

Improving fishermen awareness to reduce the presence of lobster traps in MPAs of the Florida Keys



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Project Information

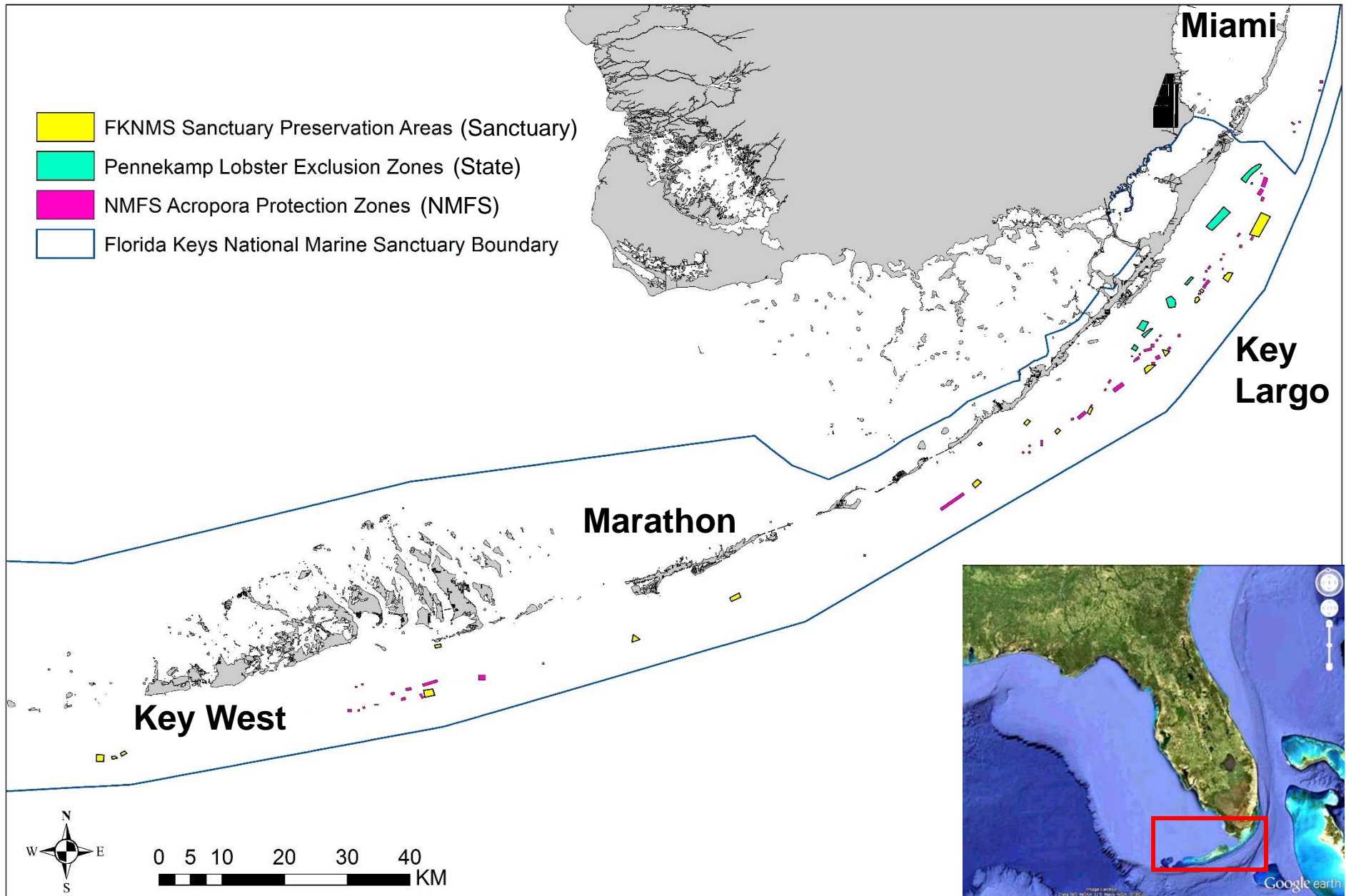
- **Purpose:**

- Evaluate fishermen compliance with MPAs that prohibit trap fishing
- Evaluate marine debris accumulation inside MPAs that prohibit trap fishing

- **Funding:**



Study Location



Florida Keys Coral Reef Decline

- Documented decline since 1970s
 - Live coral cover
 - 1970s: ~40%
 - Present: ~10%
 - *Acropora* spp.: ESA listed as “Threatened” in 2006
- Many natural and anthropogenic stressors
 - Our focus: lobster trap fishing



