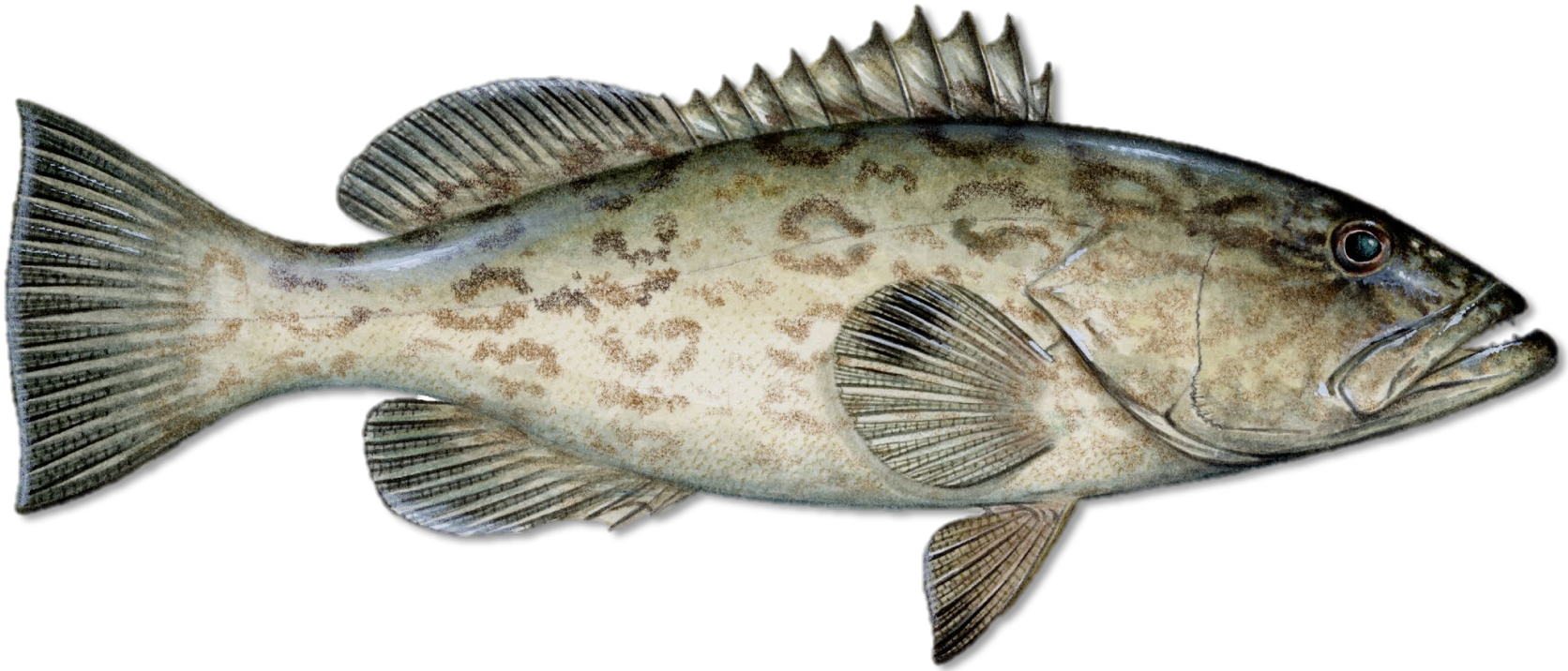
Mitigation of Gag Release Mortality on the West Florida Shelf



Will Patterson, Sue Lowerre-Barbieri, Selia Zimmermann, Zach Siders, Miaya Taylor, and Joe Tarnecki

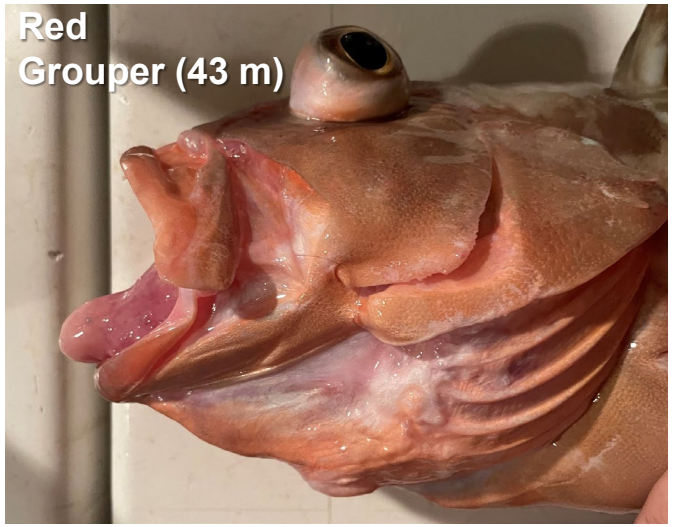
UNIVERSITY of FLORIDA
UF
Marine Fisheries Laboratory

UF IFAS
SCHOOL OF FOREST, FISHERIES, AND GEOMATICS SCIENCES

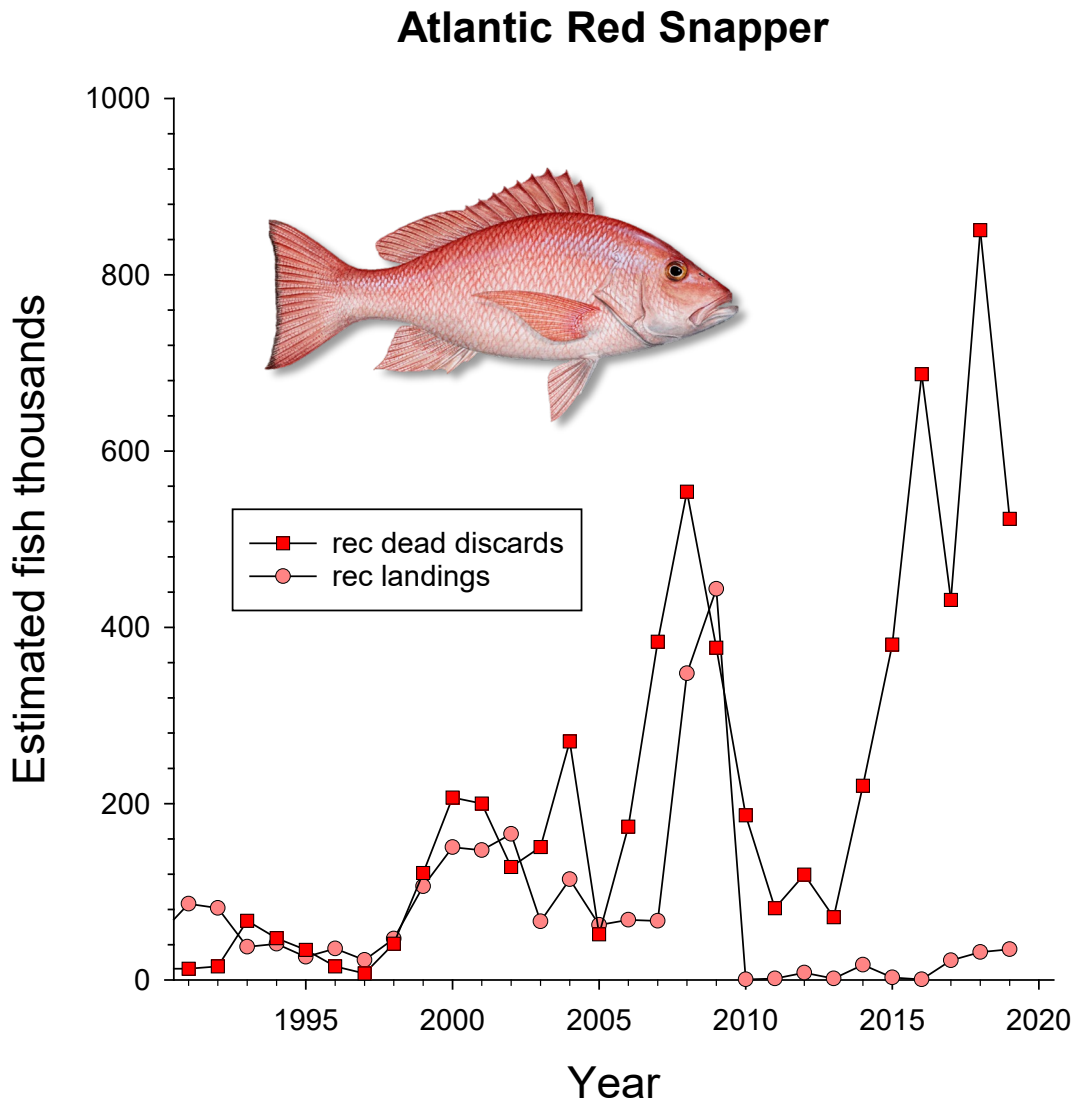
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

