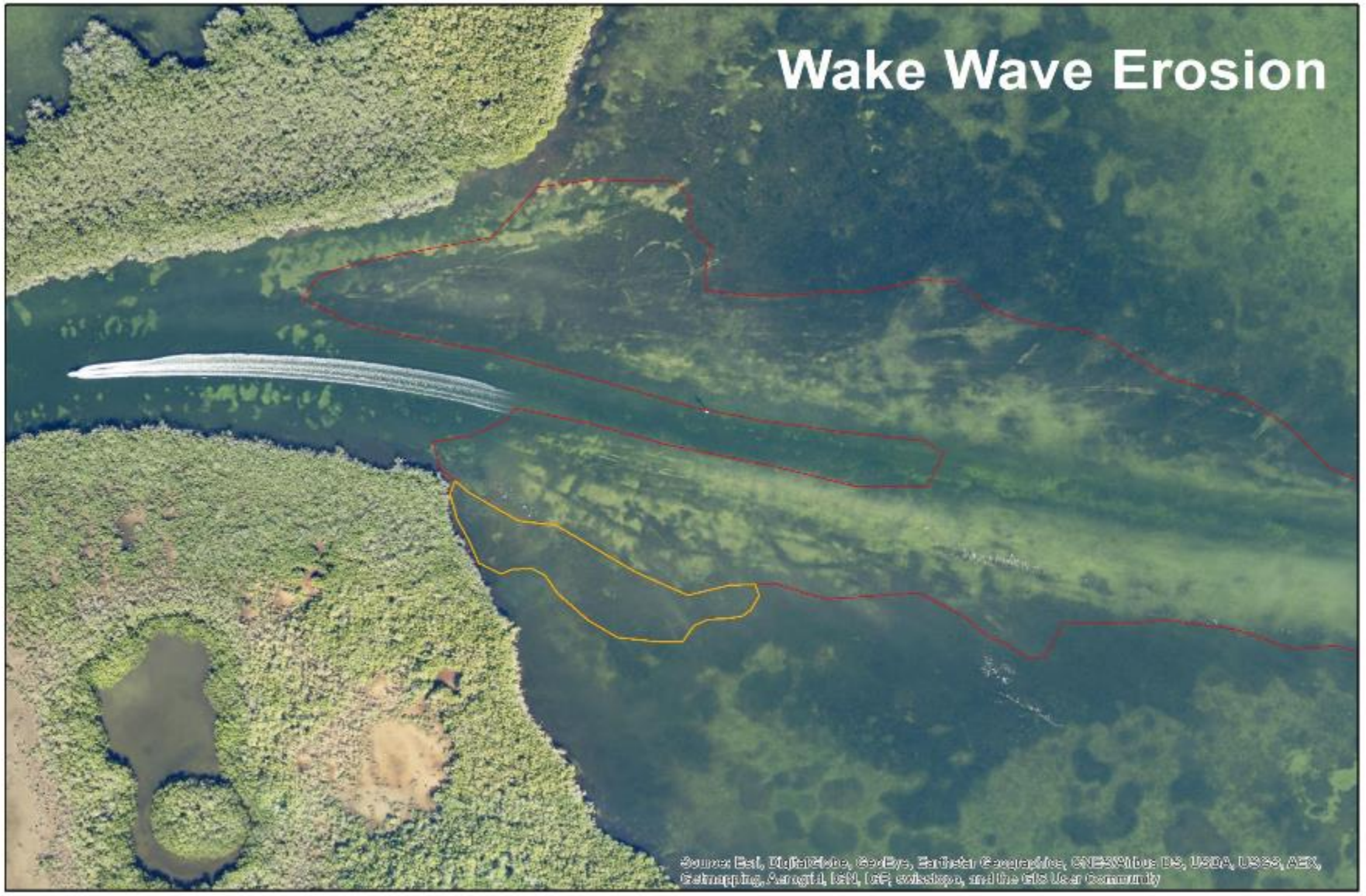

Docks and Boats
0
50
100
200 Feet
Upper Keys bayside

0 250 500 1,000 Feet

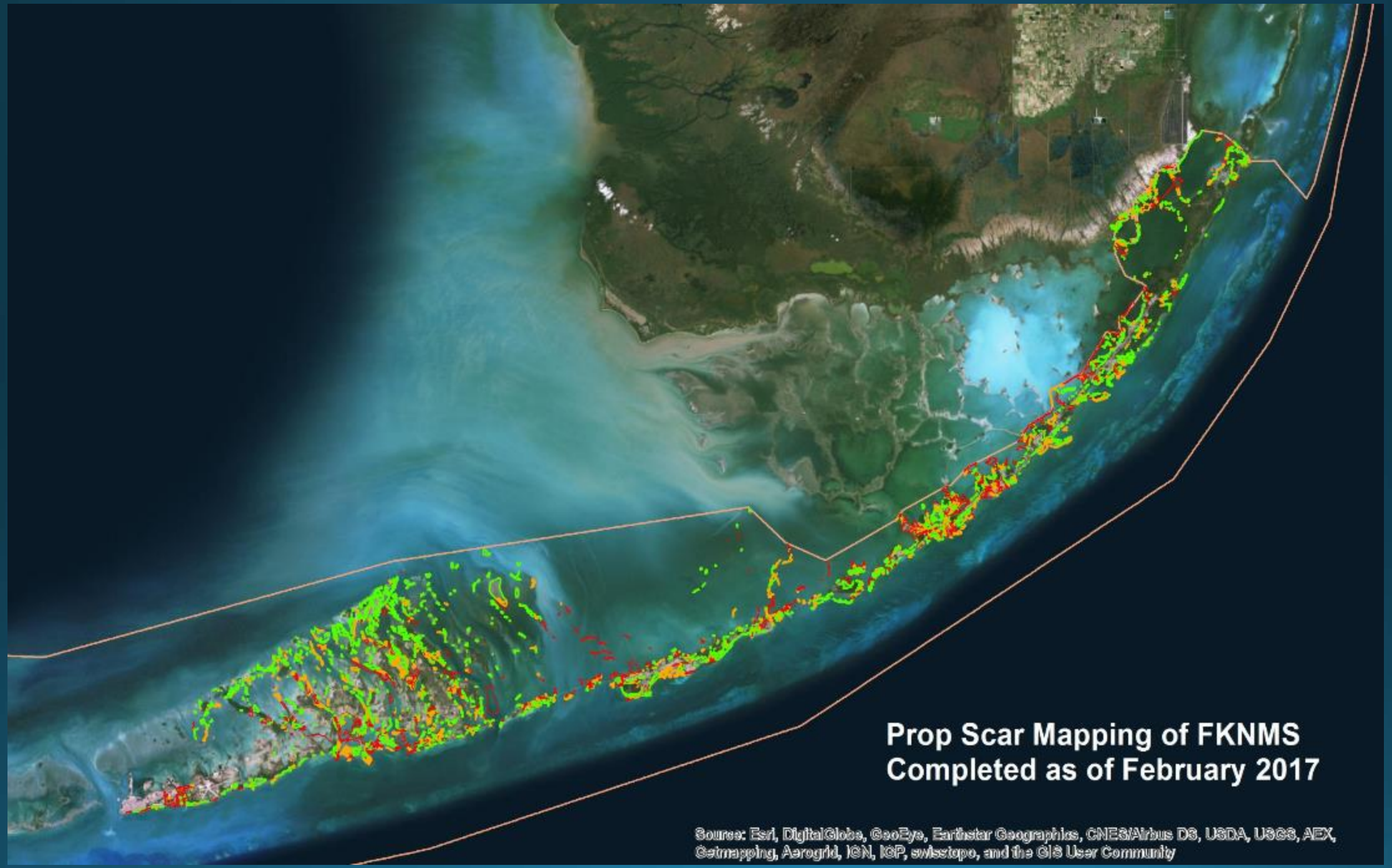
Shell Key Bank

0 125 250 500 Feet

Bayside Key Largo



ICWW Bayside Key Largo


