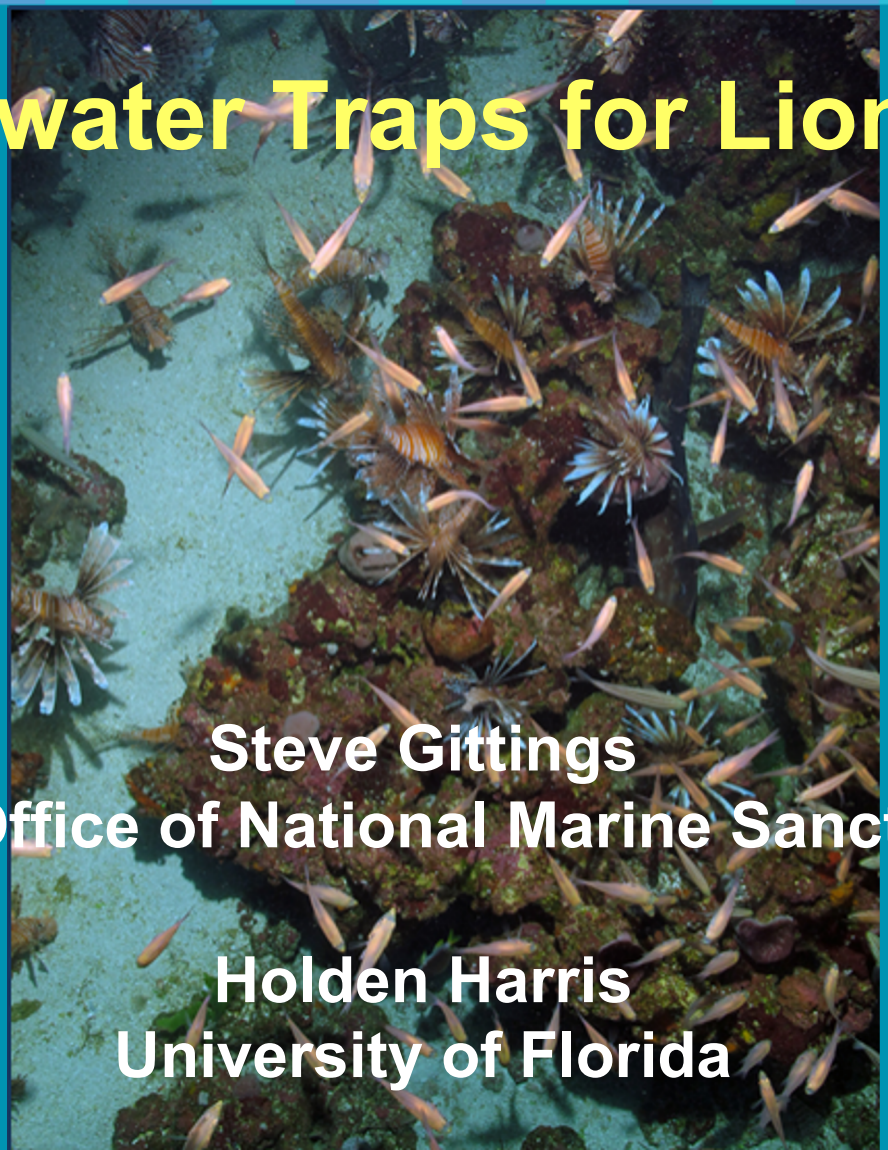
Deepwater Traps for Lionfish



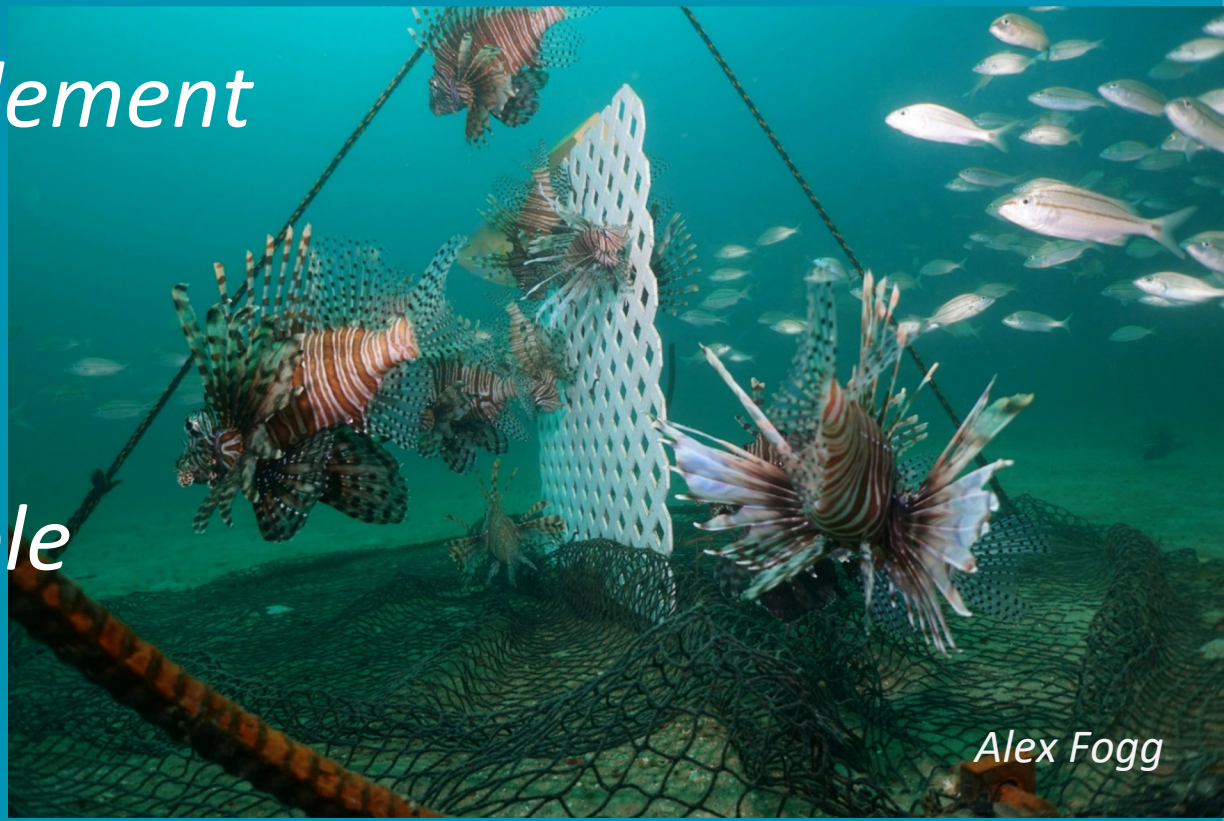
Steve Gittings
NOAA Office of National Marine Sanctuaries