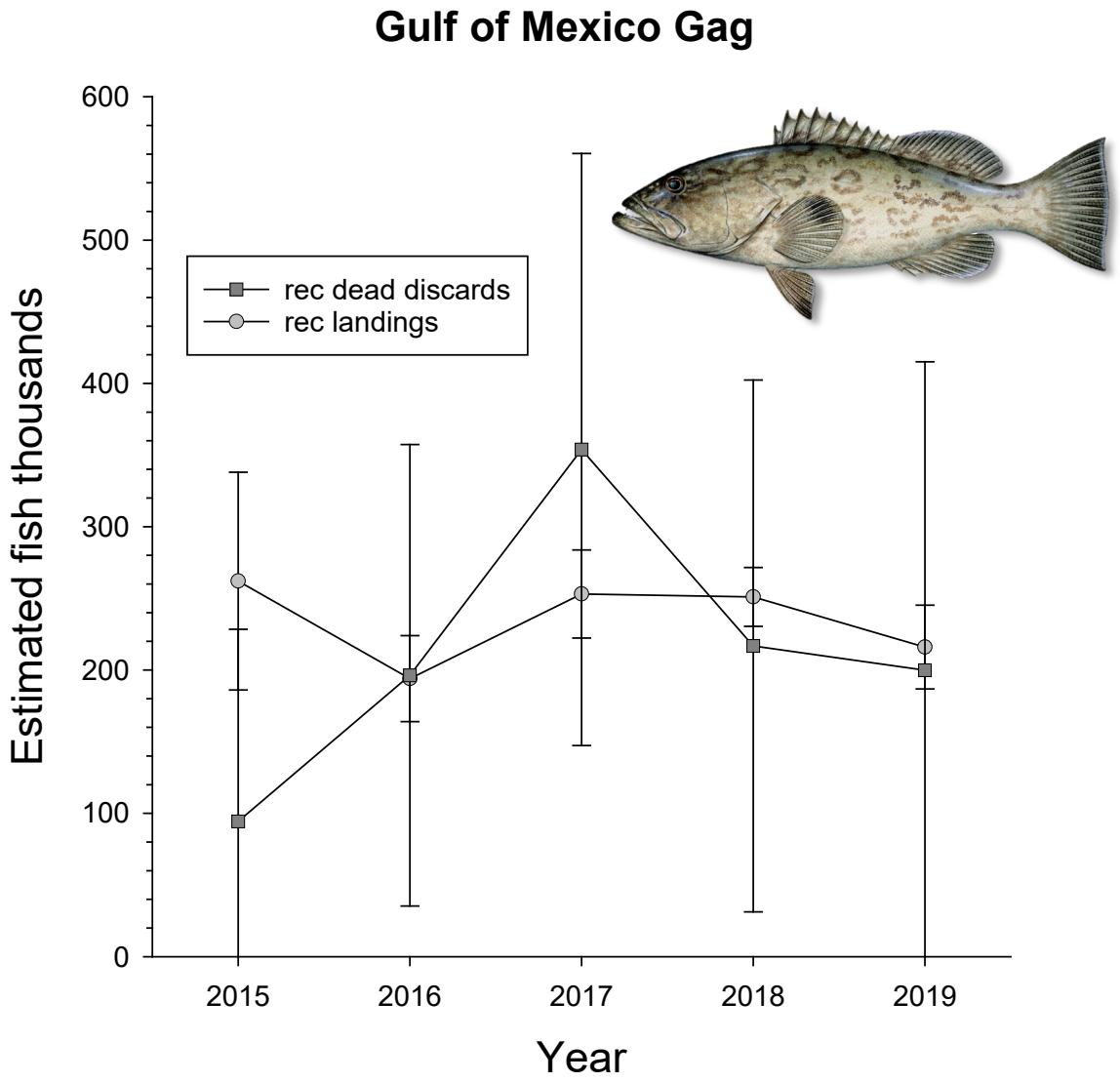
Barotrauma Effects on Reef Fishes

Gulf of Mexico Shelf Species:



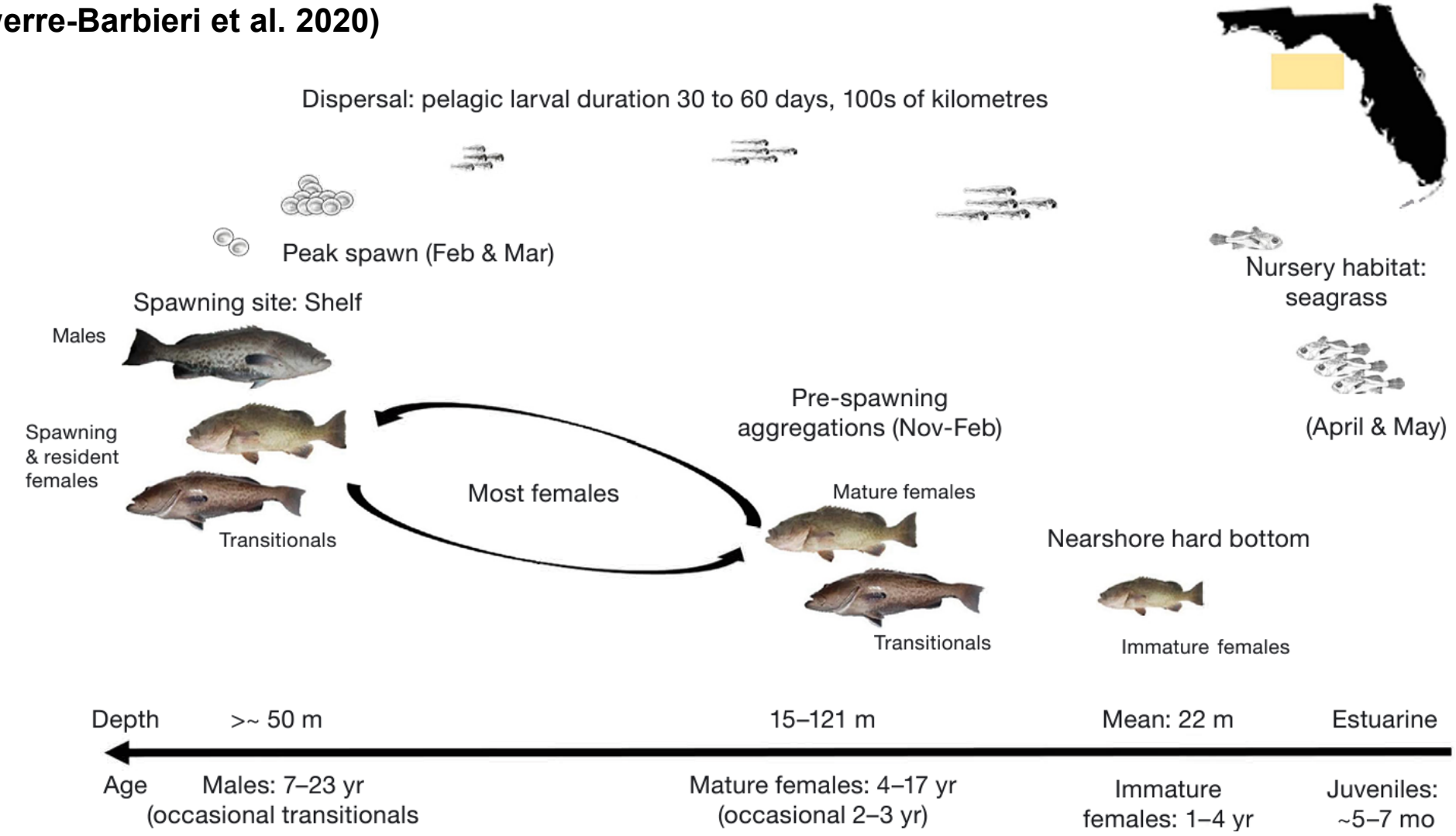
Discard Mortality and Total Kill in Reef Fish Fisheries





Gag Life History and Susceptibility to Barotrauma and CAR Mortality

Conceptual Model of Gag Spatial Ecology:
(Lowerre-Barbieri et al. 2020)



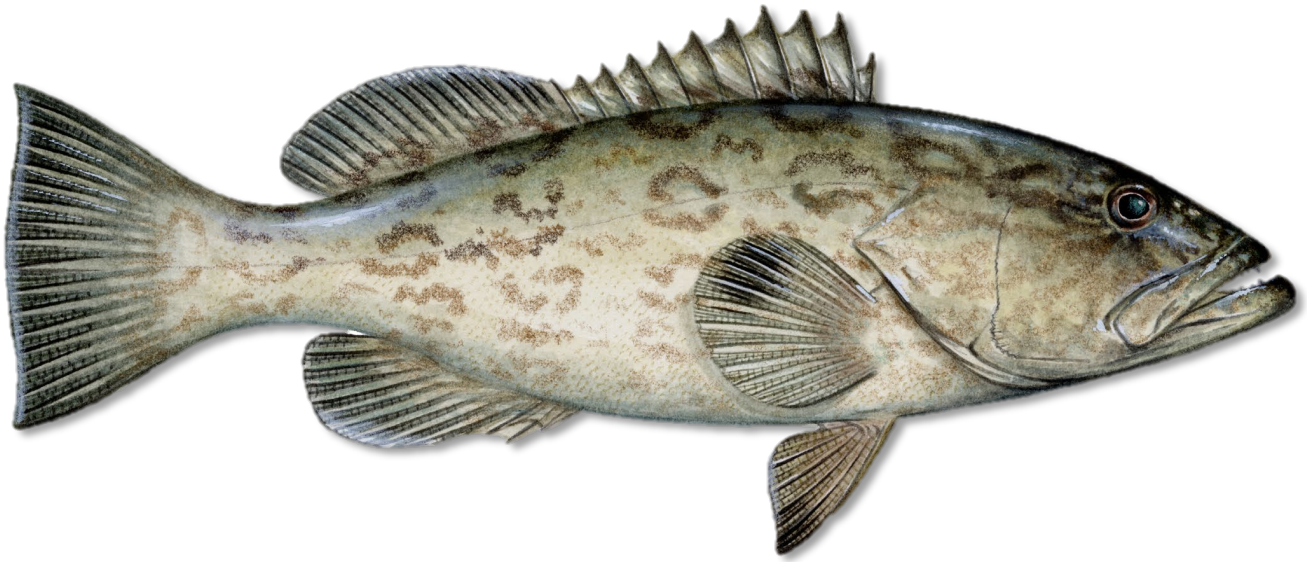
Mitigation of Gag Release Mortality on the West Florida Shelf

Study Objectives:

1) Employ high-resolution 3D acoustic telemetry to estimate the fate (e.g., survival, mortality, depredation, emigration, etc.) of gag captured with recreational fishing gear in the eGOM.

2) Estimate the effectiveness of descender devices to mitigate release mortality.

3) Estimate whether venting gag at the surface enhances post-release survival.