Prop Scar Mapping of FKNMS
Completed as of February 2017
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, 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:

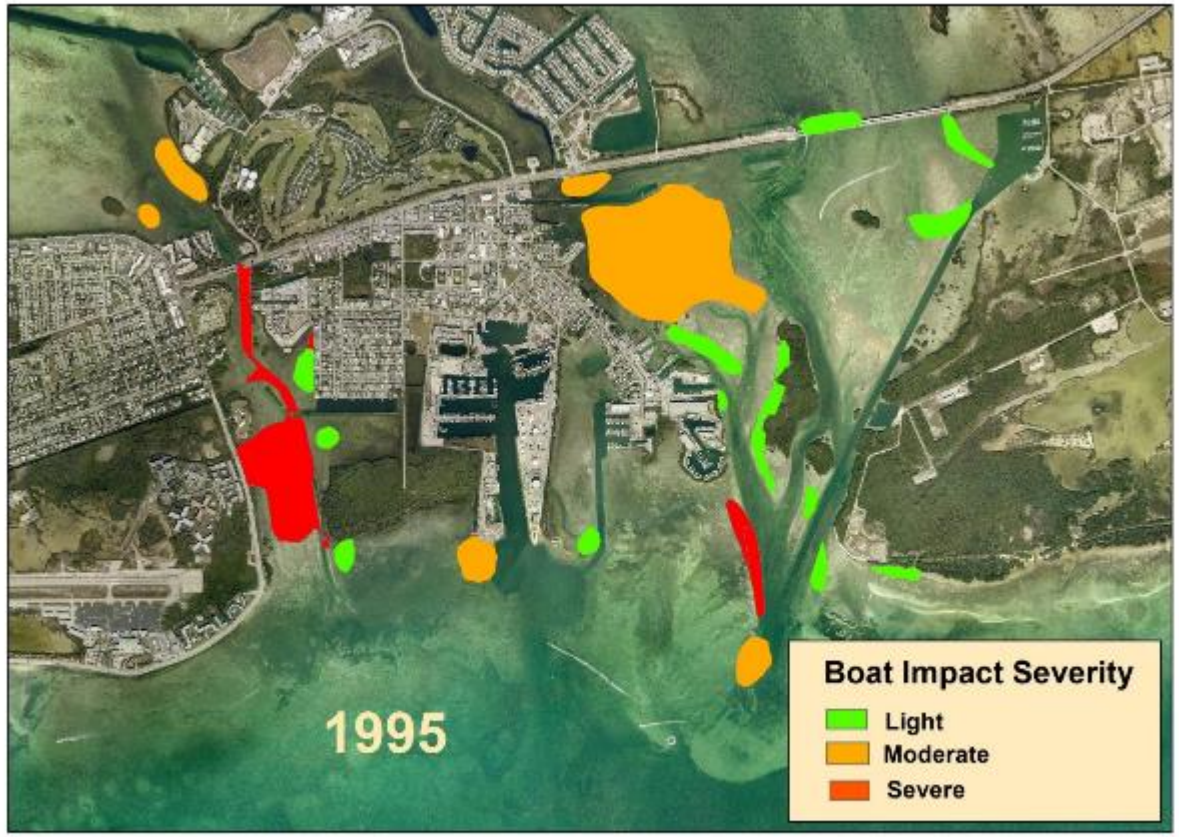
1995 (Sargent et al. 1995):