Photo Credits: Phillip Dustan in Jackson et al. 2014

Florida Spiny Lobster Trap Fishery



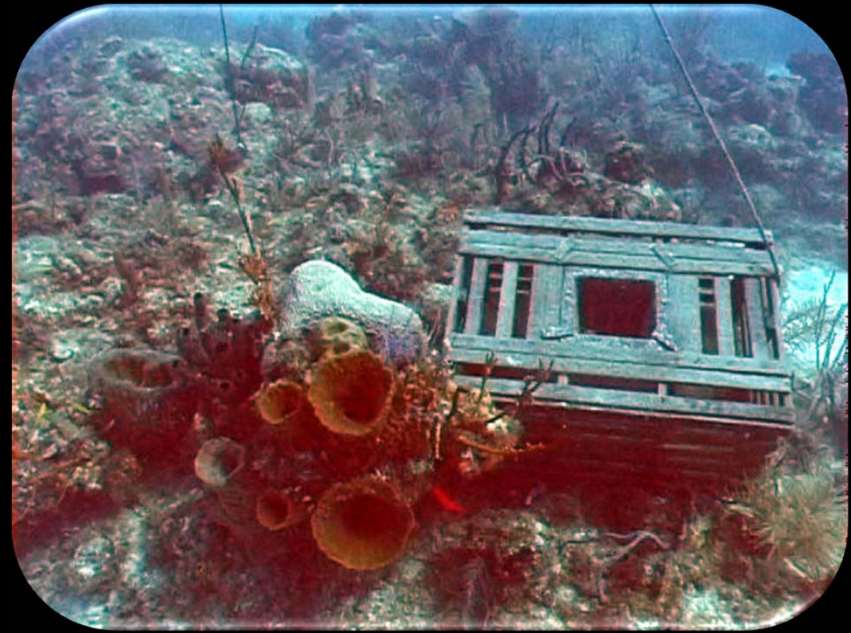
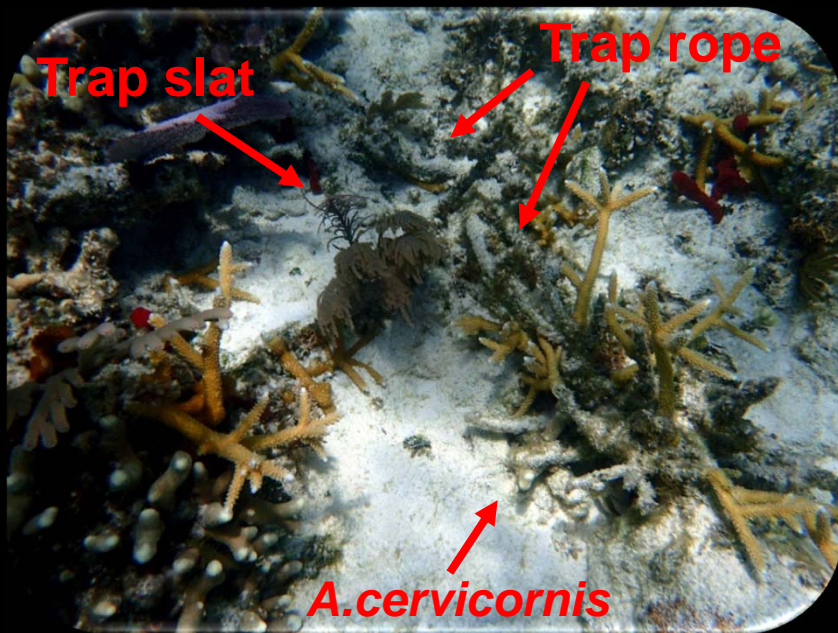
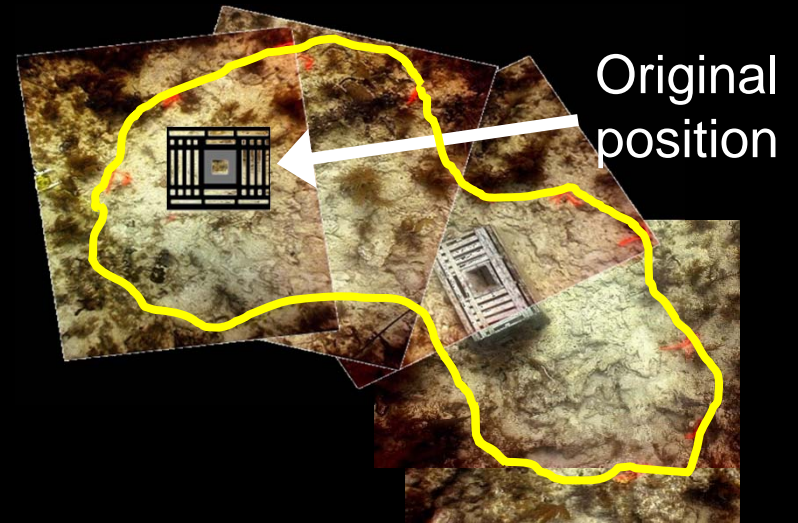
2014 Fishing Season