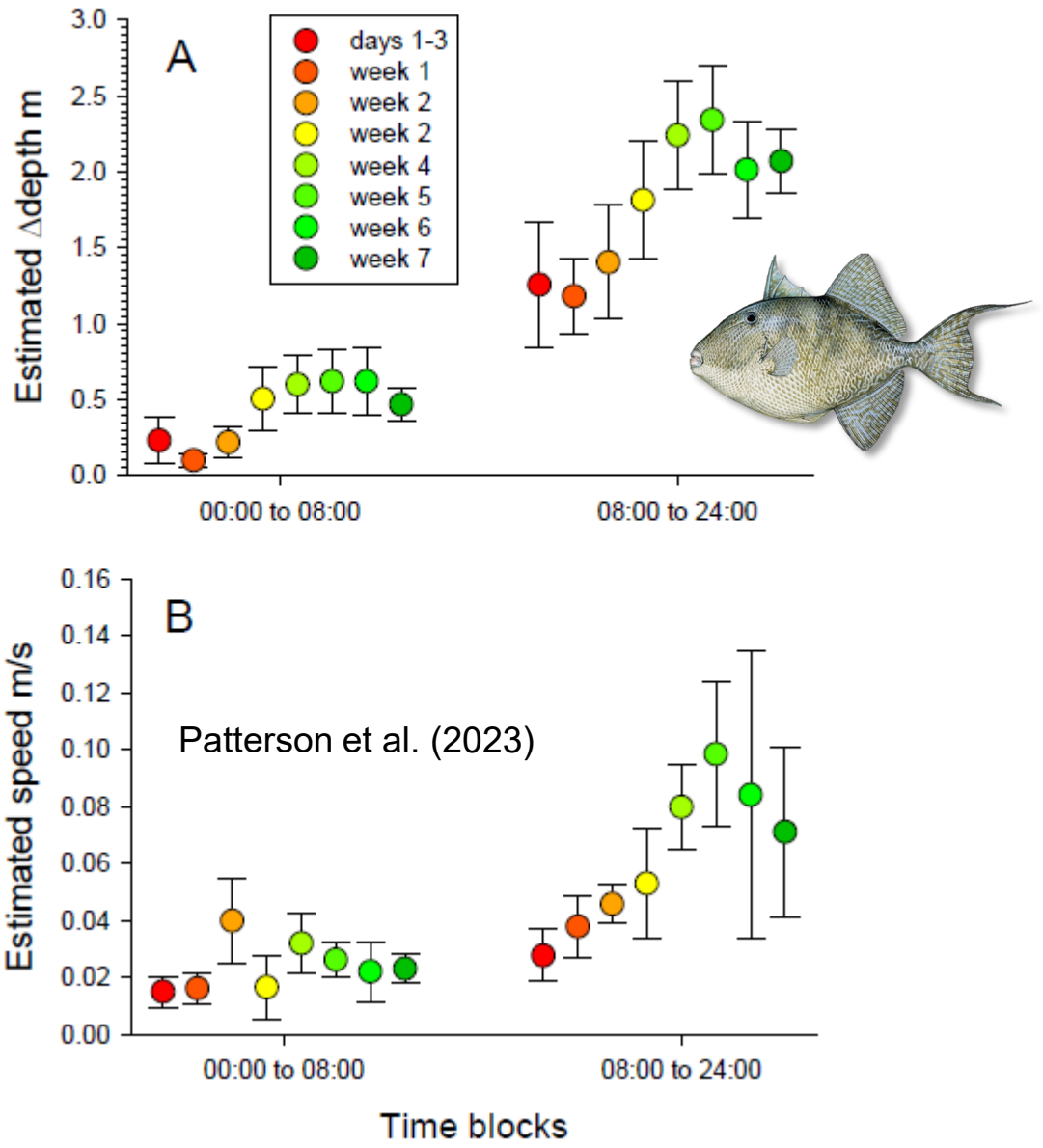
Mitigation of Gag Release Mortality on the West Florida Shelf

Study Design:

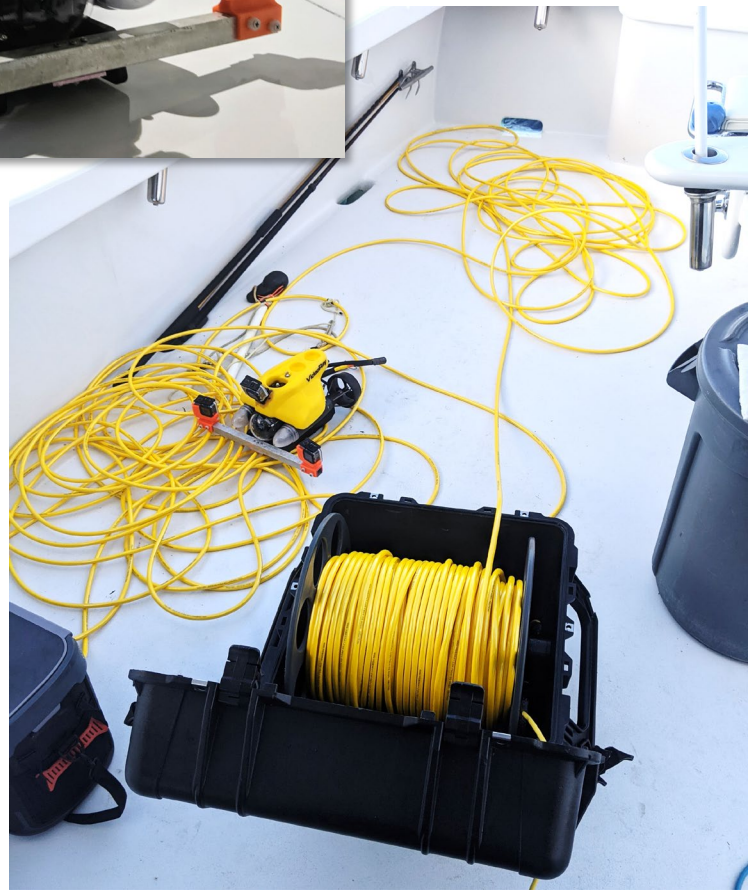
1) Acoustic receiver array off Steinhatchee Florida for 3D telemetry to track fish movement and estimate fate

2) Catch, tag, and release gag at surface (n = 20), at surface following venting (n = 20), and at depth with a descender device (n = 20) in winter and summer

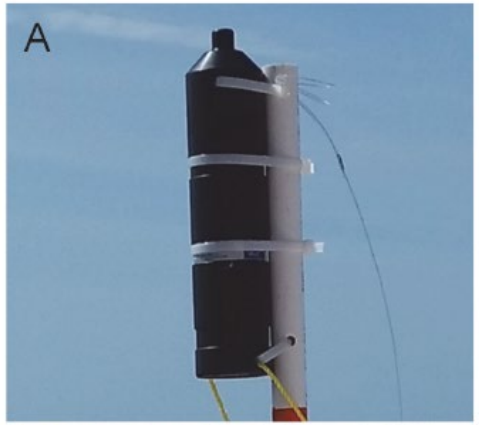
3) Retrieve acoustic receivers and estimate geoposition, movement, and fate of tagged gag