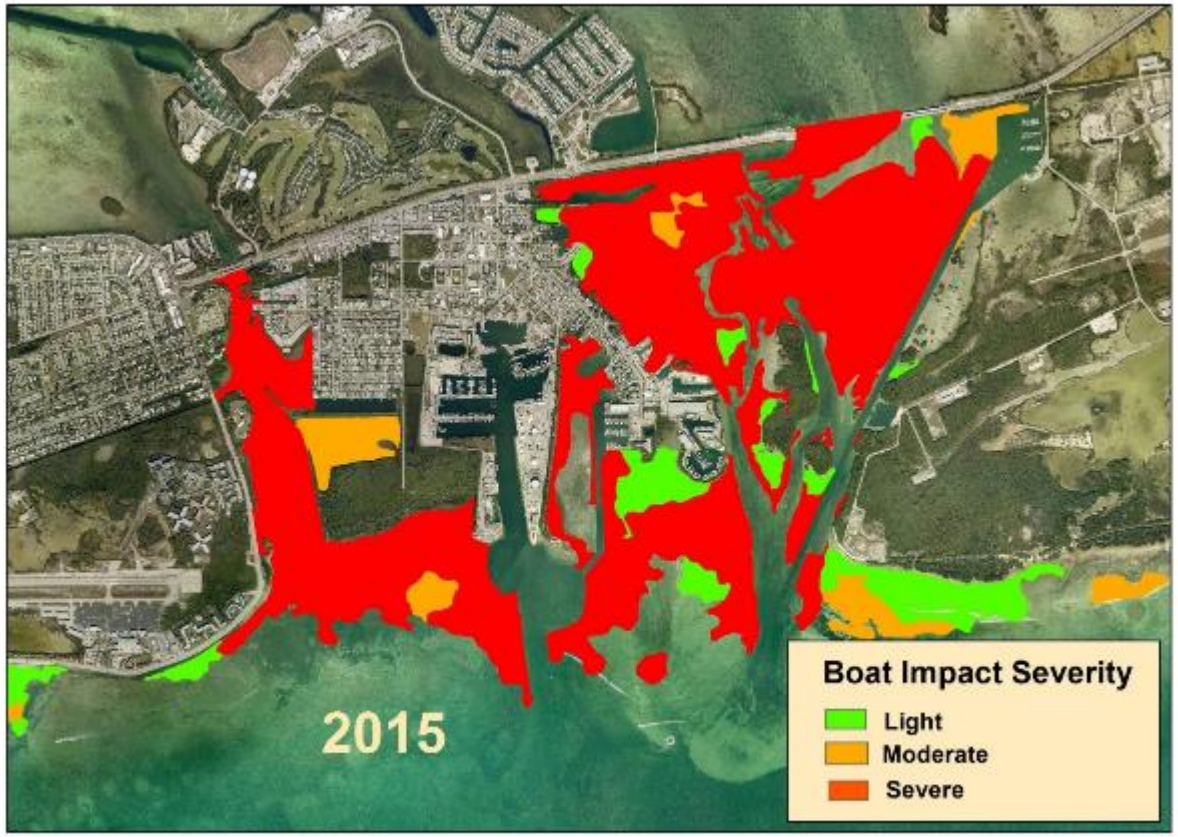
Light = 14,560
Moderate = 10,430
Severe = 5,060
Total = 30,050 acres