- Trap fishermen: ~540
- Traps: ~475,000
- Landings: ~5.4 million lbs
- Value: ~\$53 million ex-vessel



Trap Impacts on Coral Reefs

- Trap hauling
- Wind driven trap movement
- Accumulation of trap debris



See Lewis *et al.* 2009 N.Z. J. of Marine & Freshwater Research

Study Sites

- FKNMS Sanctuary Preservation Areas (Sanctuary)

- Designated in 1997
- Marked
- On navigation charts
- n = 18



Sanctuary marker buoy

- Pennekamp State Park Lobster Exclusion Zones (State)

- Designated in 1993
- Marked
- Not on navigation charts
- n = 8



State marker buoy

- NMFS *Acropora* Protection Zones (NMFS)

- Designated in 2012
- Unmarked
- Not on navigation charts
- n = 60

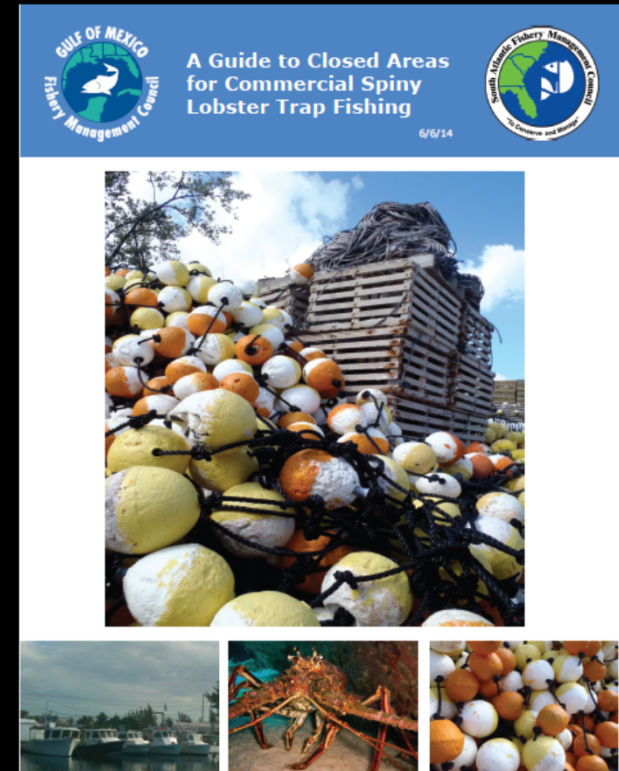
Evaluating Fishermen Compliance

- Methods:
 - Counted the number of traps and trap owners in MPAs
 - Pre and Post Education Effort (Fall 2014, Fall 2015):
 - Sanctuary: n=18 out of 18
 - NMFS: n=18 out of 60
 - State: n=8 out of 8
 - Controls (open fishing areas): n=18
 - Record GPS location of traps



Methods: Educational Effort

- Conducted in Year 1 (Fall 2014)
 - Attached courtesy notice to buoys
 - Mailed information to fishermen
 - Additional contact with fishermen:
 - Interactions on the water
 - Phone calls



Florida Fish and Wildlife Conservation Commission
Courtesy Notice/ Aviso de Cortesía

Your trap is in an area closed to lobster trap fishing. For information on this closed area, please visit the guide to Closed Areas for Spiny Lobster Commercial Trap Fishing at:
<http://www.gulfcouncil.org/docs/Public%20Hearing%20Guides/Spiny%20Lobster%20Closed%20Areas%20for%20Commercial%20Trap%20Fishing.pdf>