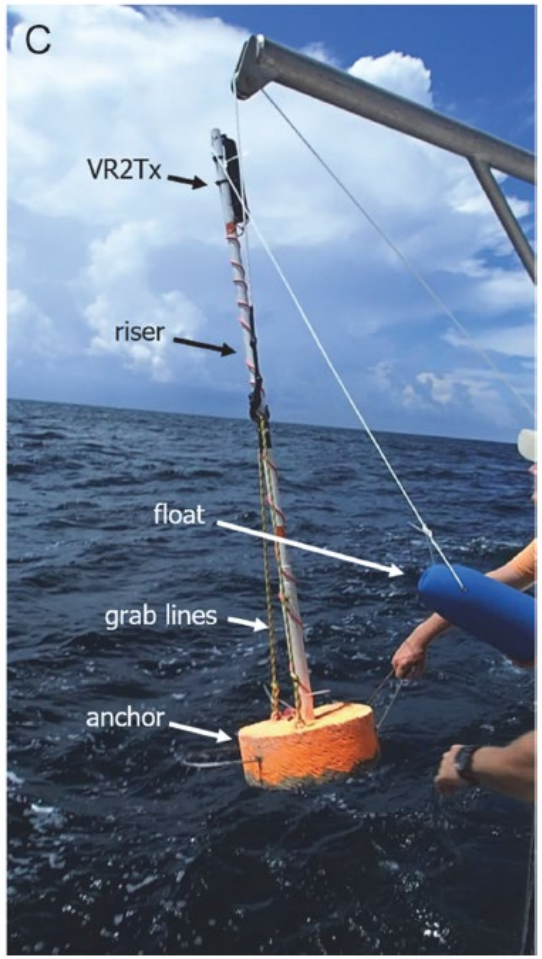


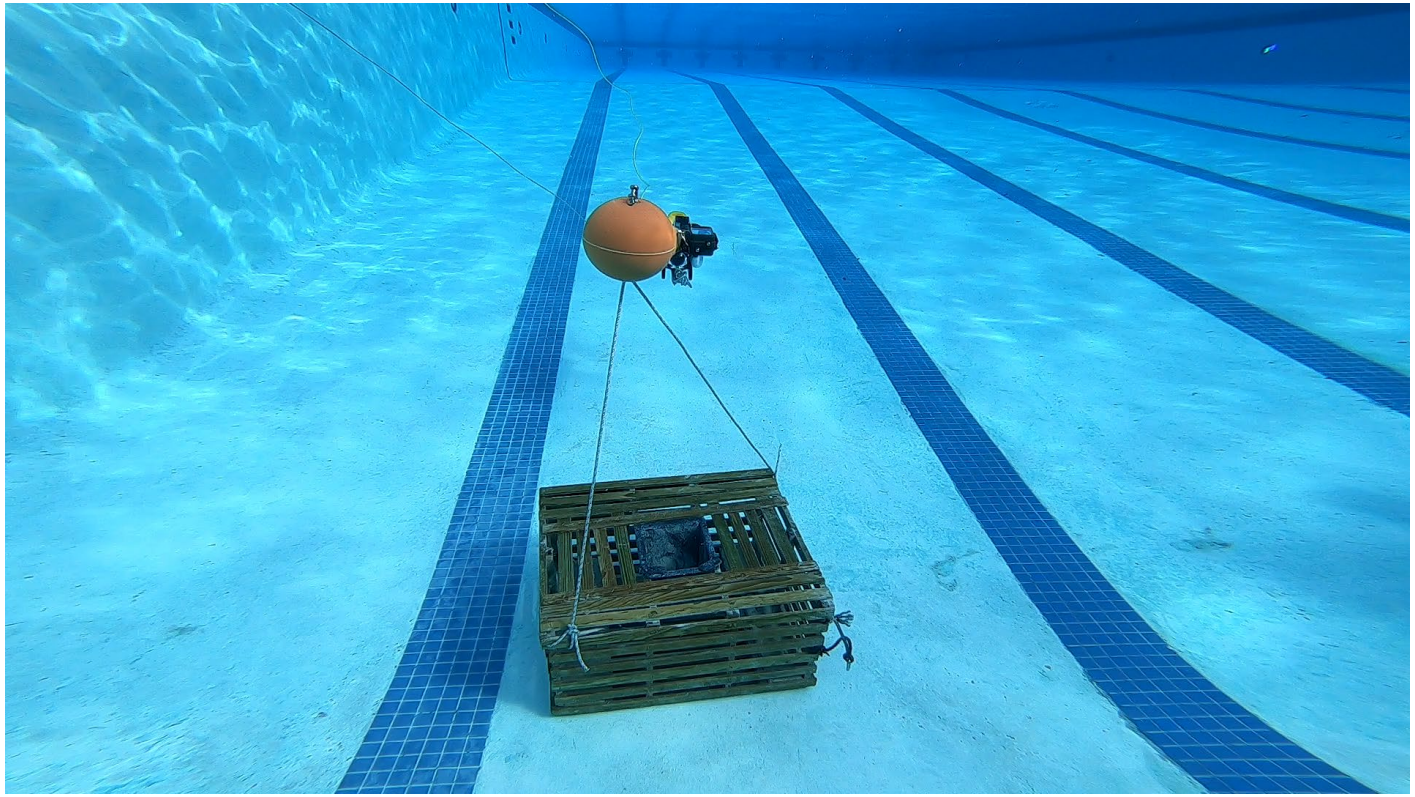
Pre-tagging Reconnaissance with Remotely Operated Vehicle



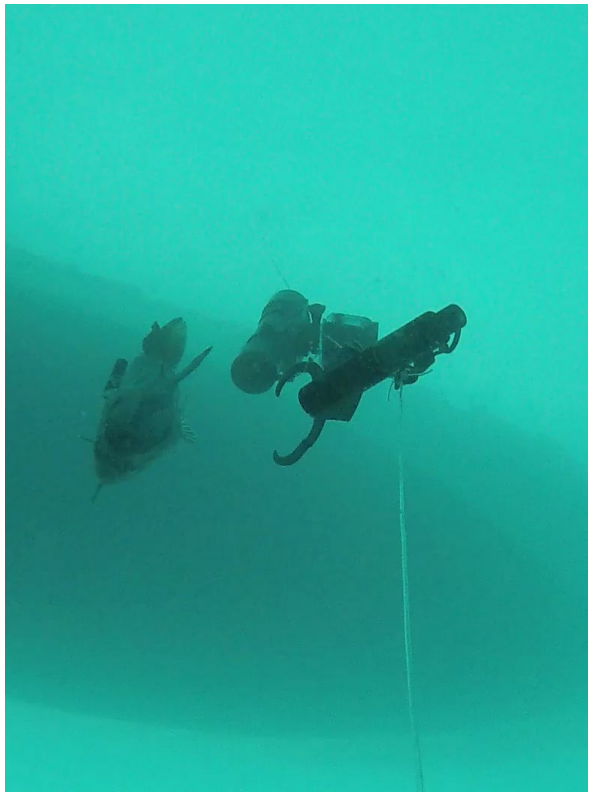
Deploying and Retrieving Acoustic Receivers and Bases







Winter 2023 Gag Tagging



Gag External Telemetry Tag Attachment

Received: 2 September 2021 | Accepted: 3 January 2022
DOI: 10.1111/jfb.14989

REGULAR PAPER

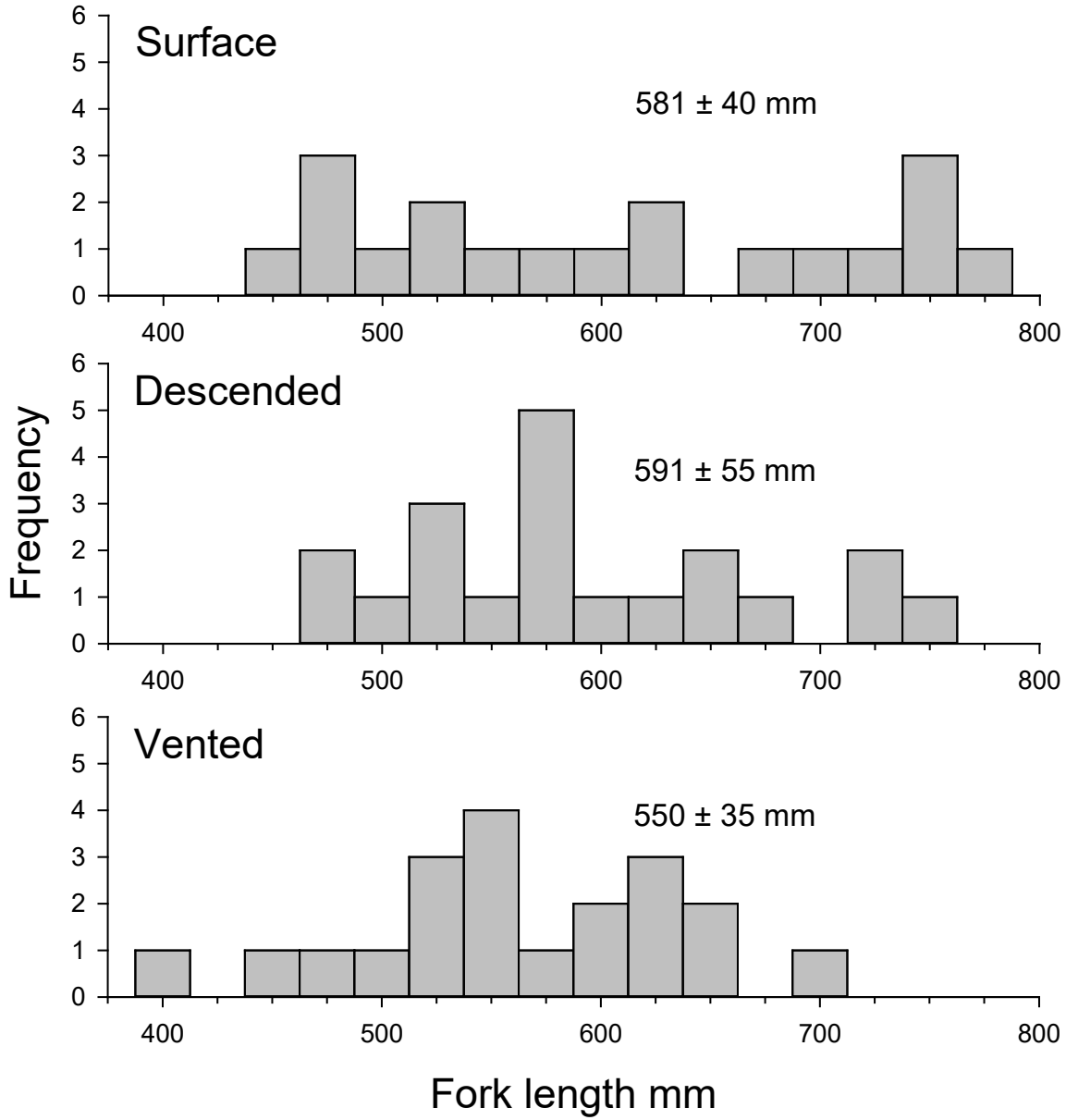
JOURNAL OF FISH BIOLOGY fsbi

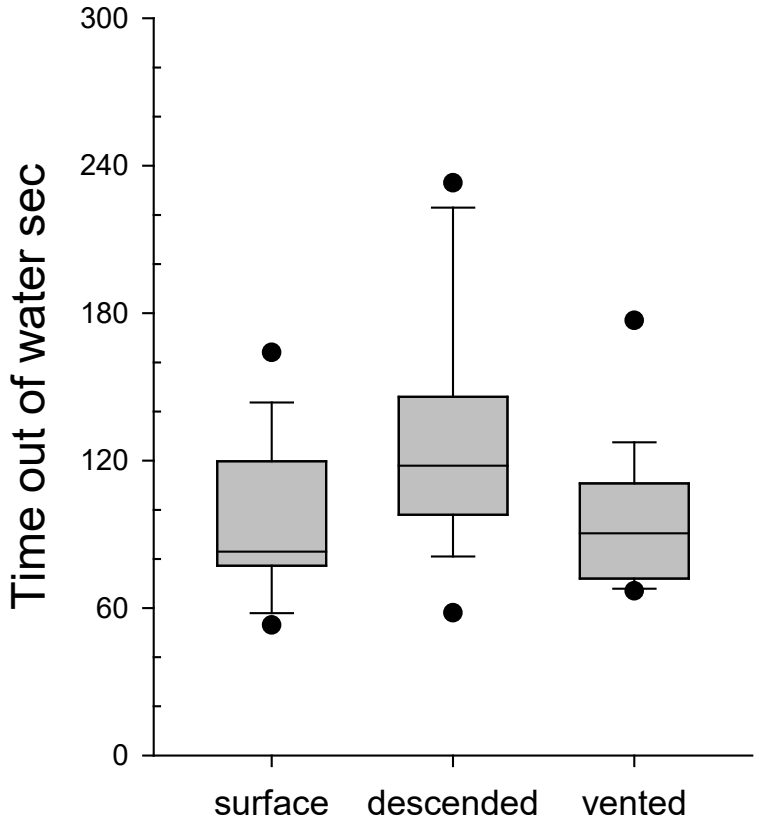
Evaluation of six methods for external attachment of electronic tags to fish: assessment of tag retention, growth and fish welfare