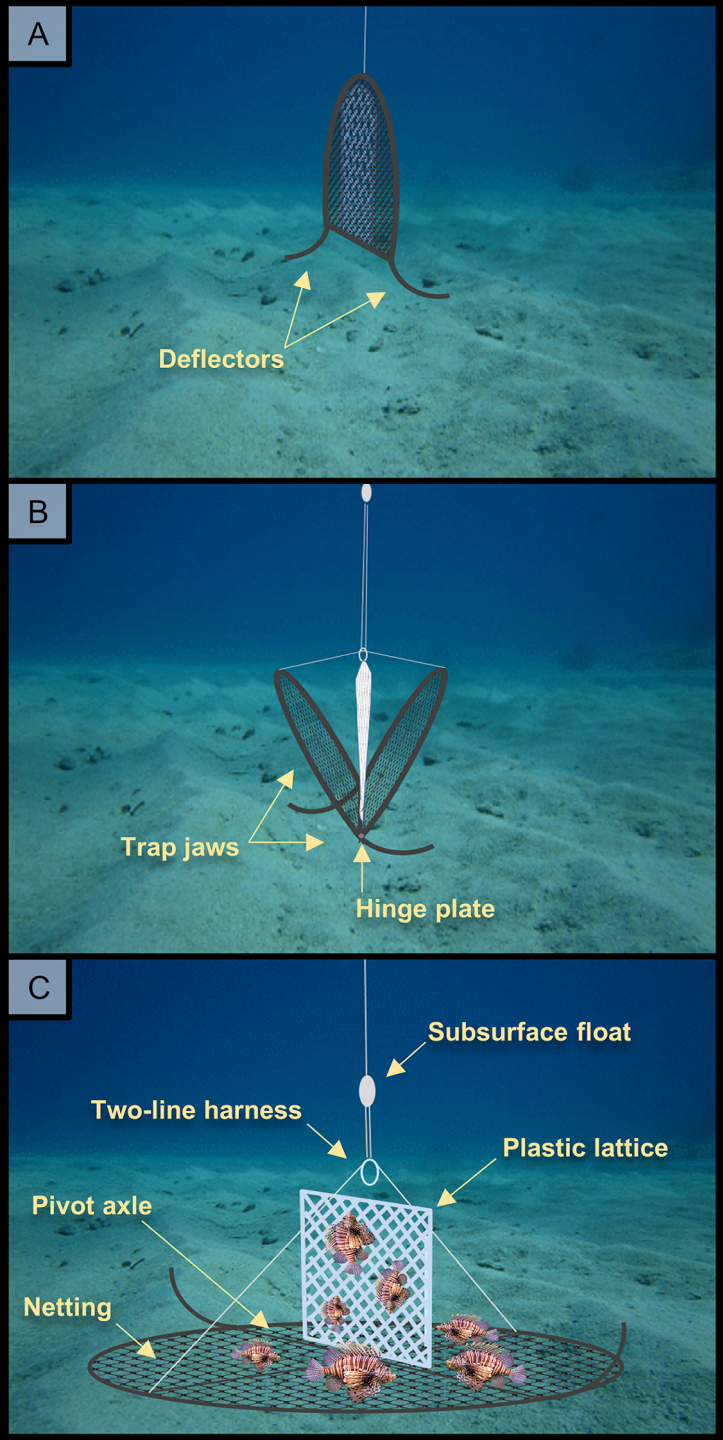
Holden Harris
University of Florida


Depth (meters)
0 to 30
30 to 300
United States
Bermuda
735,000 km2
665,000km2
Atlantic Ocean
Gulf of Mexico
Bahamas
Turks and Caicos Islands
Cuba
British Virgin Islands
Haiti
Jamaica
Mexico
Dominican Republic
Puerto Rico
Antigua and Barbuda
Belize
Guatemala
Honduras
Caribbean Sea
Saint Lucia
El Salvador
Aruba
Barbados
Nicaragua
Grenada
Pacific Ocean
Trinidad and Tobago
Costa Rica
Panama
Colombia
Venezuela
0 100 200 400 Miles

Deep Water Traps

- *Low by-catch (baitless FADs)*
- *No ghost fishing (non-containment)*
- *Low entanglement*
- *Low Impact*
- *Low Cost*
- *Transportable*

