



Tracking Protected Area Compliance in the South Atlantic

Law Enforcement AP

February 9, 2015

Prepared by:

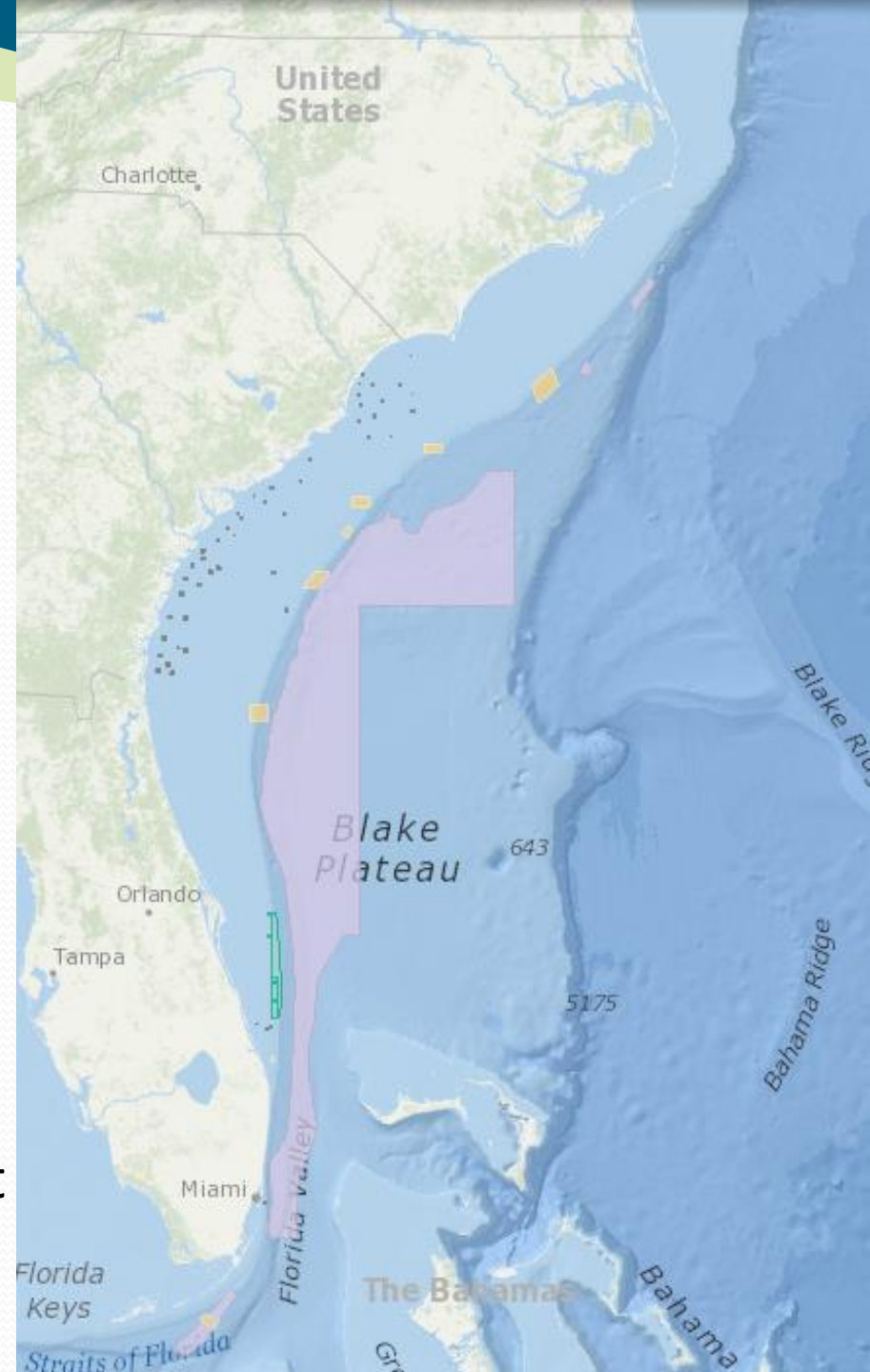
Chip Collier



SAFMC

Protected Areas

- Protected area is any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulation for the protection of natural or cultural resources.
- SAFMC has established:
 - 8 deepwater MPAs
 - 51 Special Management Zones
 - 5 Deepwater Coral HAPC
- Compliance is unknown for most areas