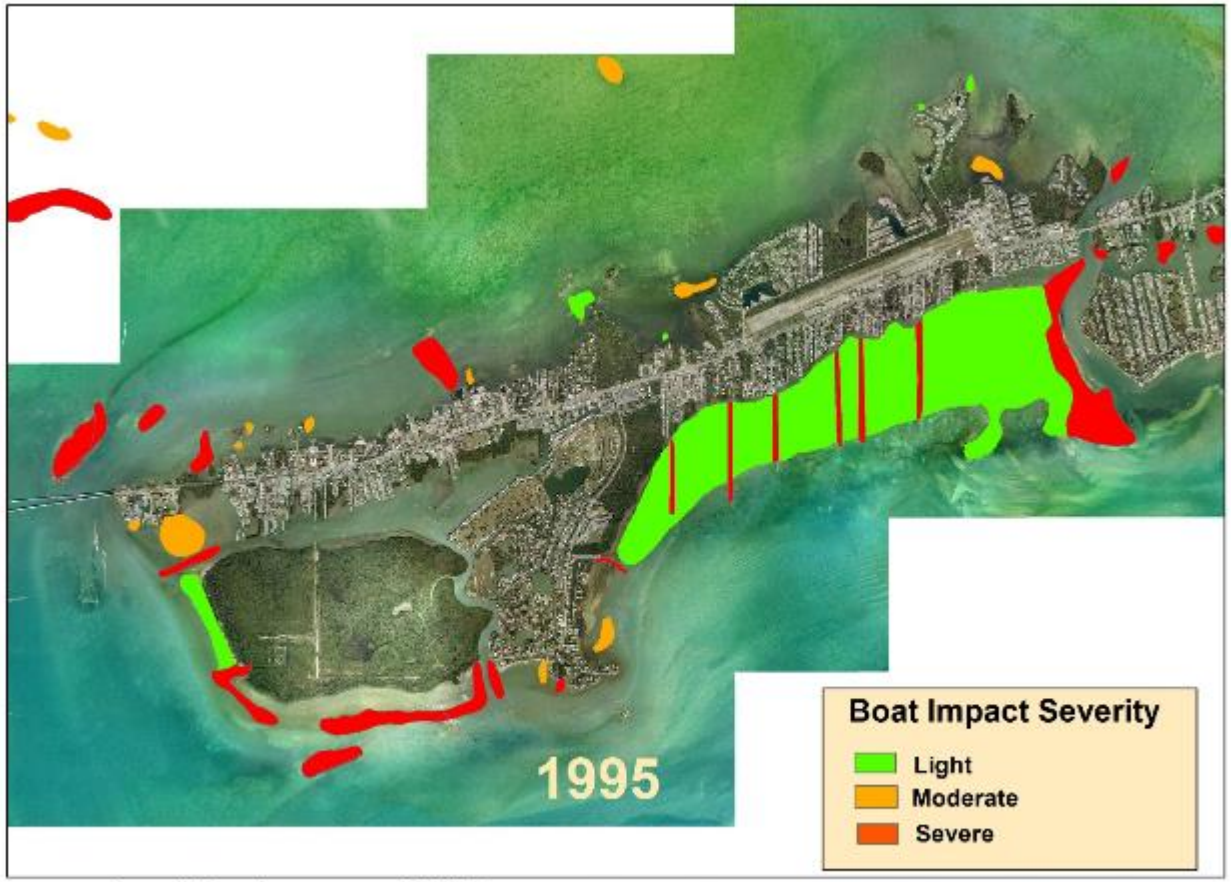
2015 (Kruer, about 80% complete):

Light = 17,496
Moderate = 9,529
Severe = 16,140
Total = 43,165 acres (~67 sq. miles)