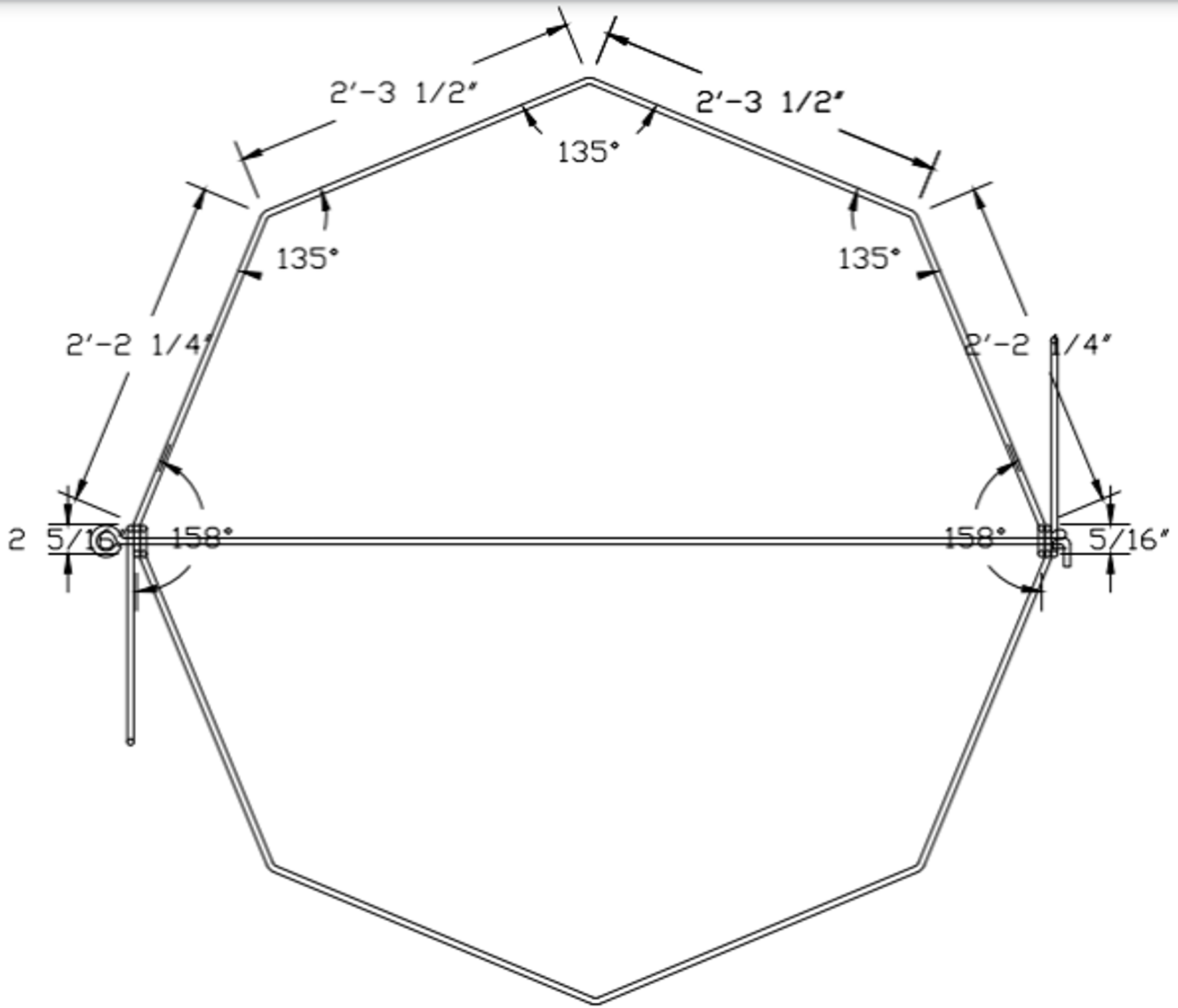




Harris et al. 2020, PLoS One

Deployment

Retrieval

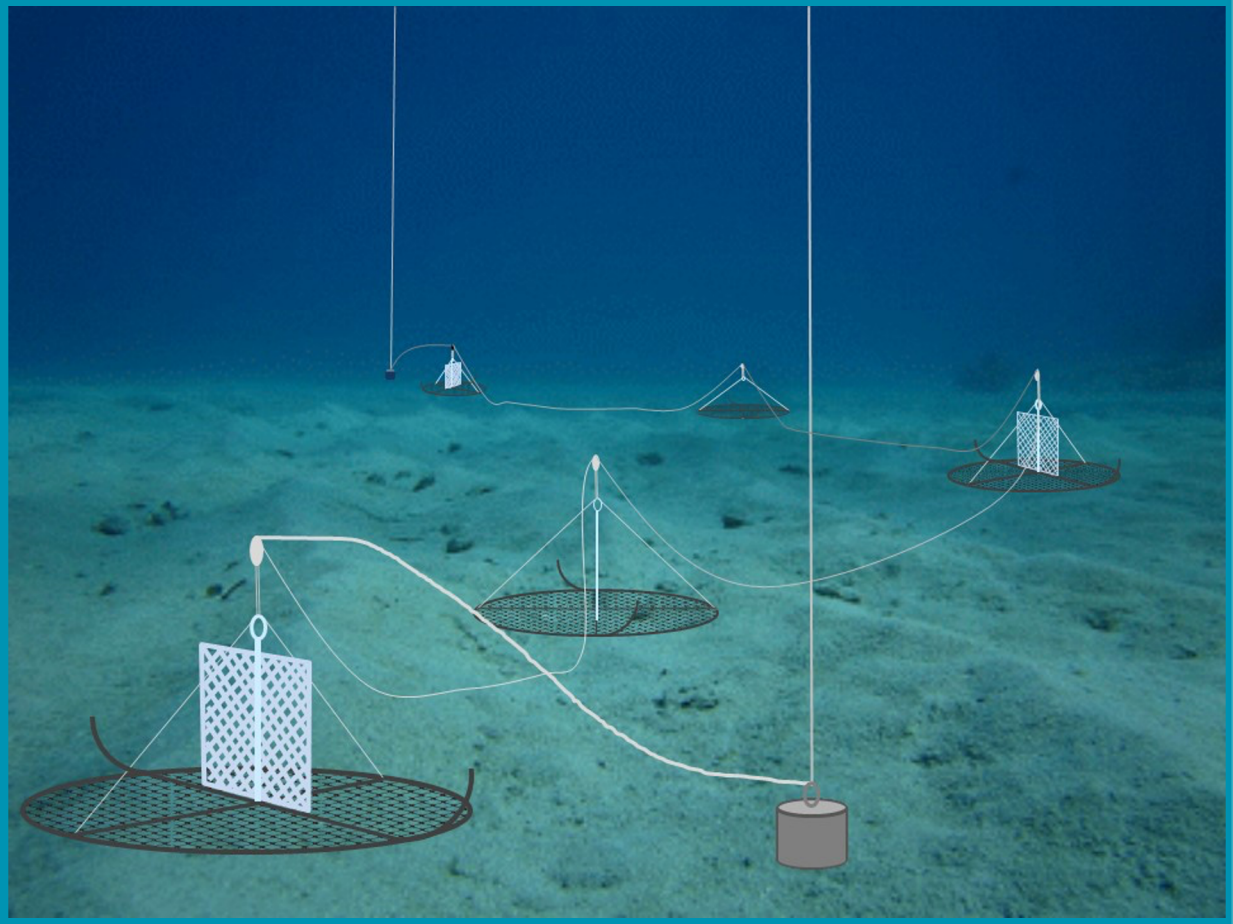

2'-3 1/2"
2'-3 1/2"
135°
135°
135°
2'-2 1/4"
2'-2 1/4"
2 5/16"
158°
158°
5/16"