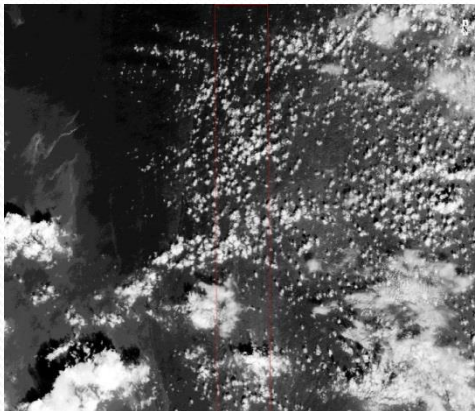
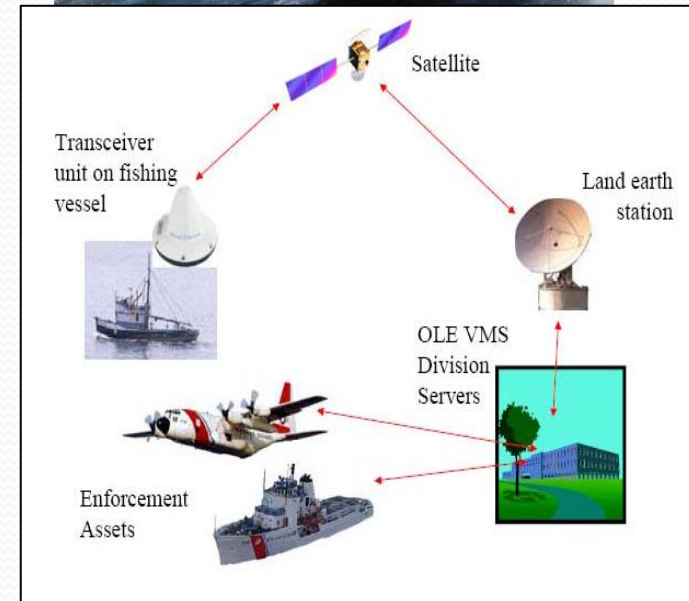
Compliance of SAFMC Protected Areas

- Advisory Panels and Public state fishermen are fishing in PAs.
- Enforcement Agencies are finding few fishing violations in PAs.
- Difficult for Enforcement Agencies because:
 - Not all vessels are required to have electronic monitoring,
 - Fishermen communicate about ongoing Enforcement Operations, and
 - Some fishing is allowed in all SAFMC PAs.
- Non-Compliance of PA Regulations can reduce likelihood of achieving PA goals.
- Tools are available to track compliance.



Tools to Track Compliance

- Direct Observation
- Electronic Monitoring (i.e. VMS/GPS)
- Radar
- Buoys/Underwater Listening Devices
- Drones
- Satellite Imagery