Brendan J. Runde[1] | Jeffrey A. Buckel[1] | Nathan M. Bacheler[2] | Ryan M. Tharp[1] | Paul J. Rudershausen[1] | Craig A. Harms[3] | Tal Ben-Horin[3]

FIGURE 1 Six methods for attaching acoustic transmitters to fish

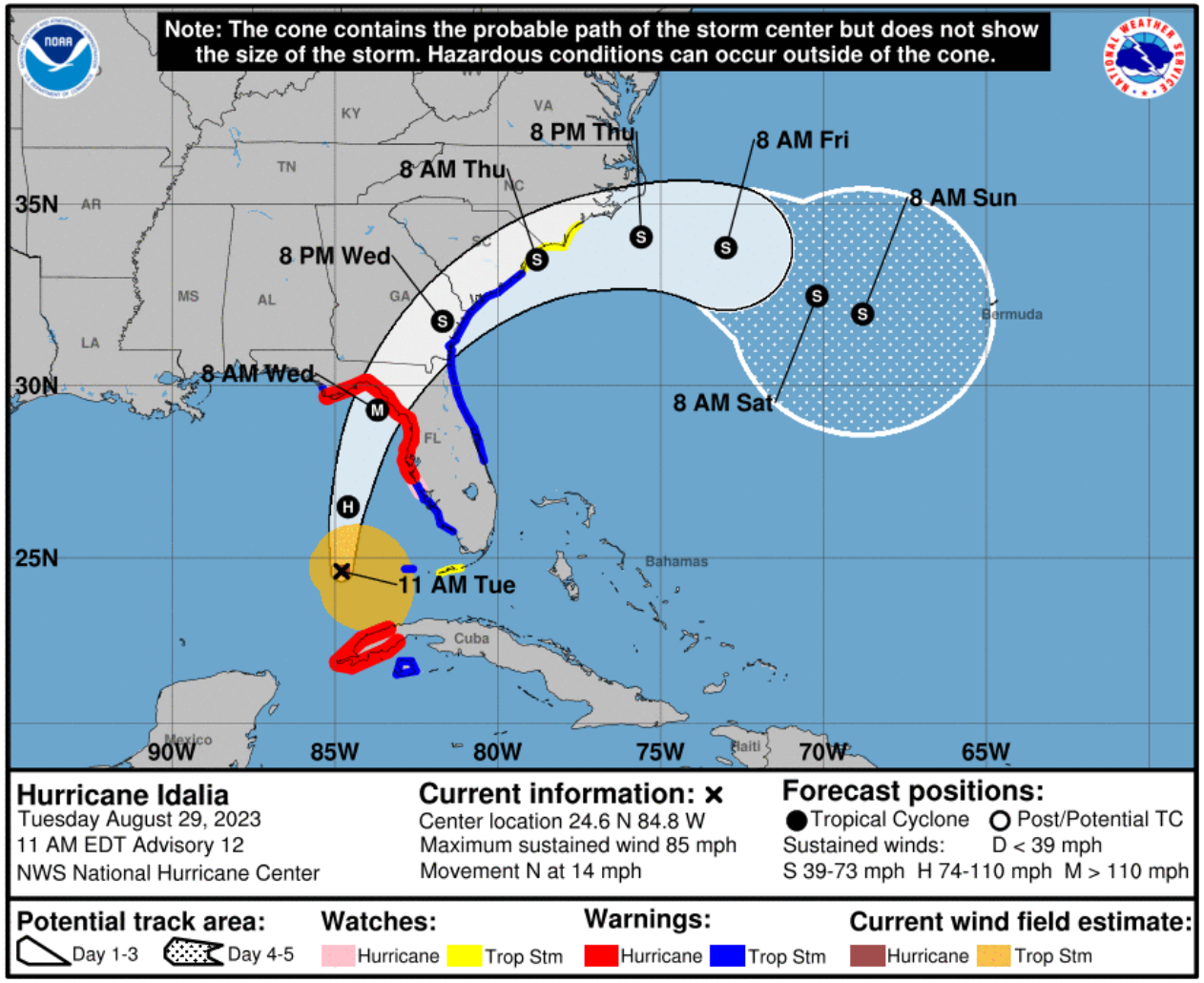
Sample Distribution from Winter 2023 Tagging

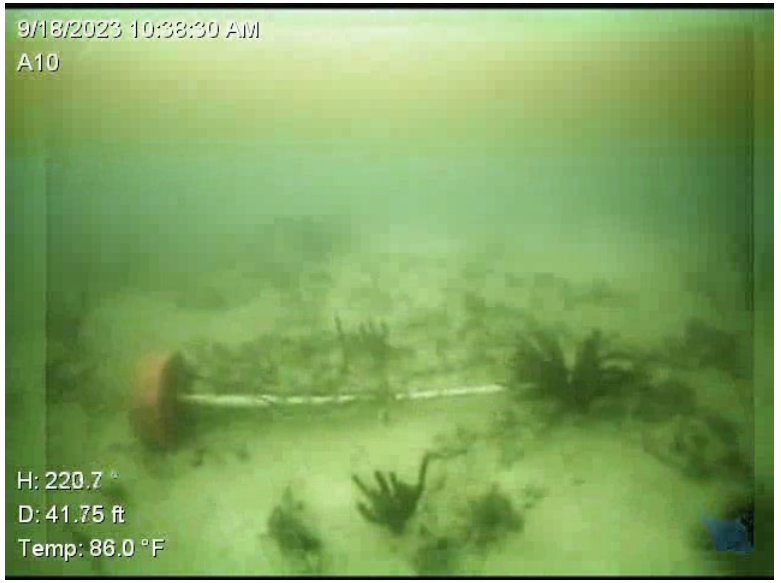




Winter 2023 Gag Tagging at Depth

Hurricane Idalia Path and Effects



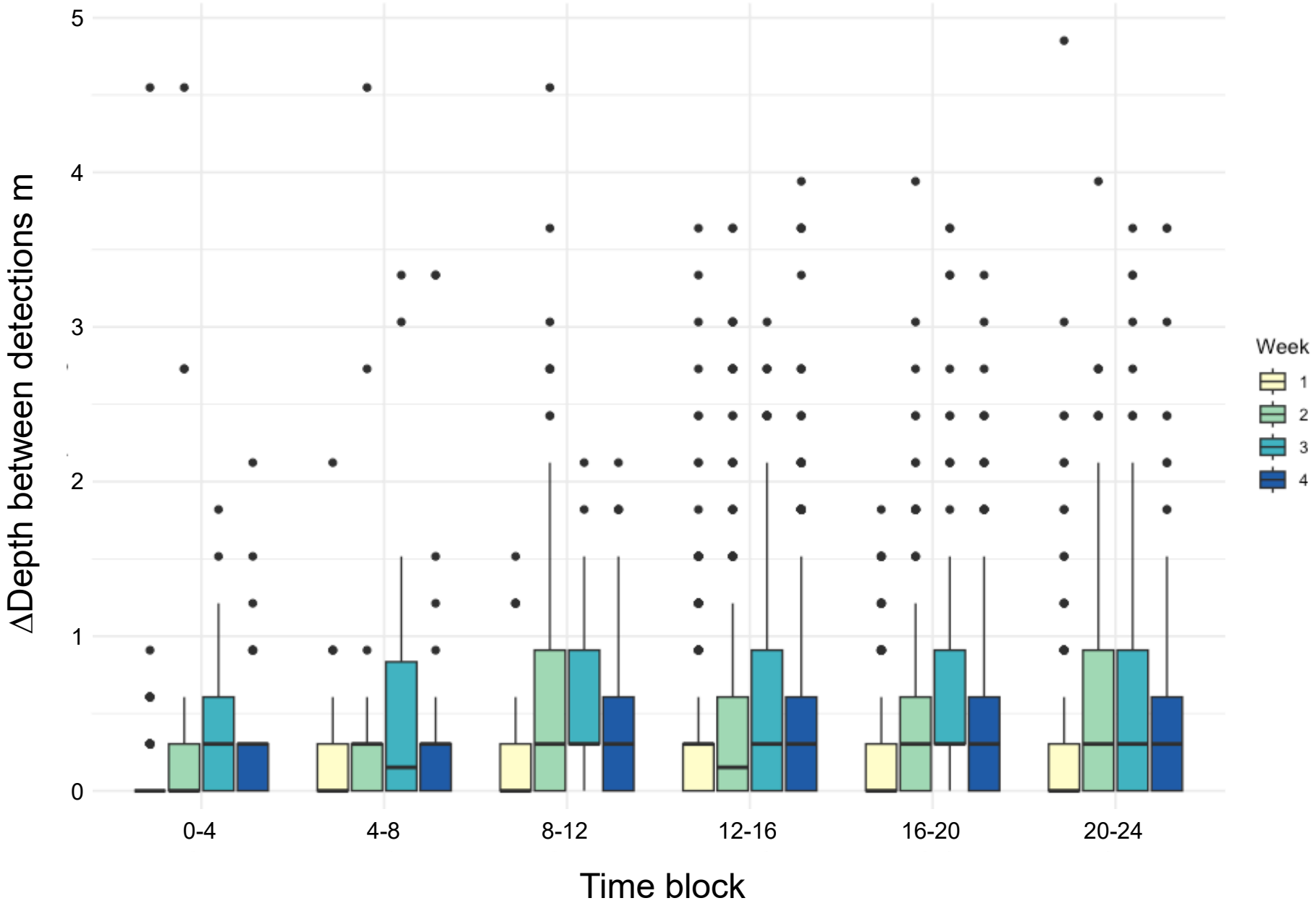


Tag Detection Metrics

- 823,279 tag detections, and 13,805 geoposition estimates
- From March 2024 to Aug 2024 we would expect millions of detections from 60 fish (ping rate = every 2 min; 130k pings per tag x 60 fish being heard on multiple receivers)
- Nearly all geoposition estimates only heard on 3 receivers; typically >5
- Still, able to estimate movement patterns for most fish over the 48-hour acute and 2-week chronic mortality period