Commercial Tests

Gear improvements

Fishing approaches

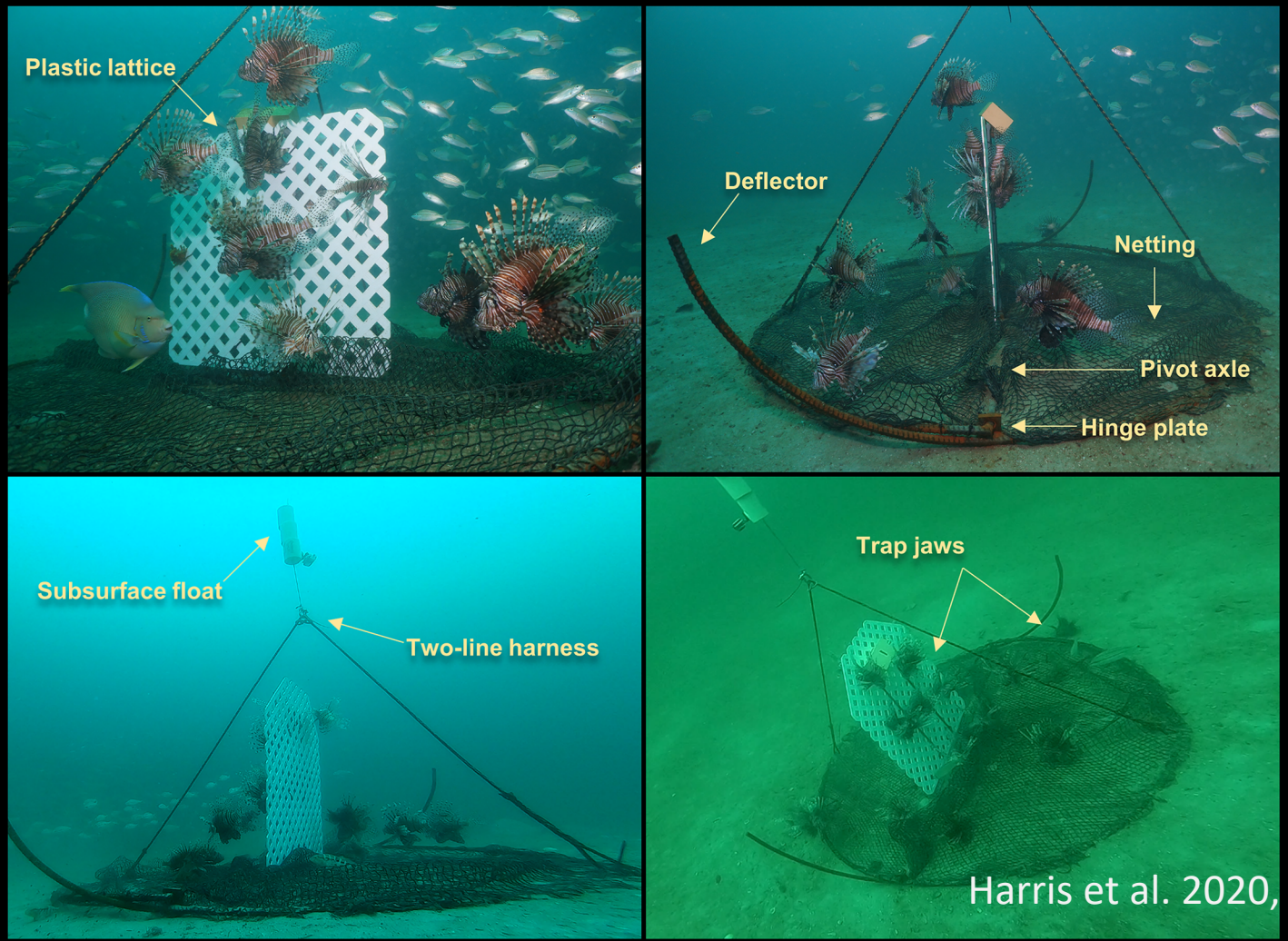
Placement/Habitats



Trap Tests

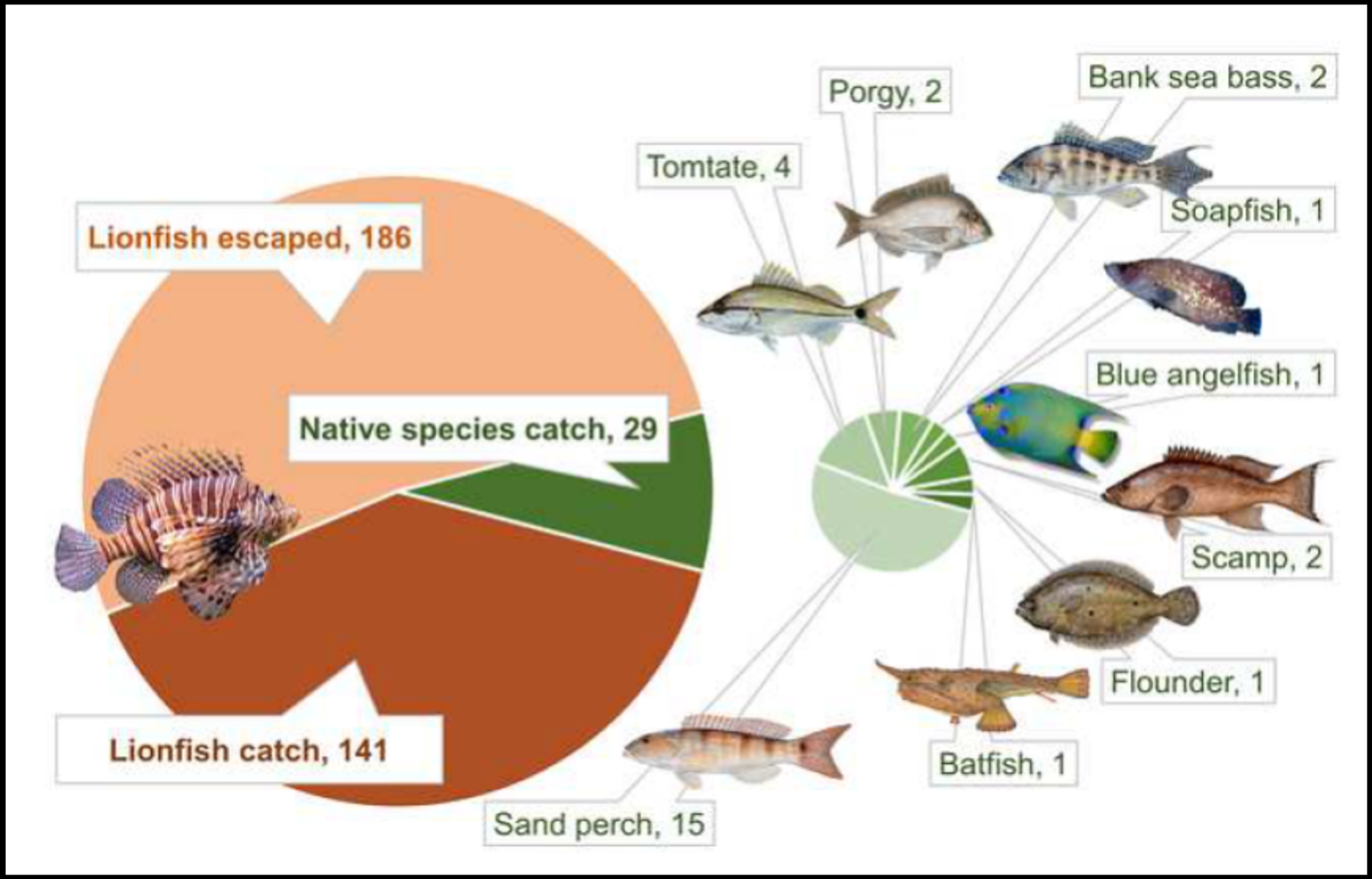
Shallow artificial reefs

Deep natural reefs