<http://www.digitalafro.com/first-look-at-navys-secret-stealth-drone-boats/>



<http://www.cetaceanresearch.com/hydrophone-systems/radar/radar->





Satellite Imagery - Considerations

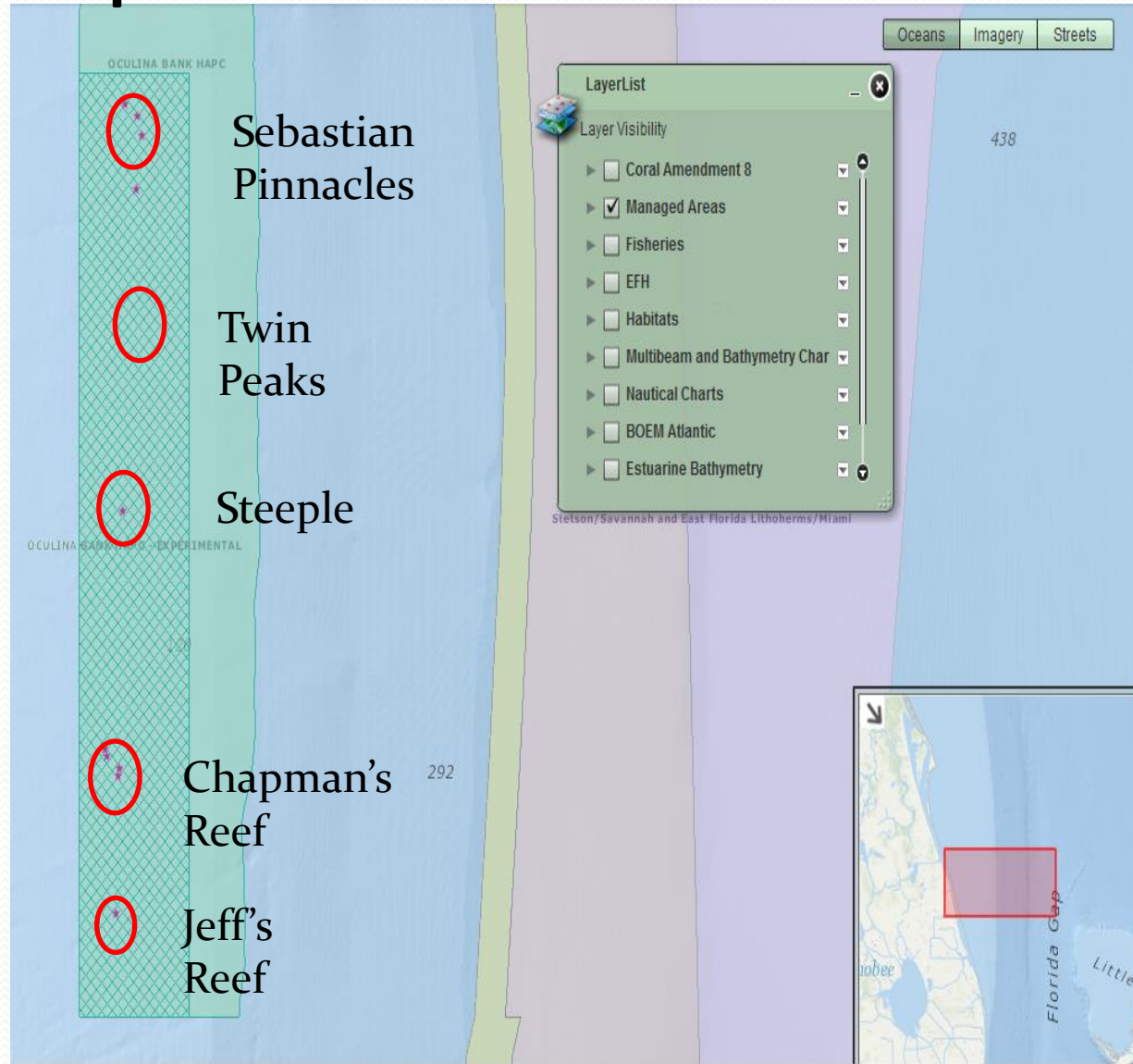
- Different types available to SAFMC:
 - Electro-optical
 - Synthetic Aperture Radar
- Cost
 - Free to ~\$5000 per scene
 - Need special software or contractor to analyze image
- Resolution
 - Varies depending on price. Higher resolution = higher price
- Scene/Image Size, Frequency, and Timing
 - Variable
 - Unknown if all PAs are captured by current satellites





Test Case – Oculina Experimental Closed Area

- Closed area off Ft. Pierce, FL with complete coverage
- 4 Electro-optical images
- Used Landsat images
- 15 m resolution
- Analyzed by CSTARS at Univ. of Miami
- Other images are available at 5 m resolution for a fee





Example:

Red circle indicates described Oculina Reefs

Oculina Bank HAPC



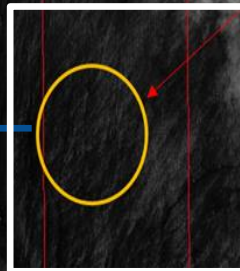
Oculina Bank HAPC - EXPERIMENTAL

Overlay Images to determine location and make satellite image transparent

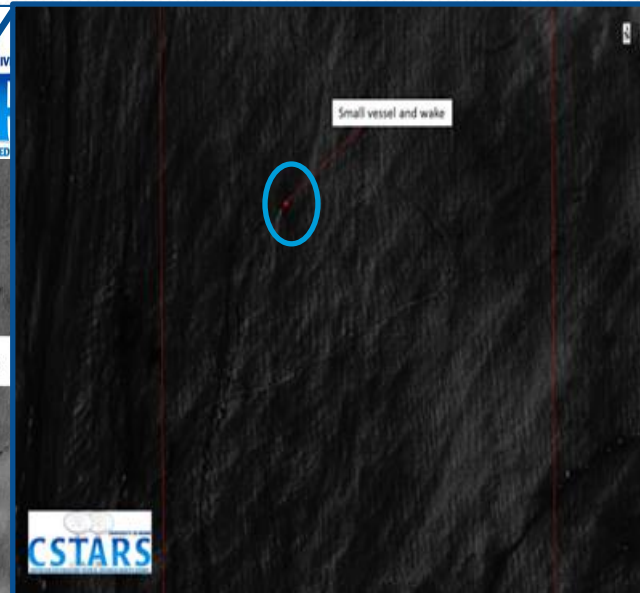
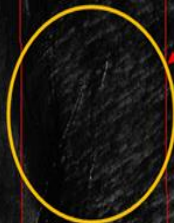
Yellow indicates potential vessel in overlay



One small vessel and wake



Two larger vessels and wakes



Blowups of each satellite image will be shown to the left (northern most vessel) and right (southern vessels). More refined blue circles will indicate vessel.