Su trampa está en un área cerrada a la pesca de langosta con trampas. Para obtener información sobre esta área cerrada, por favor visite la guía de áreas cerradas a la pesca comercial de langosta espinosa con trampas:
<http://www.gulfcouncil.org/docs/Public%20Hearing%20Guides/Spiny%20Lobster%20Closed%20Areas%20for%20Commercial%20Trap%20Fishing.pdf>

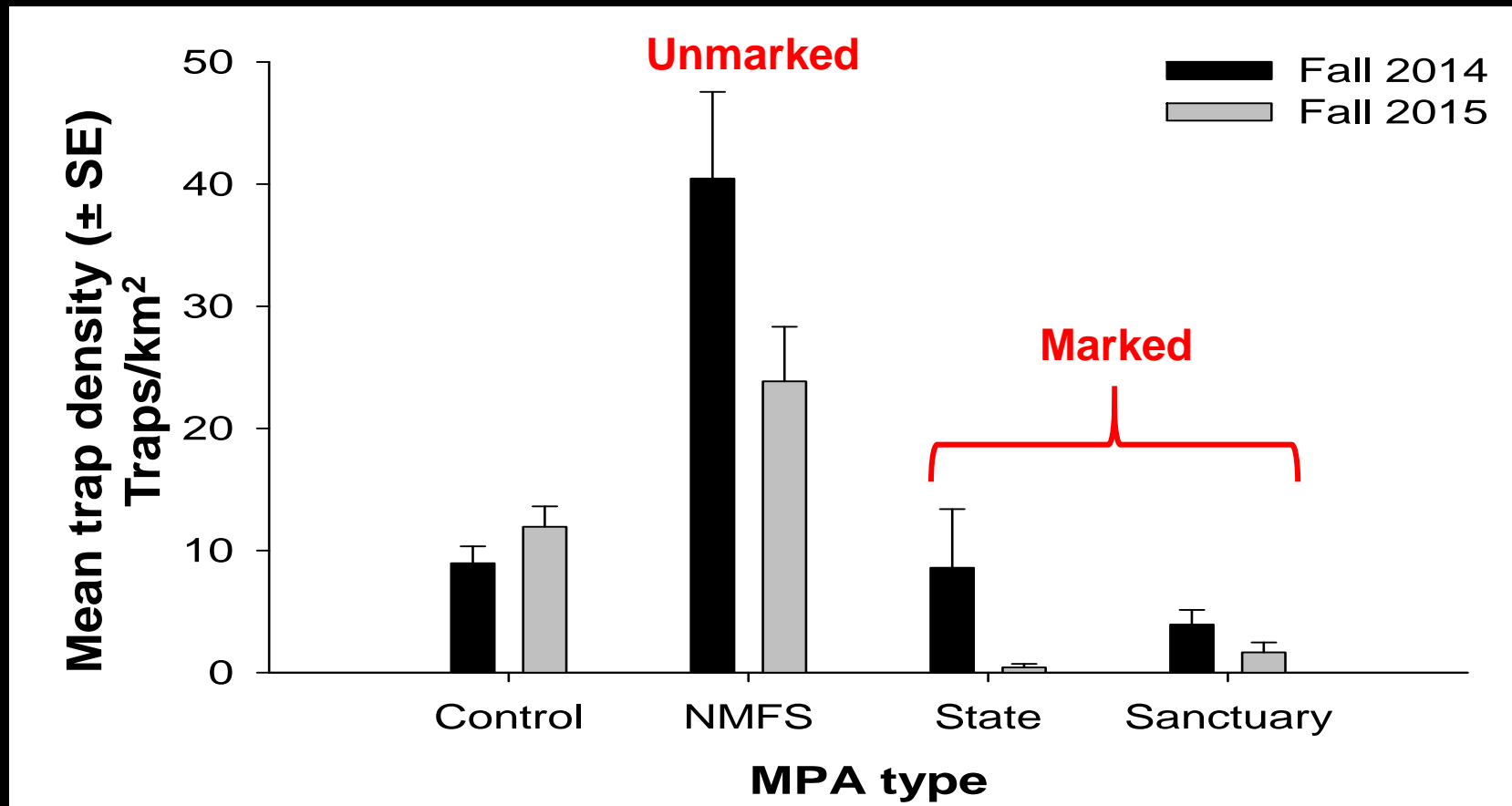
Results



Trap set inside Sanctuary MPA boundary