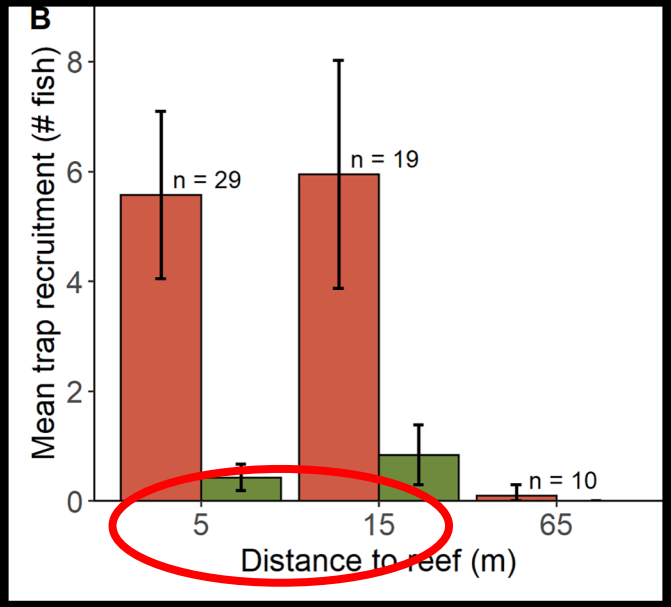
Harris et al. 2020, *PLoS One*

Low Bycatch in Lionfish Traps

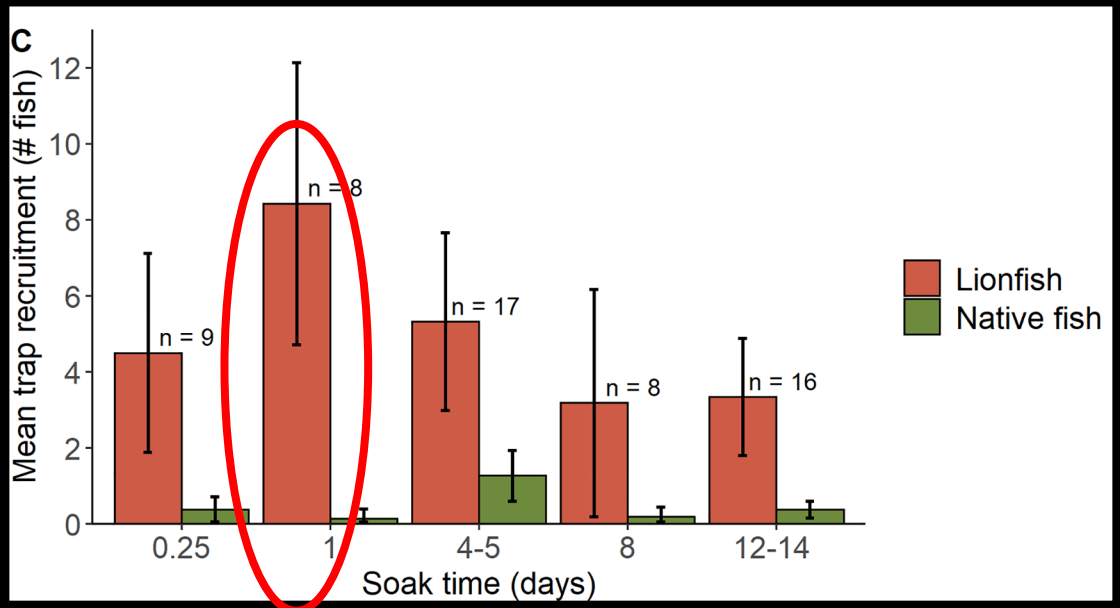


Harris et al. 2020, *PLoS One*

Source Distance

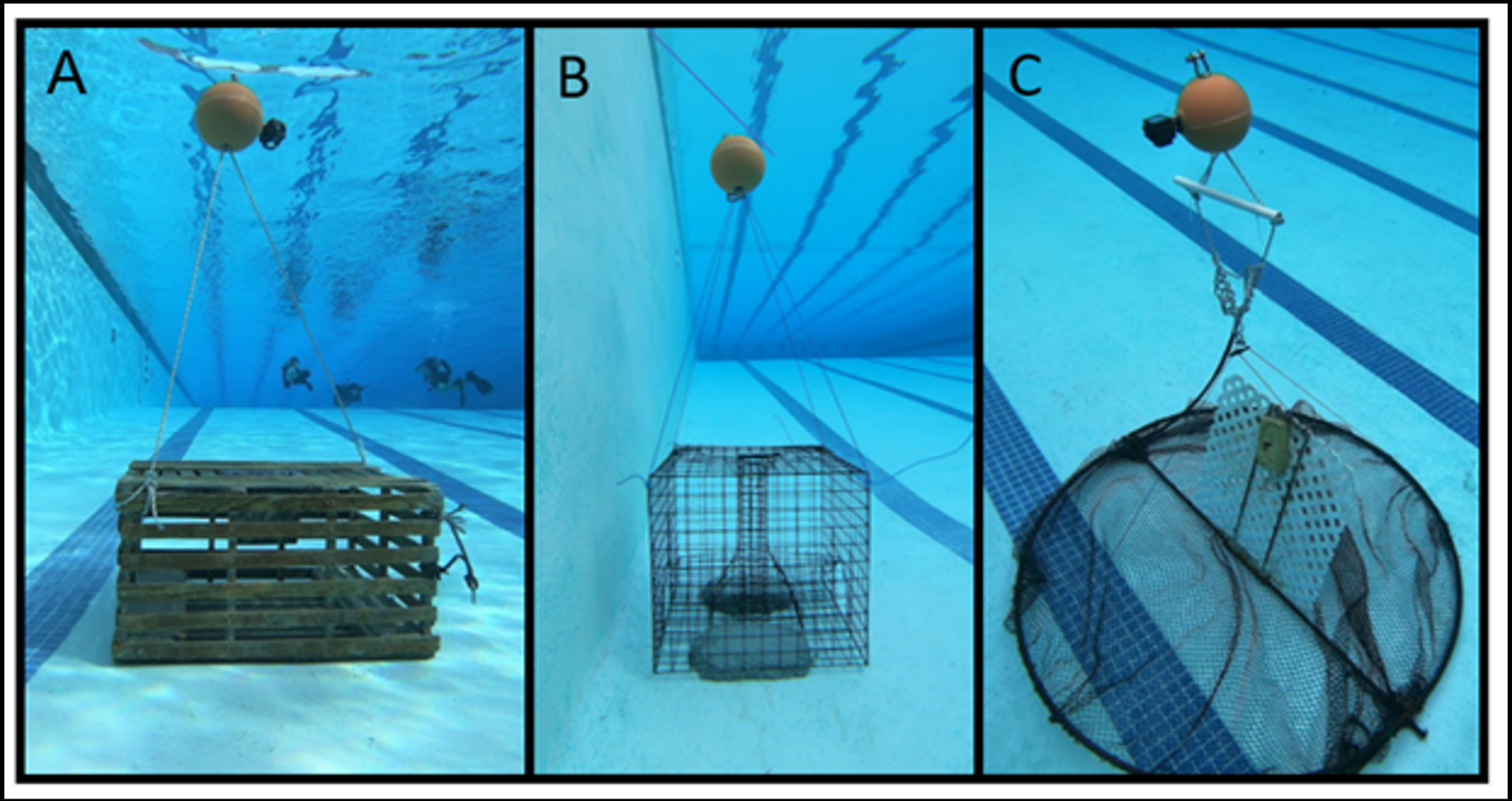