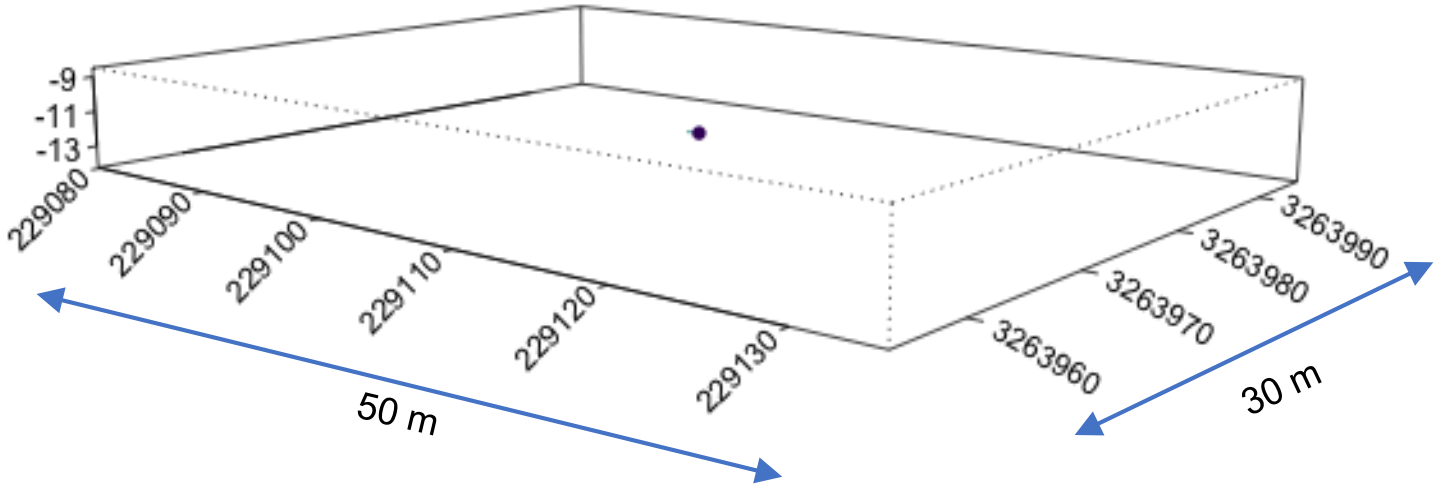
Sublethal Effects of Catch and Release

Sublethal Effects of Catch and Release



Movement Data and Fate Assignment

Fish 8015, 3 weeks post-release (surface)

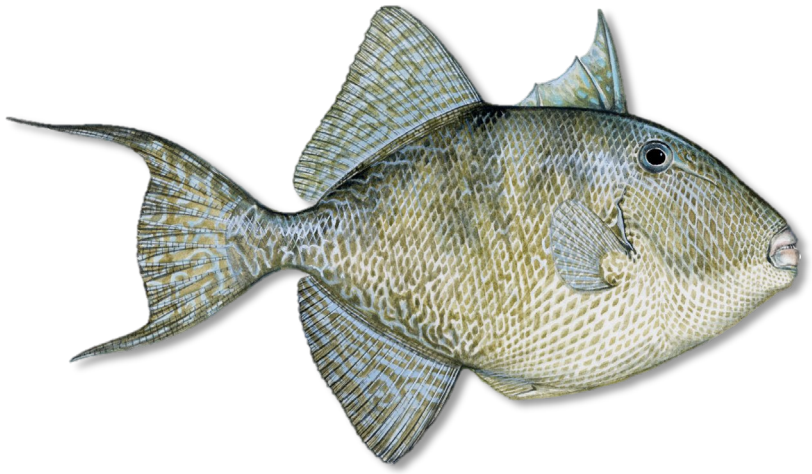


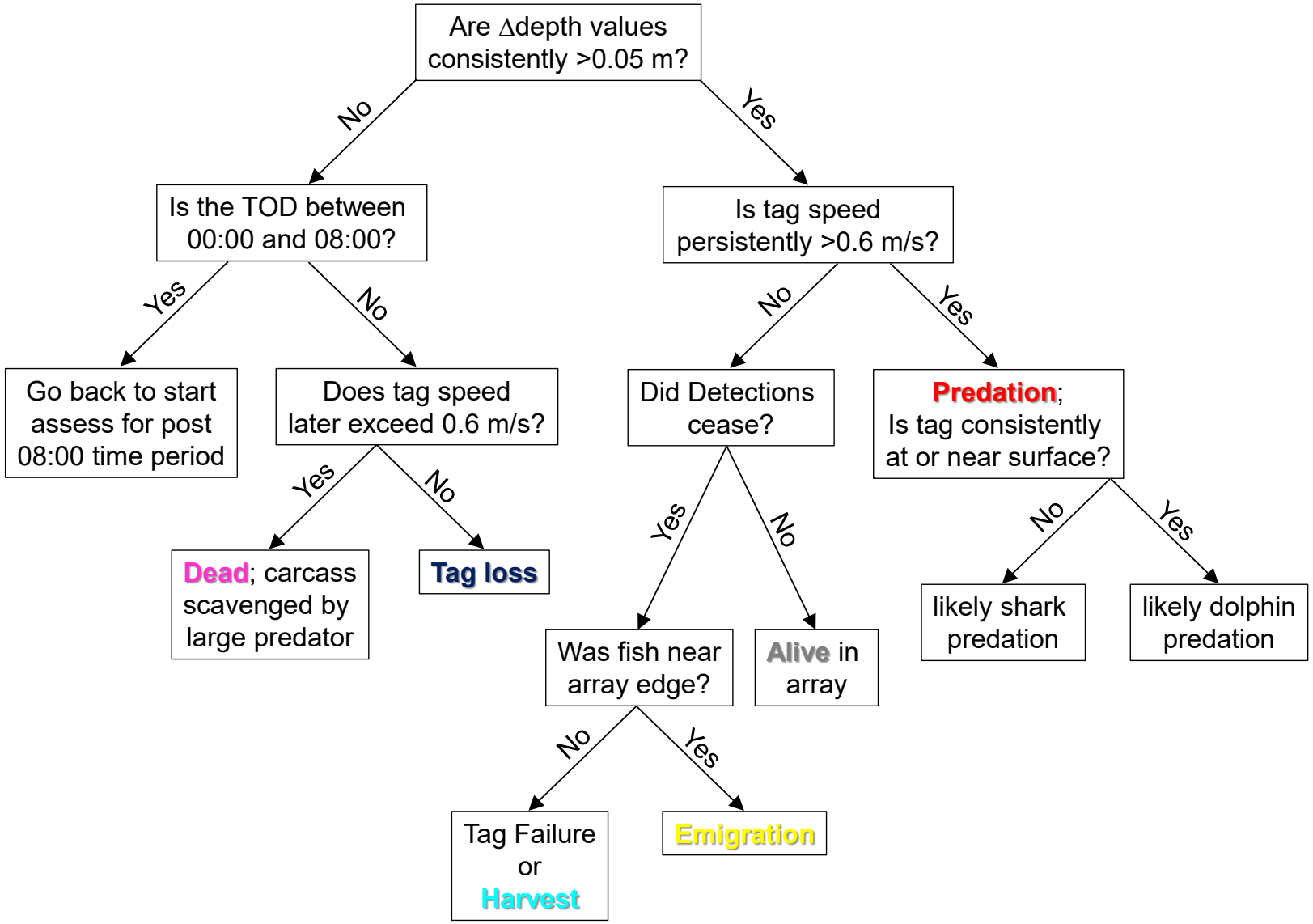
Potential Fates:

1. alive
2. emigration
3. tag loss or failure
4. discard mortality
5. predation

Estimating Fates of Winter-tagged Gag

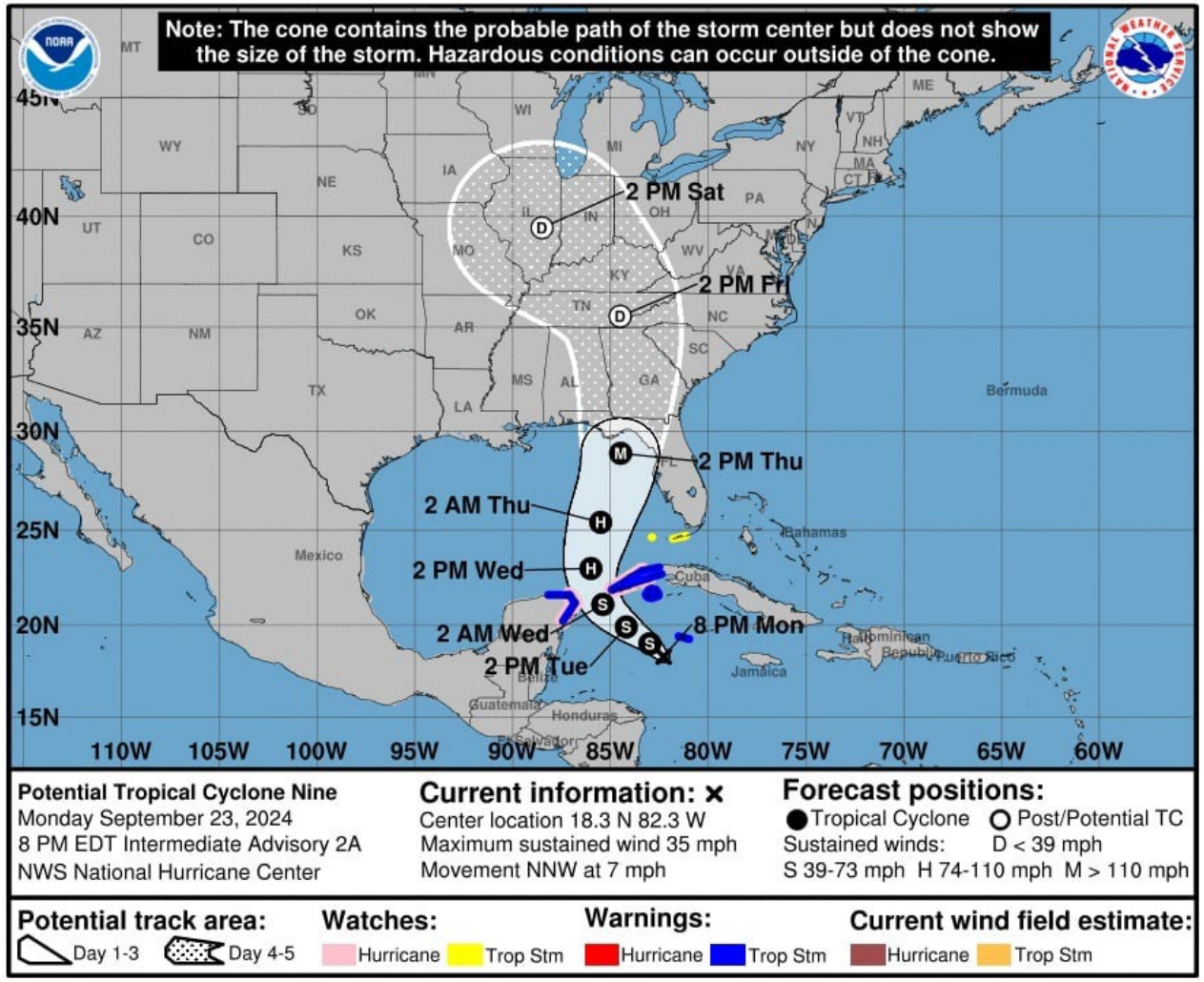
Patterson et al. (2023) fate decision tree for gray triggerfish





“It’s like déjà vu all over again”

- Redeployed 5, 16-receiver arrays in August 2024
- Tagged 24 gag on Sept 24, 2024; engine issues kept us from tagging on Sept 23, 2024
- Hurricane Helene passed over our tagging arrays on Sept 26, 2024
- Search for receivers is underway…



Alternative Plans for Retrieval

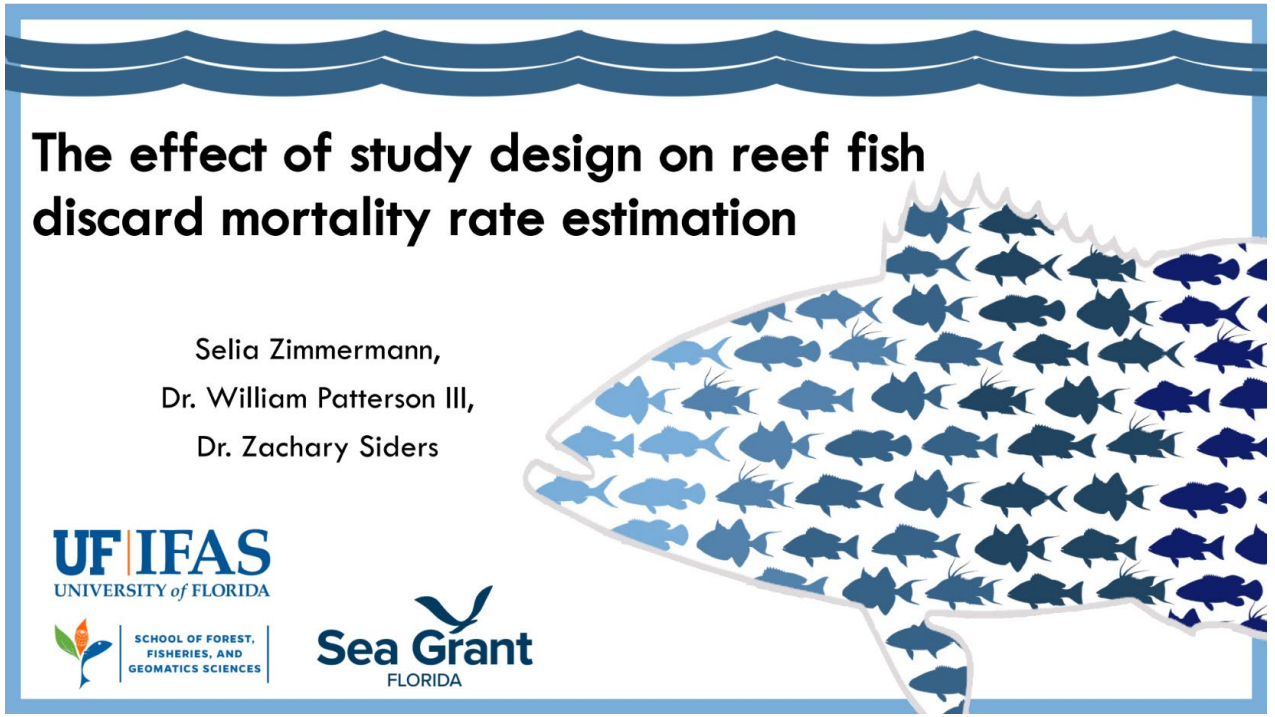
Selia Zimmermann's Dissertation Research

1. Empirical estimates of reef fish release mortality via 3D telemetry

2. Meta-analysis of barotrauma, release mortality, and descender mitigation among a suite of reef fish species

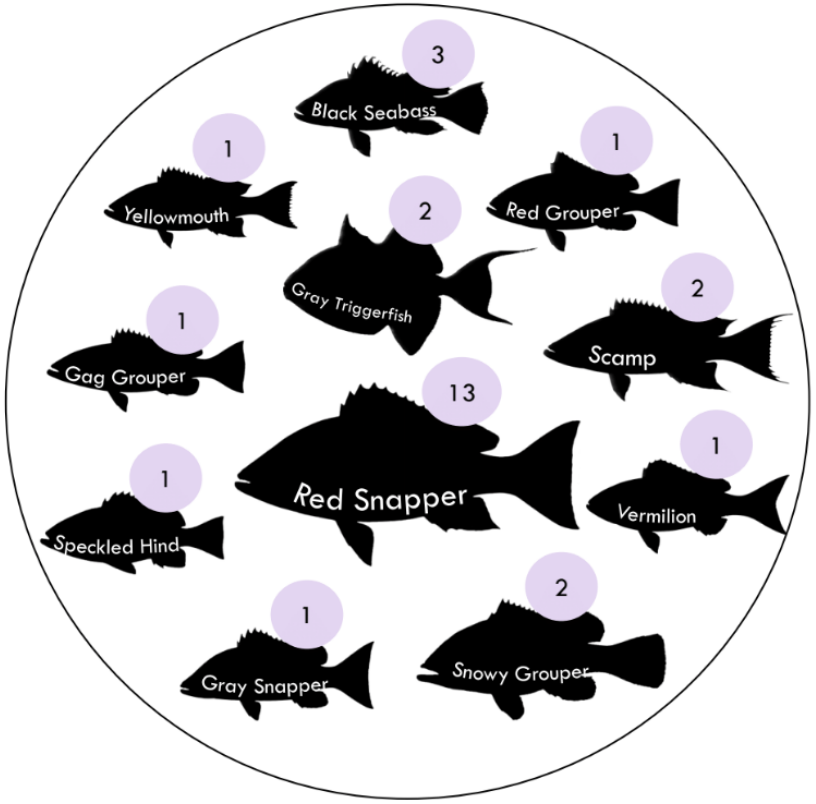
3. Stock assessment simulations to examine the conservation benefit of widespread usage of descender devices