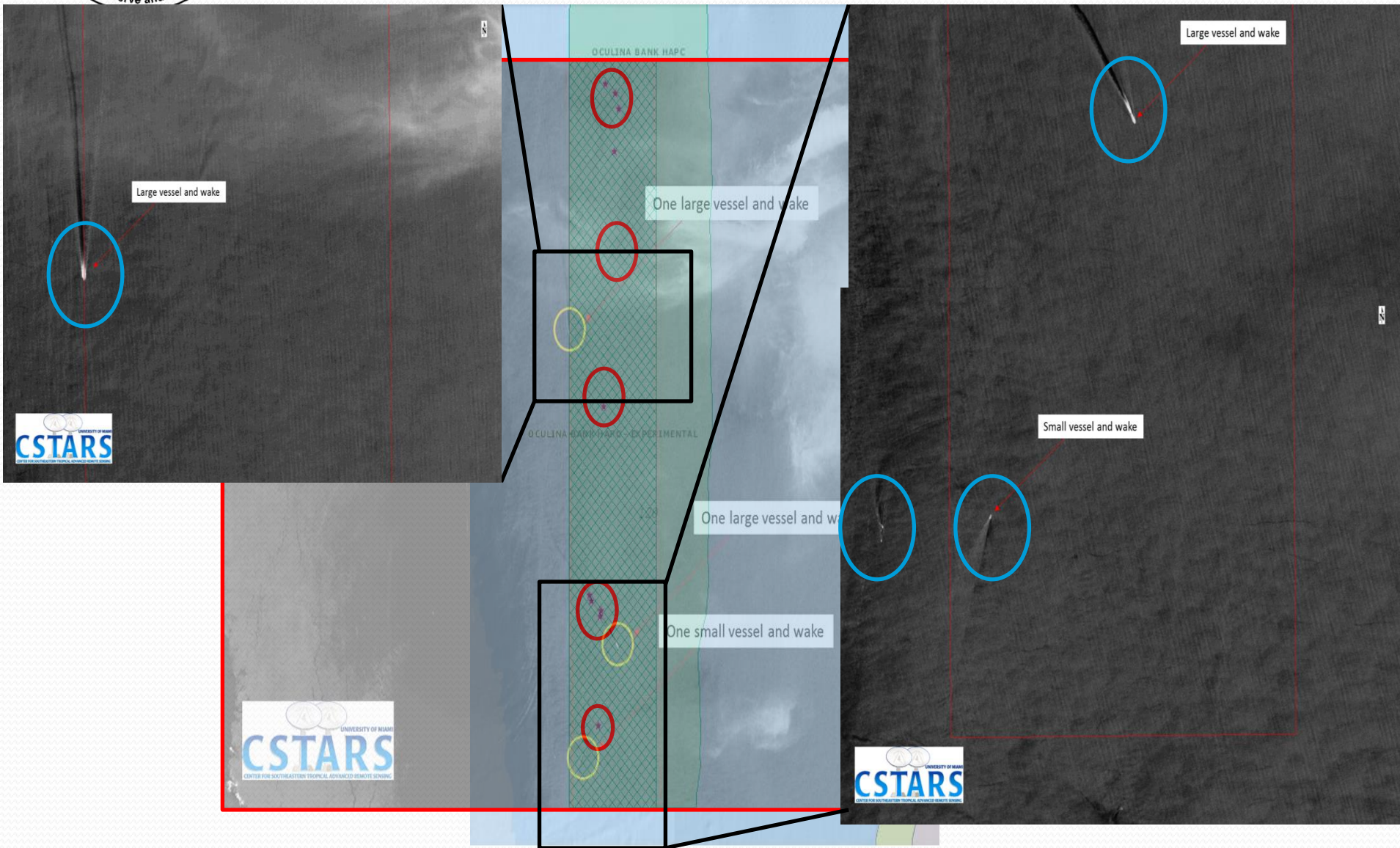


OECA – June 11, 2014



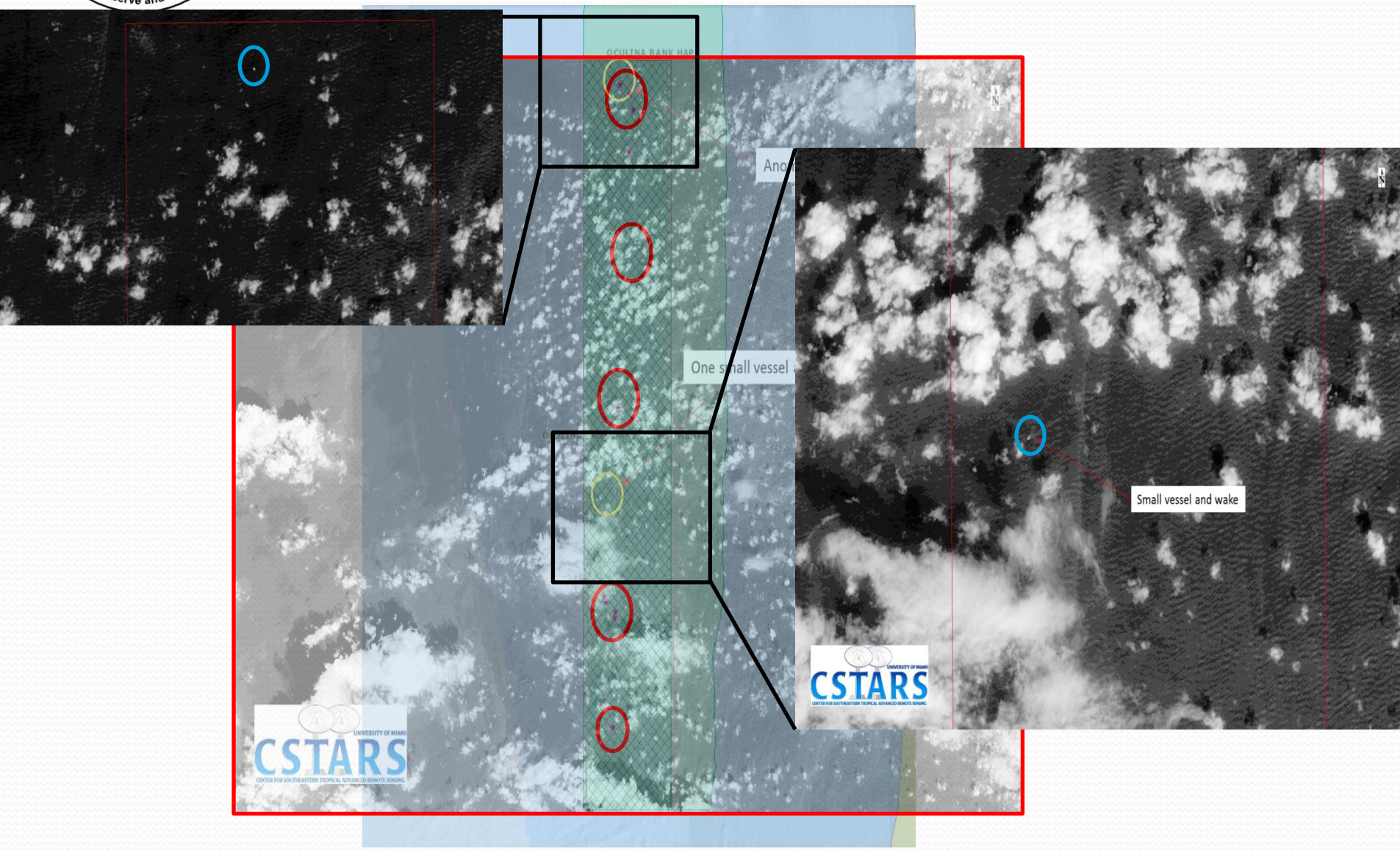


OECA – August 15, 2014



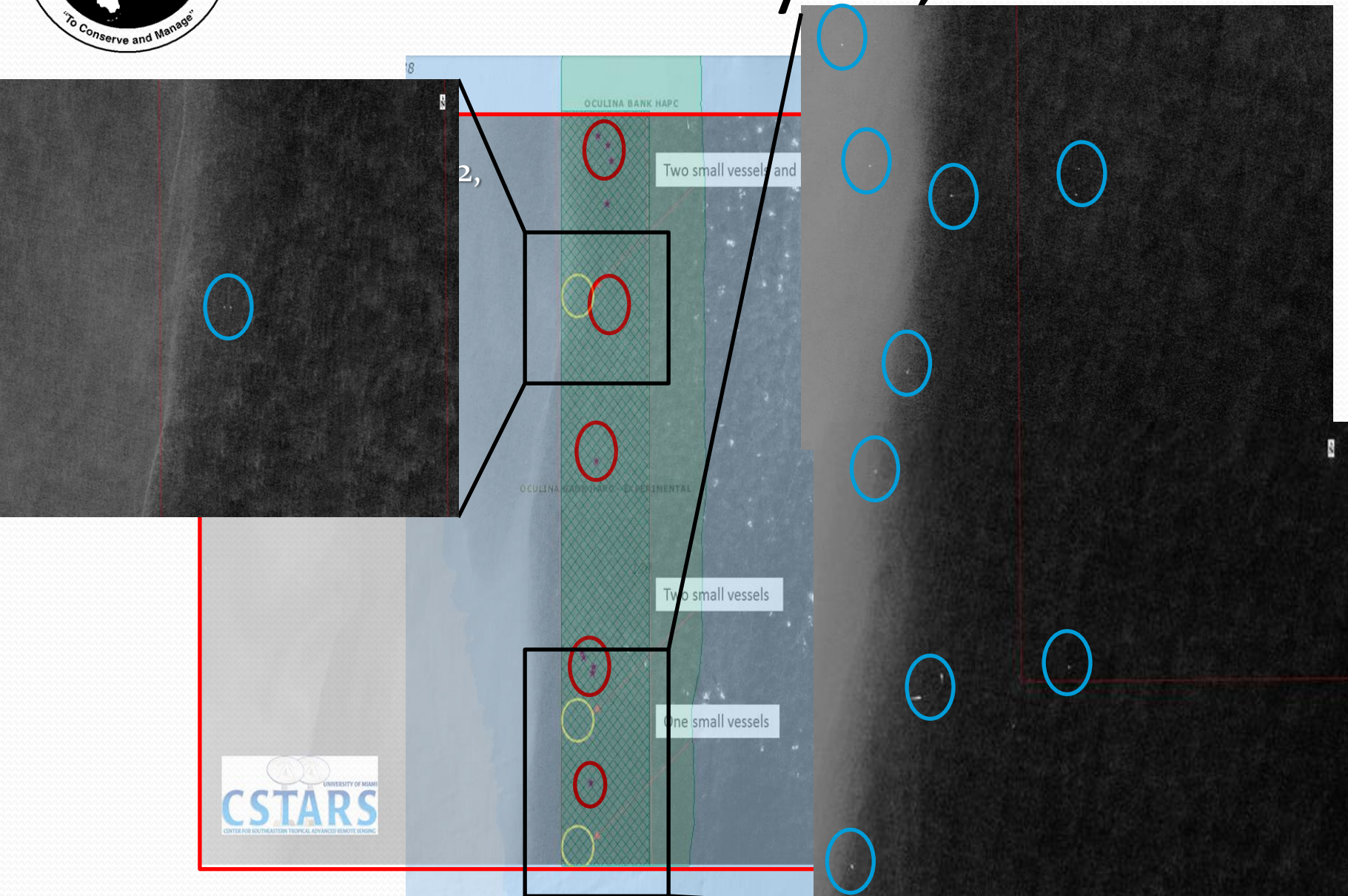


OECA – October 1, 2014





OECA – January 22, 2015





Satellite Imagery – Pros and Cons

Pros	Cons
Can provide pre- and post-regulation effort	Only one or two scenes per day
Potentially compare effort inside and outside MPA	Difficult to determine if a vessel is fishing illegally
Multiple sources of scenes may be available	Not real-time data
Images can be available next day	Cloud cover can block detection capability for some images
Can be used by Enforcement to optimize timing of boat operations	Cost may be prohibitive



Concluding Points and Questions for AP

- Potential to quantify protected area compliance in South Atlantic.
- Vessels can be observed even with 15 m resolution.
- Cannot determine if a vessel is fishing illegally.
- Cloud cover may be problematic with electro-optical images.

How useful is this technique for Law Enforcement and Council to estimate compliance?

Does the AP recommend additional efforts be pursued to track compliance?

Are there recommended locations outside PAs to compare?