Soak Time



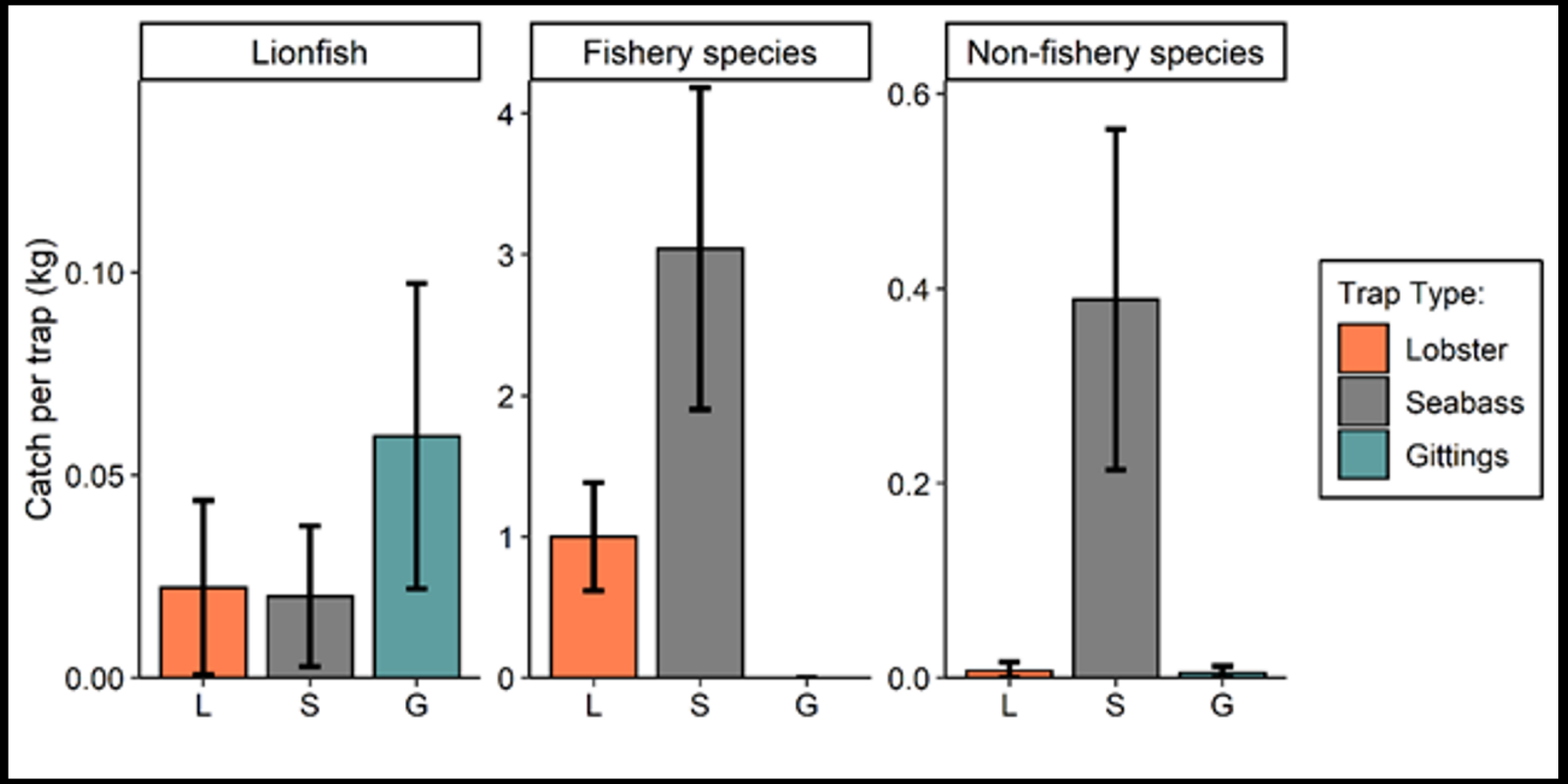
Harris et al. 2020, *PLoS One*

Lobster Seabass Lionfish



Harris et al. in prep, *Frontiers Mar. Sci.*

Catch and Bycatch

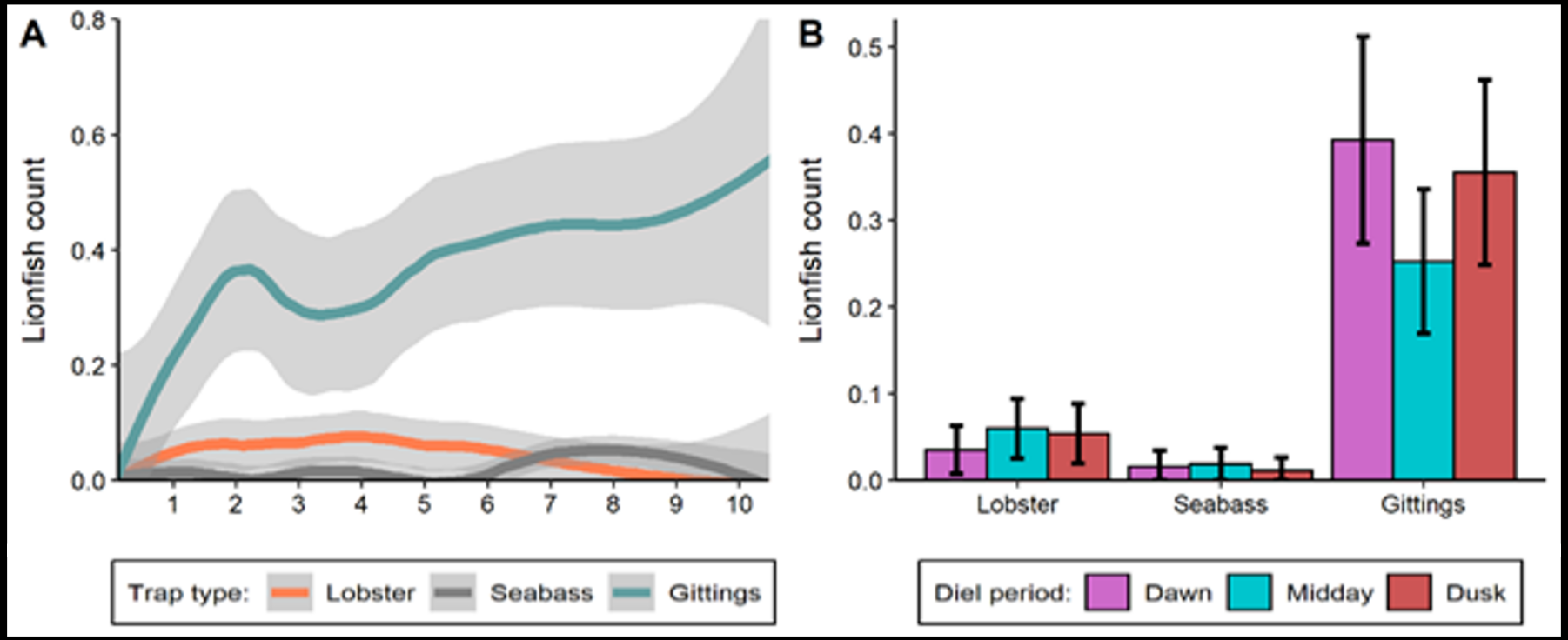


Harris et al. in prep, *Frontiers Mar. Sci.*

High Bycatch in Lobster and Seabass Traps

Photo: H. Harris

Timelapse Cameras



Harris et al. in prep, *Frontiers Mar. Sci.*

Can catch rates support a commercial fishery?

