Lobster Trap Debris in Florida Keys National Marine Sanctuary

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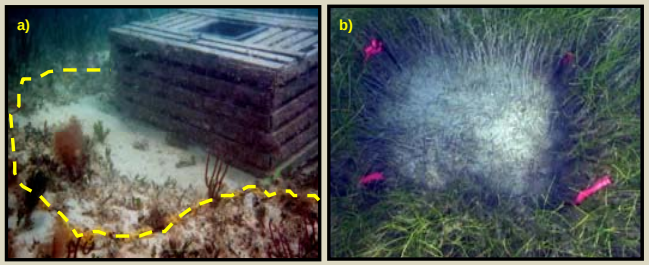
THE ISSUE

- Number of annually-permitted lobster traps averages 478,000
- Tens of thousands of traps lost annually during routine fishing; losses greatly exacerbated by hurricane activity
- Extended trap deployment and wind-driven trap movement damages benthic habitats in FKNMS = loss of ecosystem services
- Derelict trap retrieval programs are prohibitively expensive and remove < 5% of derelict traps annually

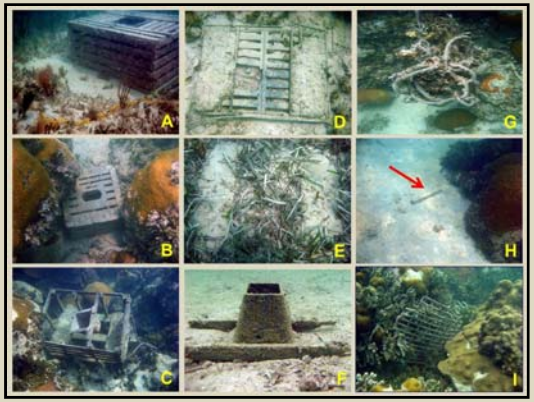


Lobster trap impacts: a) abrasion halo from wind-generated movement on hardbottom and b) bare footprint from prolonged deployment (6 months) on seagrass

METHODS

- Towed-diver surveys to identify all observed marine debris in bare substrate, seagrass meadows, algae beds, hard bottom, coral reefs
- Surveys conducted in 6 historic trap-use zones
- Paired divers towed for 1 km – each diver surveyed 2 meters on either side of tow line = 8000 m² swath per tow

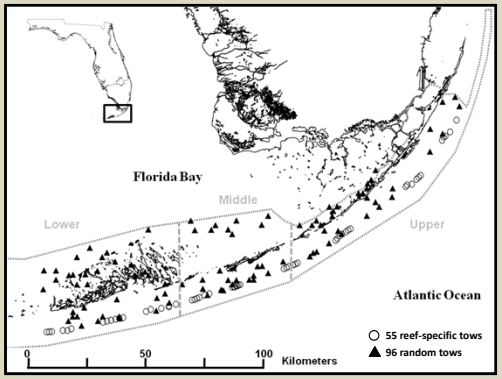
Towed-diver underway



Ghost traps (intact, fishing) for spiny lobster (A) and stone crab (B), and stages of degradation considered nonfishing traps: intact trap bottom with framing (C); intact trap bottom (D), and paired concrete ballast slabs (E). Additional categories included plastic funnel entrance (throat, F), rope (G), wood slats (H), and wire components (I).

RESULTS

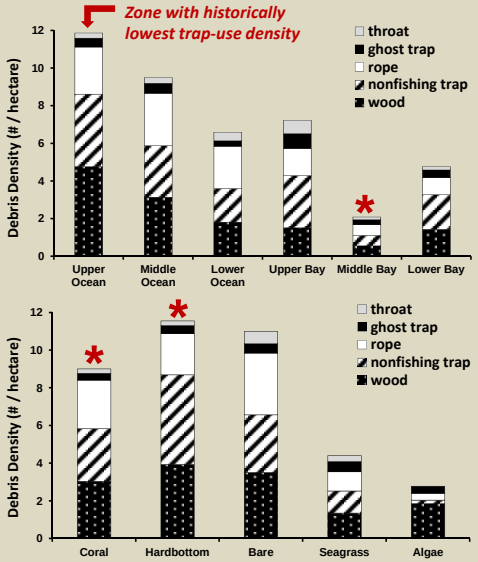
- Completed 151 tows covering an area of 120.8 hectares
- 1408 debris items: ~70% trap-related; ~30% non-trap
- 85,548 ghost traps and 1,056,127 nonfishing traps/trap remnants estimated to be in study area



Locations of towed-diver marine debris surveys conducted in the Florida Keys National Marine Sanctuary. The vertical dashed lines separate the six historic trap-use zones. The dotted line is the boundary of the Sanctuary encompassing our sample domain.

RESULTS

- Significant effect of trap-use zone and habitat on trap debris density
- Lowest density of debris in highest trap-use area*
- Coral-dominated habitats had greatest density of trap debris*



Mean (± SE) debris density (# incidences per 0.8-ha transect) in each trap-use zone (top) and habitat category (bottom)

CONCLUSIONS

- Bulk of observed marine debris originated in spiny lobster fishery
- Trap debris not proportionally distributed with fishing effort; other factors likely at play (i.e., redistribution of debris by storms)
- Coral-dominated habitats may entrap debris more readily and facilitate trap degradation vs. less structurally complex habitats (i.e., seagrass)
- Area of affected seafloor may exceed 600,000 m² given our estimates of lost traps and considering a trap footprint of 0.6 m²
- Removal programs should focus on vulnerable coral-dominated habitats

Acknowledgments

Funding by the NOAA Marine Debris Program and direct support from the NOAA National Centers for Coastal Ocean Science. We thank R. Bertelsen, C. Cox, O. Eaken, M. Fonseca, J. Hornbeck, J. Hunt, E. Leone, S. Maschal, K. Maxwell, J. Simonds, S. Slade, B. Sympson, J. Vander Pluym, and A. Zito for field and technical support. The views expressed here do not necessarily reflect those of NOAA. Presented at the Joint Graduate Student Recruitment Poster Session, held 7 February 2013, University of Wisconsin Madison, USA.