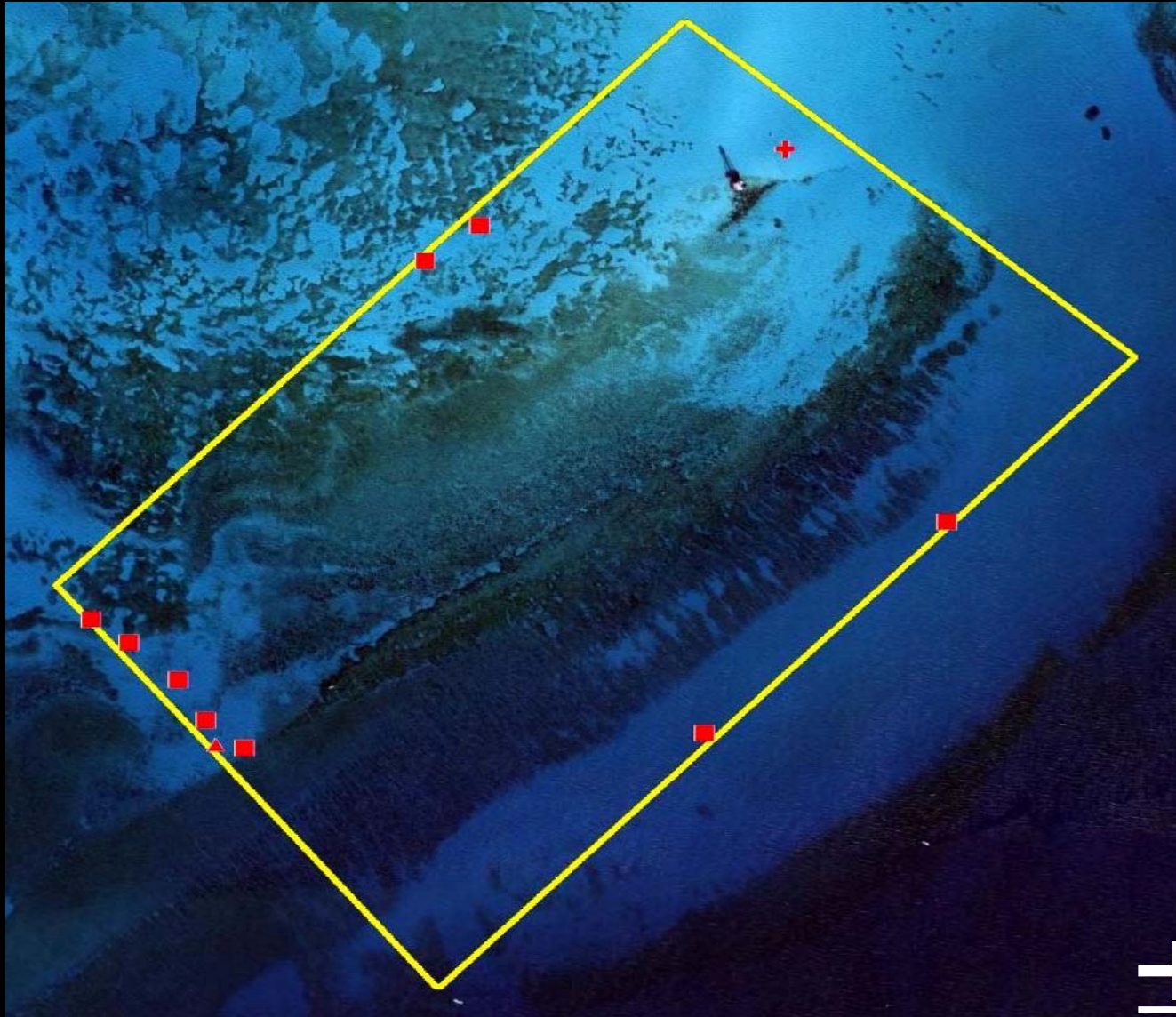
Sanctuary MPA boundary marker

Density of Traps in MPAs



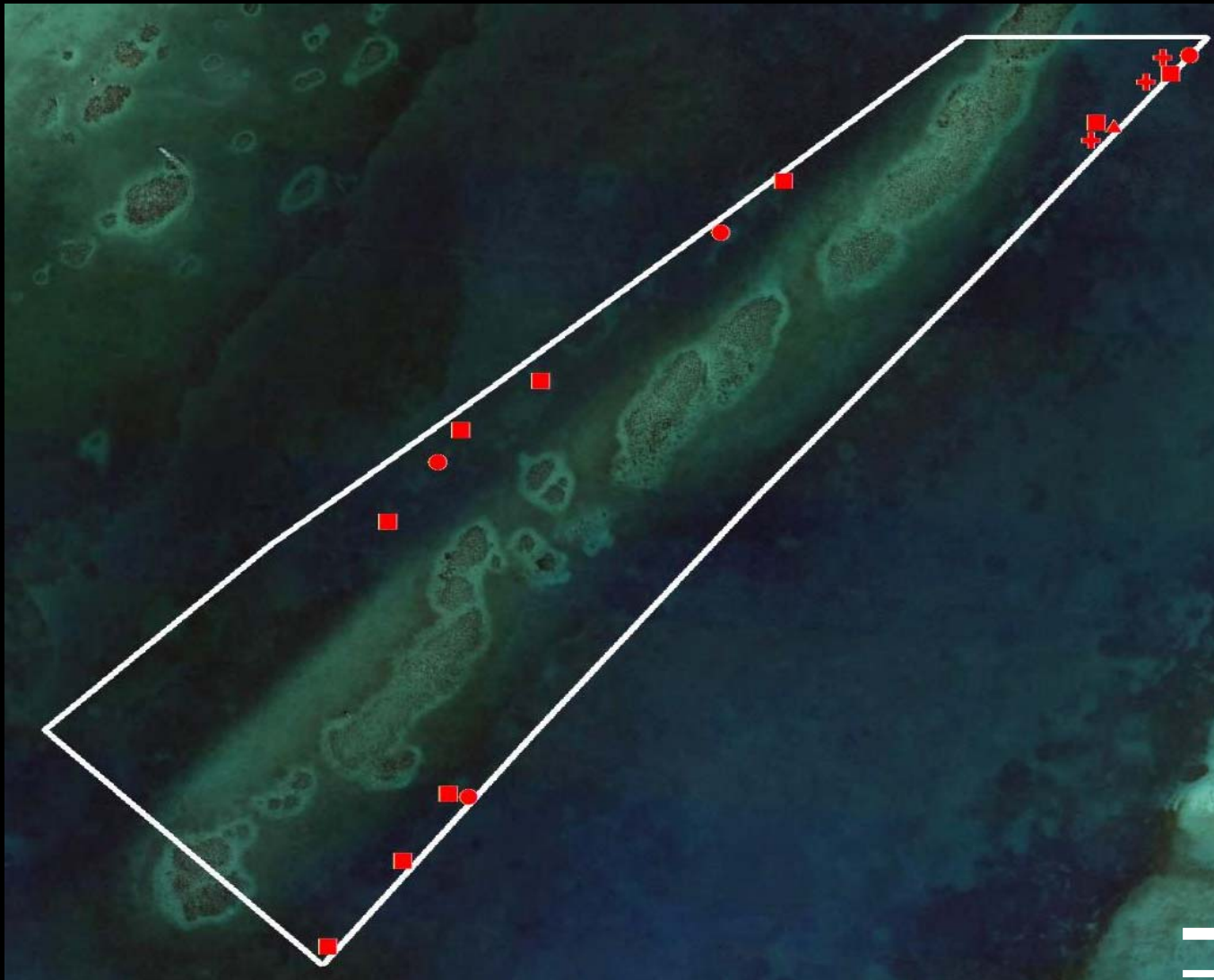
- Unmarked MPAs had highest density of traps
- Density of traps in MPAs decreased post education