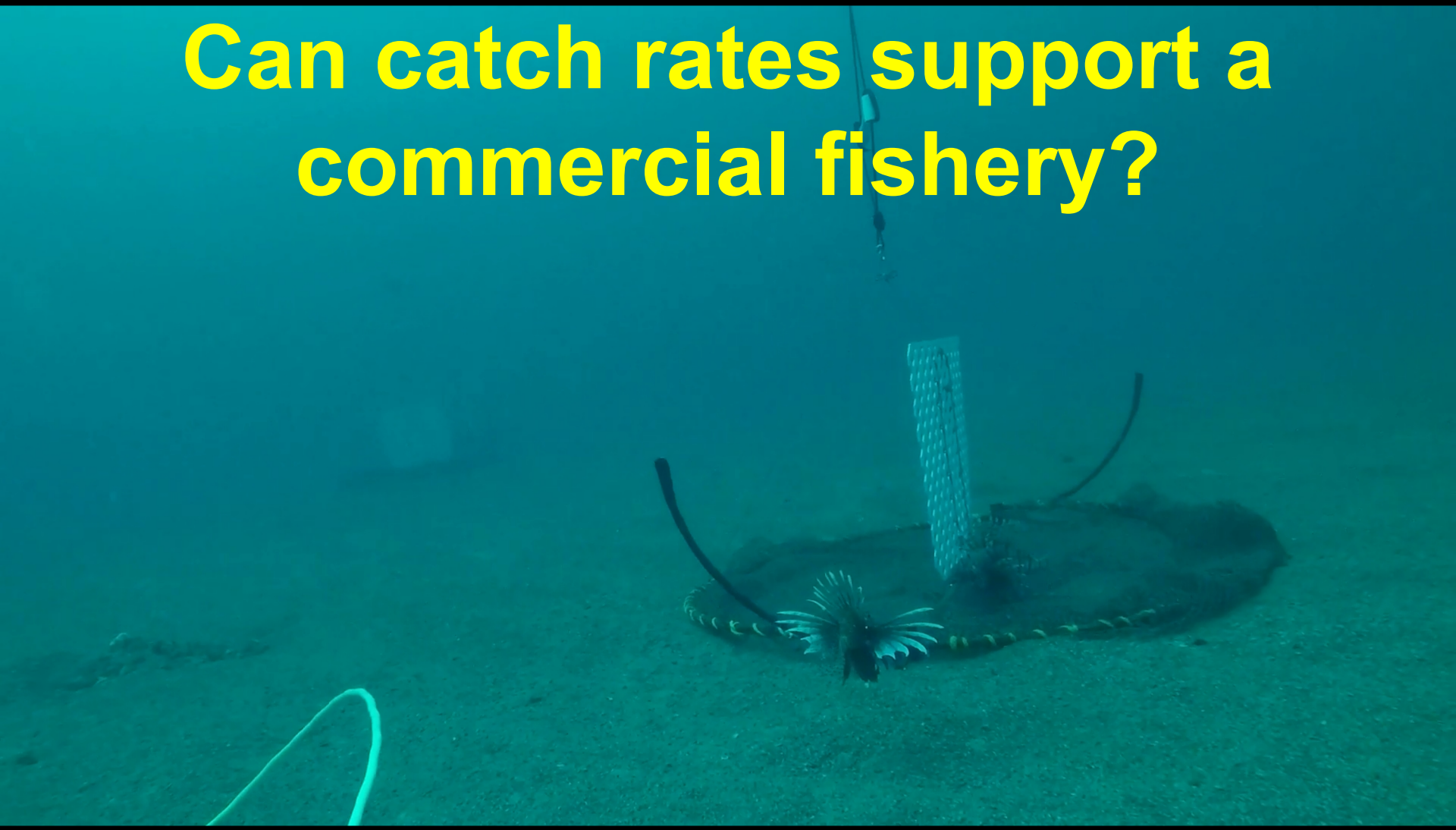


Photo: H. Harris

More info

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RESEARCH ARTICLE

Testing the efficacy of lionfish traps in the northern Gulf of Mexico

Holden E. Harris, Alexander Q. Fogg, Stephen R. Gittings, Robert N. M. Ahrens, Micheal S. Allen, William F. Patterson III

Published: August 26, 2020 • https://doi.org/10.1371/journal.pone.0230985 • >> See the preprint

Abstract

Spearfishing is currently the primary approach for removing invasive lionfish (*Pterois volitans/miles*) to mitigate their impacts on western Atlantic marine ecosystems, but a substantial portion of lionfish spawning biomass is beyond the depth limits of SCUBA divers. Innovative technologies may offer a means to target deepwater populations and allow for the development of a lionfish trap fishery, but the removal efficiency and potential environmental impacts of lionfish traps have not been evaluated. We tested a collapsible, non-containment trap (the 'Gittings trap') near artificial reefs in the northern Gulf of Mexico. A total of 327 lionfish and 28 native fish (four were species protected with regulations) recruited (i.e., were observed within the trap footprint at the time of retrieval) to traps during 82 trap sets, catching 144 lionfish and 29 native fish (one more than recruited, indicating detection error). Lionfish recruitment was highest for single (versus paired) traps deployed <15 m from reefs with a 1-day soak time, for which mean lionfish and native fish recruitment per trap were approximately 5 and 0.1, respectively. Lionfish from traps were an average of 19 mm or 62 grams larger than those caught spearfishing. Community impacts from Gittings traps appeared minimal given that recruitment rates were >10X higher for lionfish than native fishes and that traps did not move on the bottom during two major storm events, although further testing will be necessary to test trap movement with surface floats. Additional research should also focus on design and operational modifications to improve Gittings trap deployment success (68% successfully opened on the seabed) and reduce lionfish escapement (56% escaped from traps upon retrieval). While removal efficiency for lionfish demonstrated by traps (12–24%) was far below that of spearfishing, Gittings traps appear suitable for future development and testing on deepwater natural reefs, which constitute >90% of the region's reef habitat.

Figures