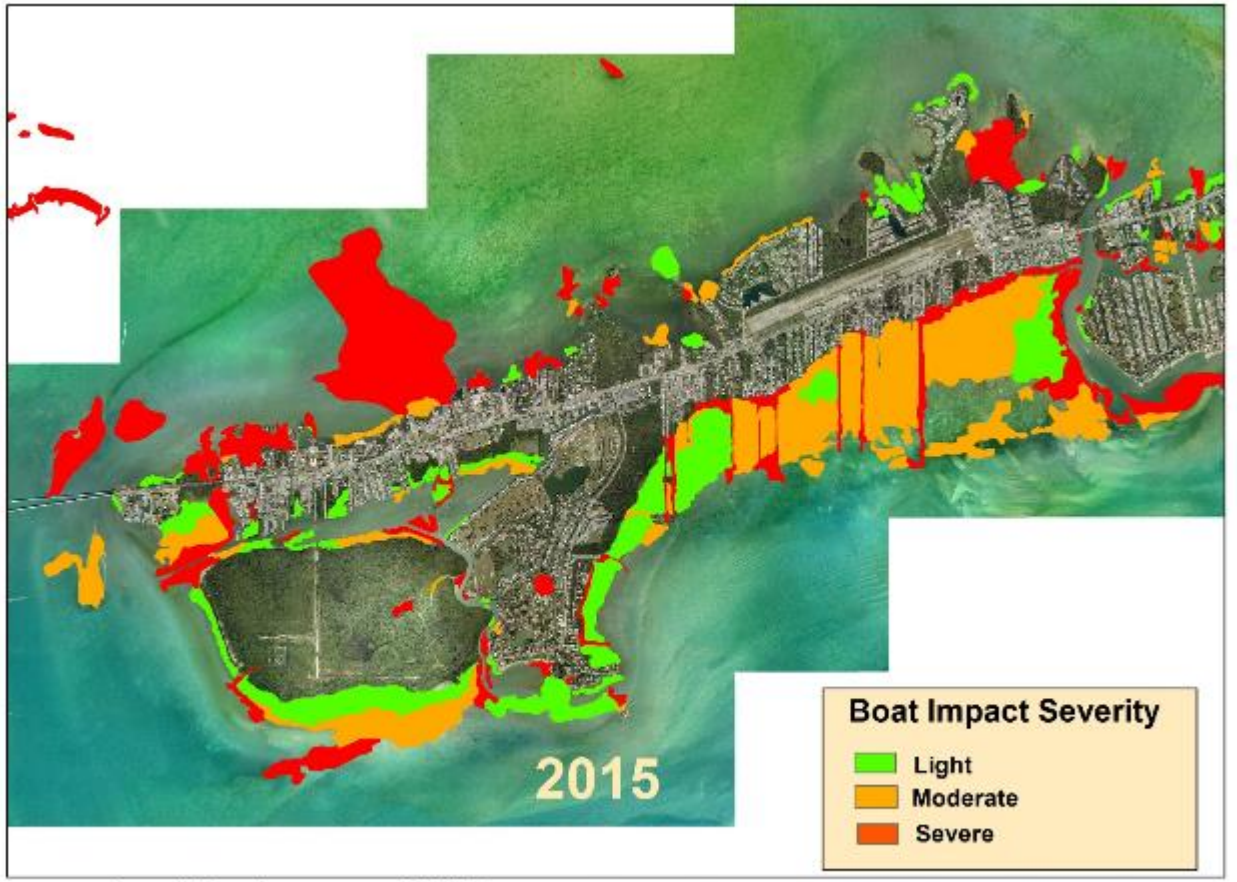
Comparison of Impacts from 1995 to 2015







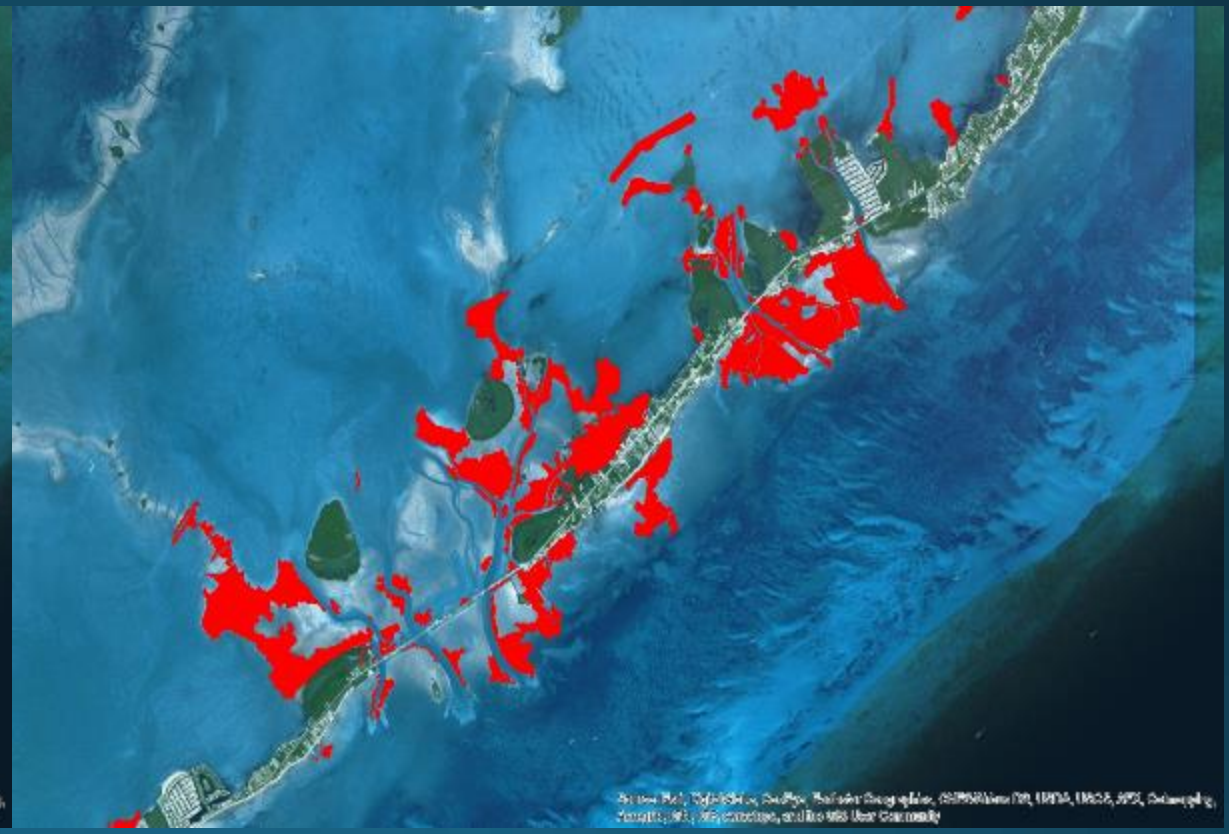
Marathon - 1995 Scar Mapping



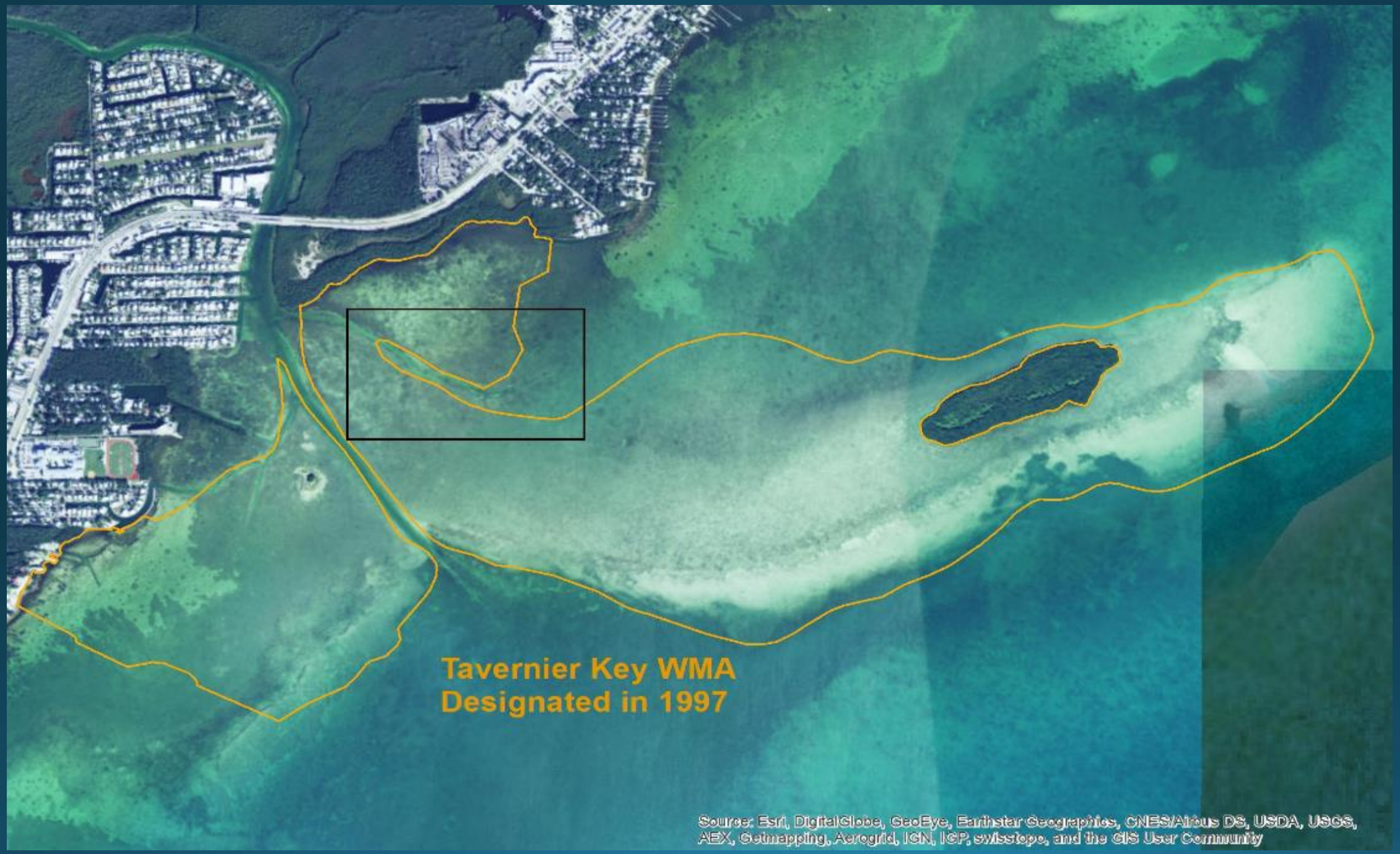
Marathon - 2015 Scar Mapping