2025 AFS Presentation in Honolulu

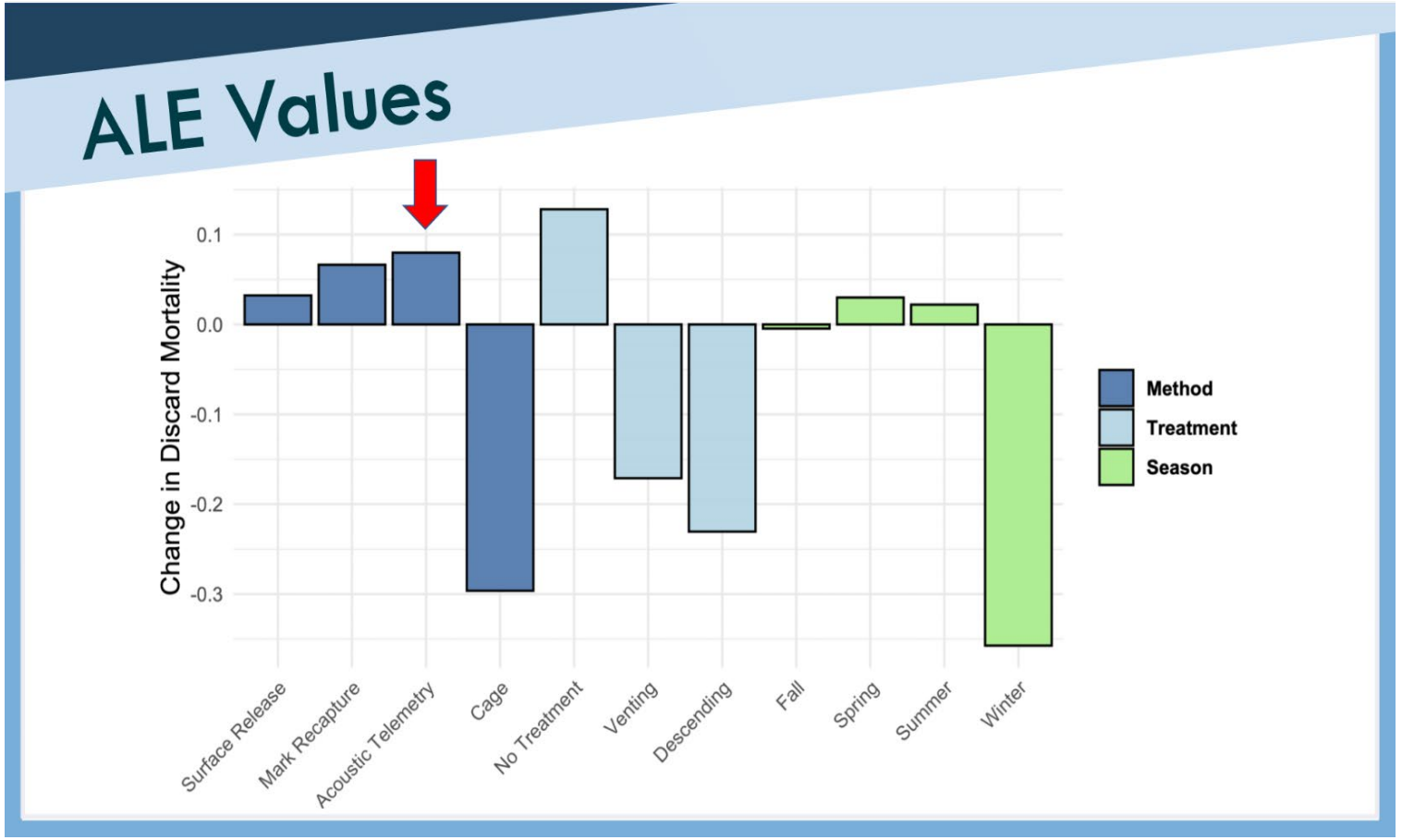


Selia Zimmermann's Dissertation Research

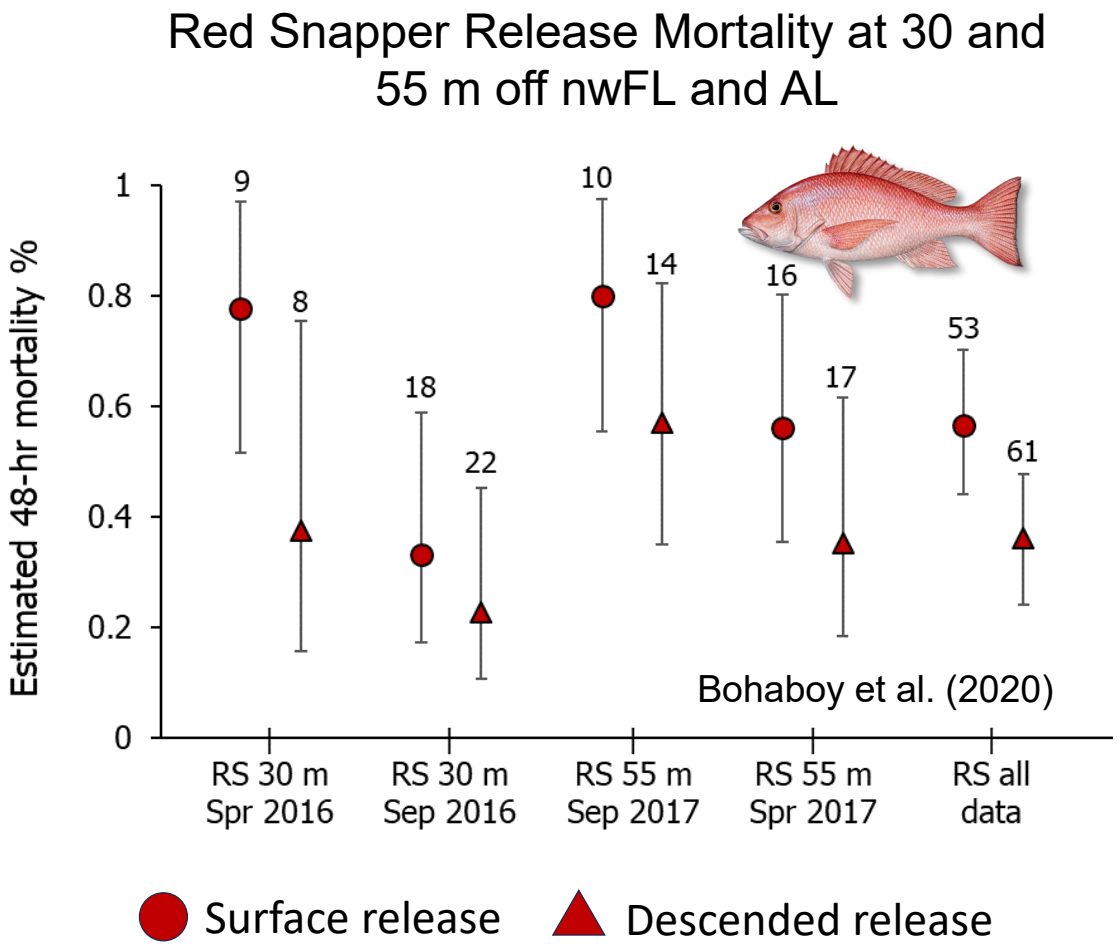
SEUS Reef Fish
Release Mort Studies

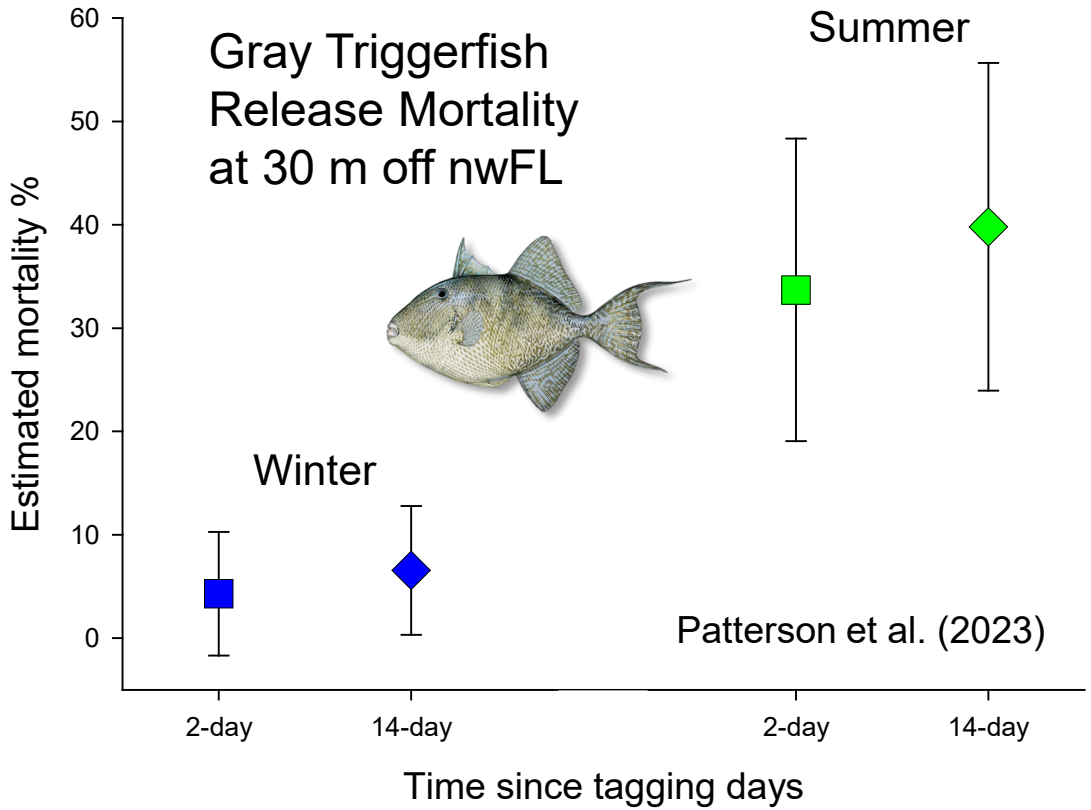


Accumulated Local Effects



Ideal Extension of Reef Fish Release Mortality Research





Ideal Extension of Gag Release Mortality Mitigation Study

Simulation Analysis to Test Conservation Benefits

Fisheries Research 250 (2022) 106268

Contents lists available at ScienceDirect

Fisheries Research

journal homepage: www.elsevier.com/locate/fishres

A simulation framework to assess management trade-offs associated with recreational harvest slots, discard mortality reduction, and bycatch accountability in a multi-sector fishery

Erin C. Bohaboy[a,b,*], Daniel R. Goethel[c,d], Shannon L. Cass-Calay[c], William F. Patterson III[a]

[a] Fisheries and Aquatic Sciences, School of Forest Resources and Conservation, University of Florida, 7922 NW 71st Street, Gainesville, FL 32653, United States
[b] National Marine Fisheries Service, Pacific Islands Fisheries Science Center, 1845 Wasp Boulevard, Building 176, Honolulu, HI 96818, United States
[c] National Marine Fisheries Service, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149, United States
[d] National Marine Fisheries Service, Alaska Fisheries Science Center, 17109 Point Lena Loop Road, Juneau, AK 99801, United States

Received: 14 April 2023 | Revised: 18 September 2023 | Accepted: 22 September 2023

DOI: 10.1002/nafm.10966

North American Journal of Fisheries Management

ARTICLE

Fishery management strategies for Red Snapper in the southeastern U.S. Atlantic: A spatial population model to compare approaches

Kyle Shertzer[1] | Scott Crosson[2] | Erik Williams[1] | Jie Cao[3] | Rick DeVictor[4] | Chris Dumas[5] | Geneviève Nesslage[6]

Acknowledgements

Charlie Robertson
GSMFC
NOAA RESTORE
Ed Walker
Josh Livingston
Doug Marcinek
Miaya Glabach
Derek Chamberlin
Joseph Tarnecki
Joseph Moss
Jordan Bajema
Ryan Rindone
Jonathon Mulock
Sean Buchanan
Christie Plough
Sara Hernandez
Innovasea
Sea Hag Marina