Trap Locations in Sanctuary MPAs



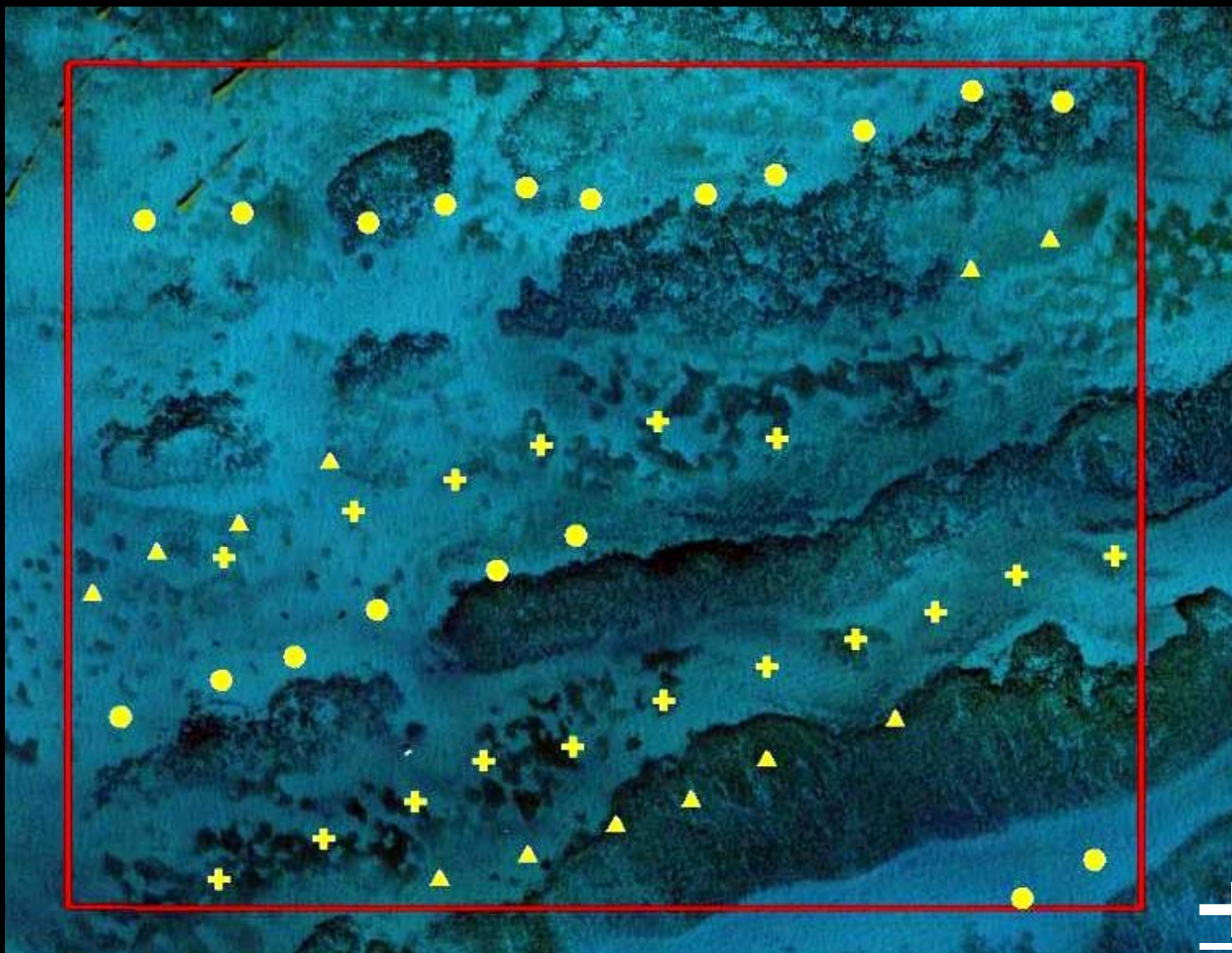
Alligator Reef Size: 0.84 km²

Trap Locations in State MPAs



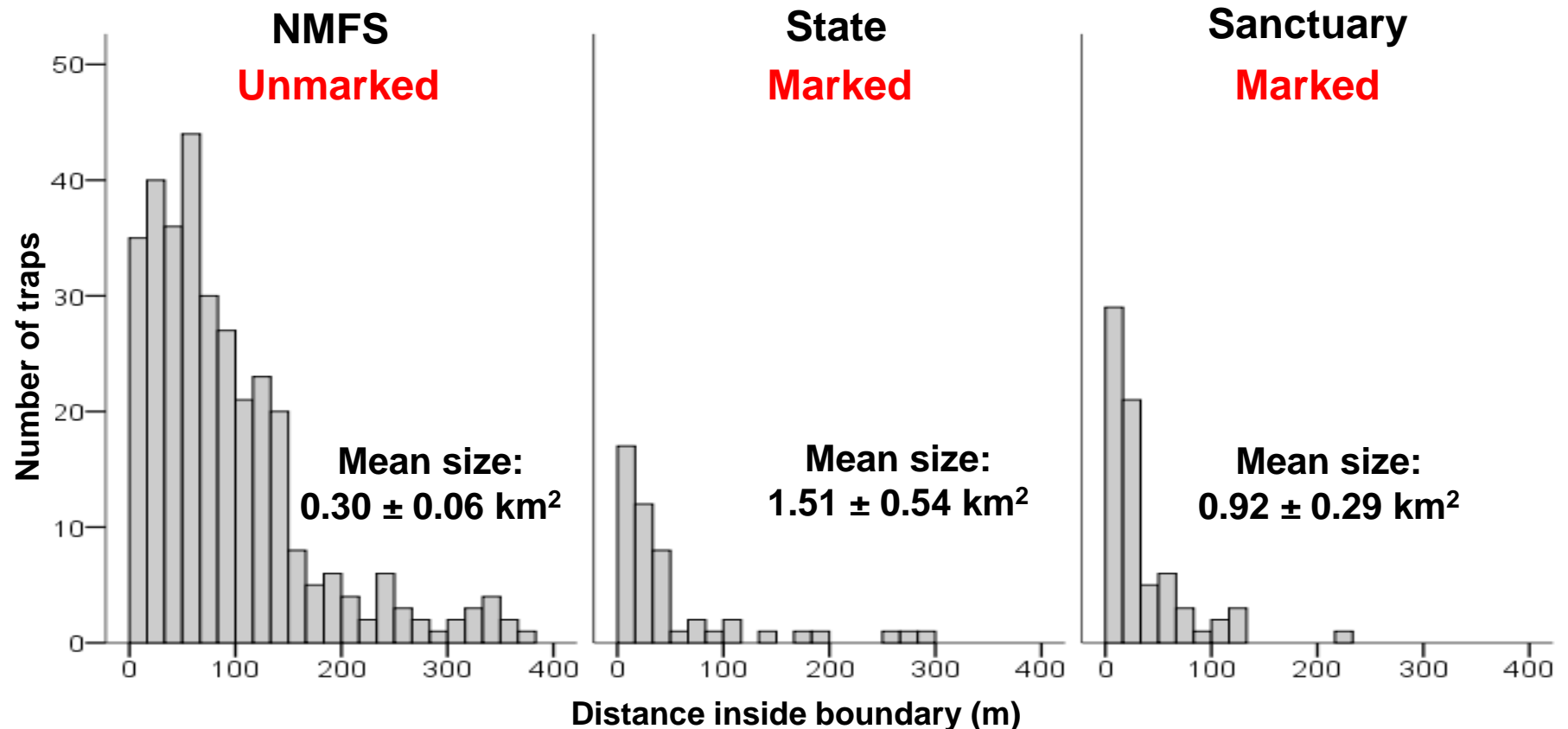
Mosquito Bank South Size: 0.52 km²

Trap Locations in NMFS MPAs



NMFS 12 (Big Pine Shoal) Size: 0.76 km²

Traps Inside MPAs: Distance from Boundary



- Traps concentrated near boundaries of marked MPAs
- Traps evenly distributed throughout unmarked MPAs

Trap Fishermen in MPAs

- Number of fishermen
 - Year 1: 32
 - Year 2: 20
 - 13 of the same fishermen from Year 1
 - 7 new fishermen
 - 19 fishermen counted in Year 1 were not counted in Year 2



MPA type	Average number of fishermen (\pm SE)	
	Fall 2014	Fall 2015
NMFS <i>Acropora</i> Protection Zones (NMFS)	2.2 \pm 0.3	1.7 \pm 0.4
Pennekamp Lobster Exclusion Zones (State)	2.0 \pm 0.7	0.3 \pm 0.2
FKNMS Sanctuary Preservation Areas (Sanctuary)	1.2 \pm 0.3	0.4 \pm 0.2
Controls	2.3 \pm 0.4	3.1 \pm 0.4

Results Summary

- More traps in unmarked MPAs
- Most traps near boundaries in marked MPAs
- Improved compliance after education
 - 19 out of 32 fishermen removed traps from MPAs (~60%)
 - 7 additional fishermen in MPAs in Year 2



Evaluating Marine Debris Accumulation

- **Methods:**

- Summer 2015

- Diver transects: 100 m long x 15 m wide (n=261)

- Recorded:

- Debris type

- Habitat type

- Distance on transect



Results Summary

- Trap debris was most prevalent type of marine debris
 - Accumulated in coral reef habitat
 - Found in all types of MPAs surveyed



Conclusions

- Education effort improved compliance
- Marked MPAs had better compliance
- Area protected by MPAs is smaller than intended due to traps fished inside boundaries
- MPAs may not protect corals from trap debris because of wind-driven transport of traps



Thank You