Middle Keys - ‘Severe’ Impacts Mapped 1995 and 2015

1995

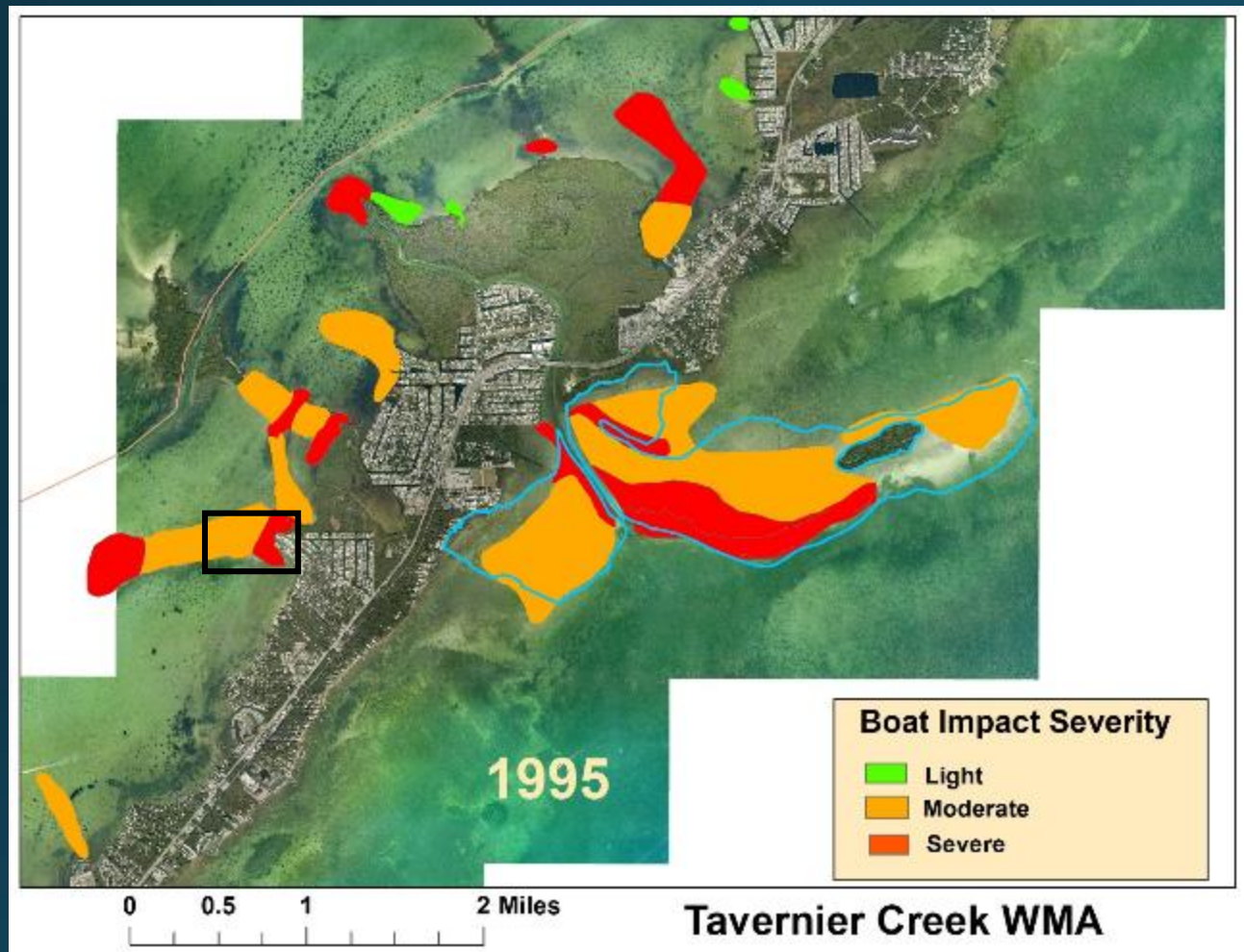


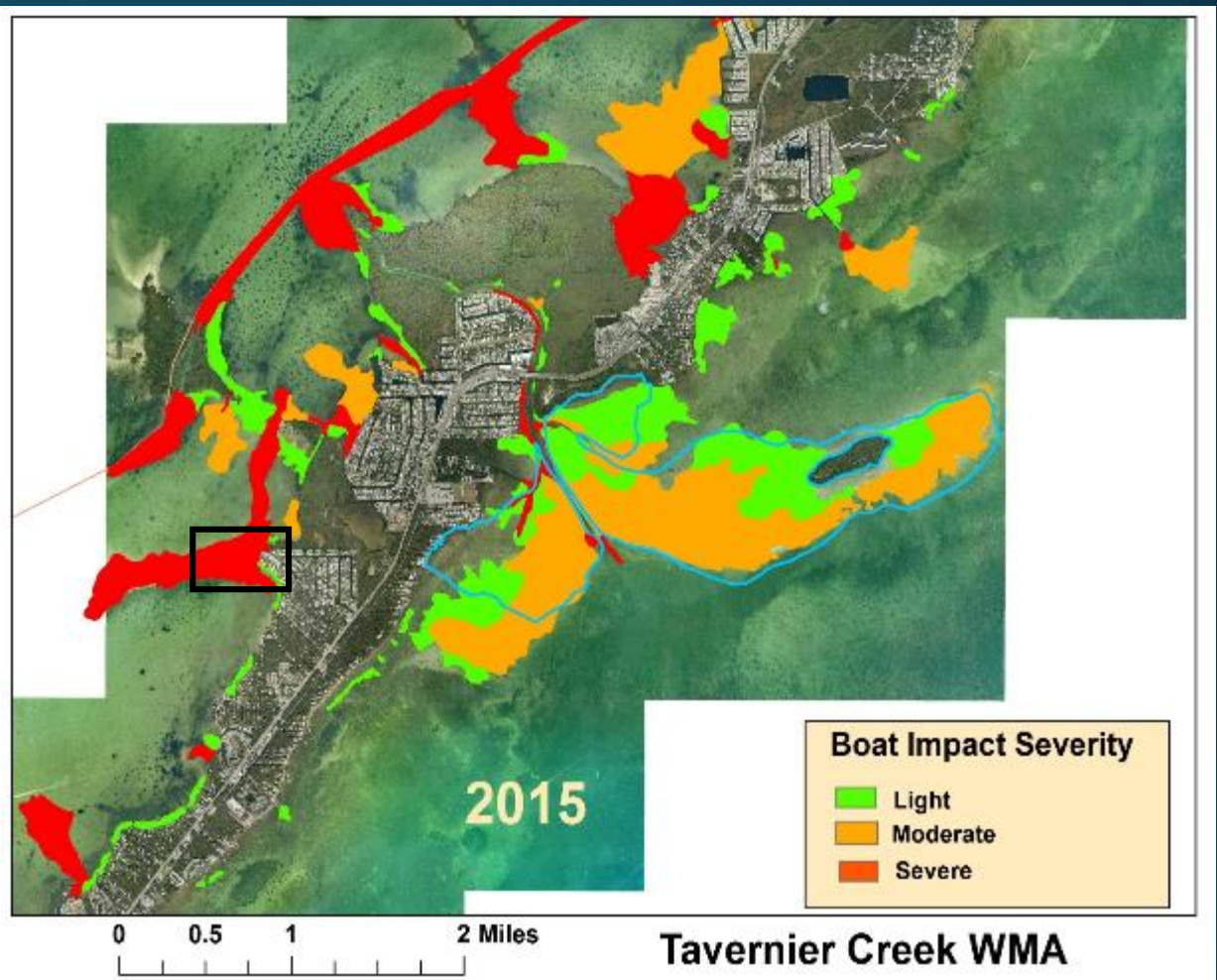
2015


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

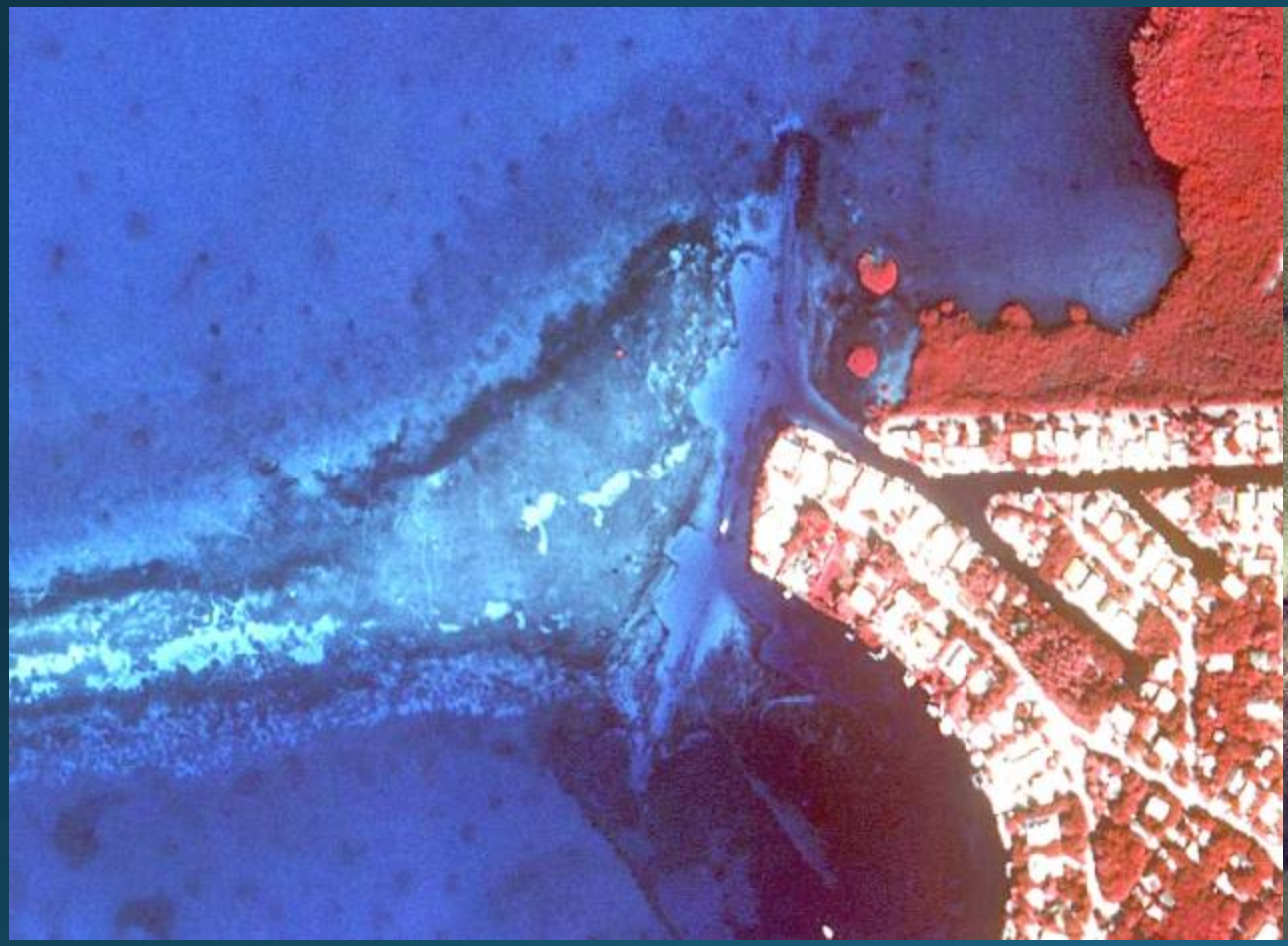
1998 - Kruer Photo
Tavernier Key WMA

2014
Tavernier Key WMA


1995
Boat Impact Severity
Light
Moderate
Severe
0
0.5
1
2 Miles
Tavernier Creek WMA


2015
Boat Impact Severity
Light
Moderate
Severe
0
0.5
1
2 Miles
Tavernier Creek WMA

Increased Impacts from 1995 to 2015 – bayside of Plantation Key



1995

2015

Increased Impacts from 1995 to 2014 – bayside of Whale Harbor

1995

2014

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