

# Analysis of Environmental Variables and Their Correlation to Sea Turtle Occupancy and Bycatch

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## BACKGROUND

- Sea turtles utilize a variety of habitats in nearshore environments and benefit from spatial protections (Barnette 2017).
- Little research has explored sea turtle usage of fishing piers as habitat (Lamont 2021)
- Sea turtle bycatch at Northwest Florida fishing piers is some of the highest in the state based on data from the Sea Turtles Stranding and Salvage Network (STSSN).

### Gulf of Mexico Sea Turtle Pier Bycatch Distribution from 2015-2017 for the State of Florida

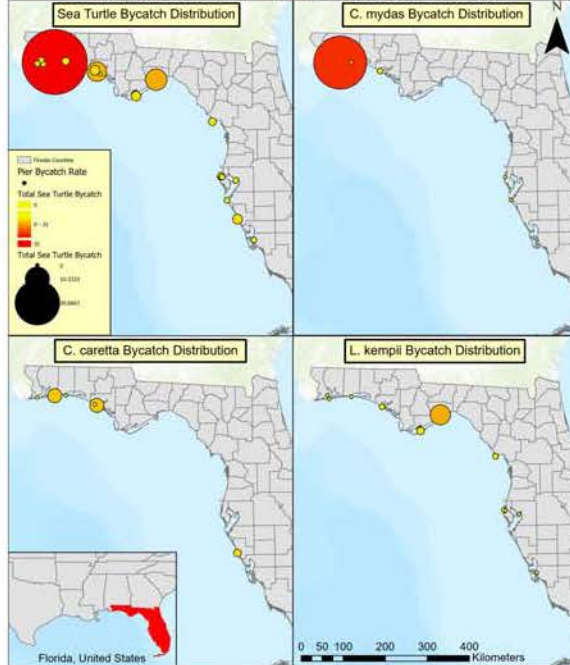


Figure 1. Map indicating the distribution of recreational sea turtle bycatch from 2015-2017 at fishing piers and docks located on the Gulf of Mexico side of Florida. The distribution of total bycatch and total bycatch of each species is indicated by the various maps. Most recreational bycatch is concentrated in NW Florida.

- The effects of bycatch on increased mortality are largely unknown, since it has not been thoroughly investigated.
- This is a very expensive conservation activity, and it impacts fishing activity at the piers.
- The factors contributing to this increased bycatch are not well understood.

## METHODS

### Site Map



Figure 2. Map of current in-water survey sites in Northwest Florida

### SV Camera and Macroalgae Sampling Diagram

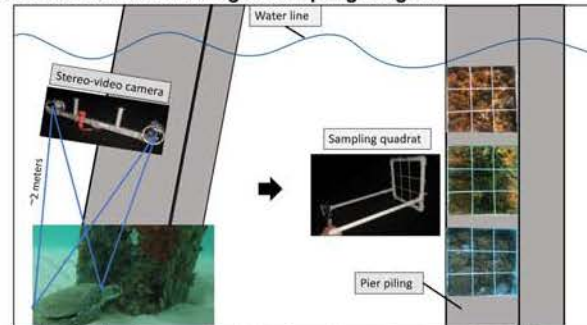


Figure 3. Outline of in-water survey methodology. Stereo-video cameras are used to video sea turtle's observed and their measure straight carapace length (SCL). Video of pier piling epibionts are recorded using a GoPro Hero 8 Black mounted on sampling quadrat.

## DATA

### Video Analysis of Fishing Pier Variables

- Using EventMeasure software and footage of sea turtles captured using the stereo-video camera system, straight carapace length (SCL) for turtles observed at the fishing piers are calculated.
- Footage of the quadrats on pilings will be analyzed for species composition and coverage.
- Facial identification footage will be analyzed to determine if an individual has already been recorded.

### GIS Analysis of Environmental Factors

- ArcGIS was used to collect environmental data on piers, including bathymetry, proximity to seagrass beds, and distance to artificial reefs

### Modeling Sea Turtle Presence and Size at Fishing Piers

- A statistical model will be used to analyze relationships with turtle abundance and size and environmental variables at sample fishing piers.

## RESULTS

- C. mydas* observations and bycatch are greatest at Navarre Beach Pier.
- Most frequently turtles are observed resting adjacent to pier pilings
- Preliminary observations suggest species composition on pilings varies with depth, side of piling, distance from shore, and seasonally.
- There are apparent differences in the species composition of the pier pilings epiflora, epifauna, and sea turtle species present across five sample sites.
- Initial data collected in ArcGIS suggest further distance to seagrass could correlate with higher *C. mydas* bycatch.

### Relationship Between Distance to Nearest Seagrass Bed and *C. mydas* Bycatch

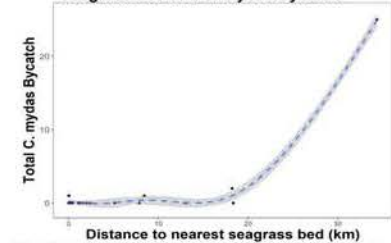


Figure 4. GAM of *C. mydas* bycatch and distance to nearest seagrass bed

## CONCLUSIONS

- Incidental sea turtle hookings at fishing piers in Northwest Florida are a prevalent issue.
- The greatest number of *C. mydas* observations and bycatch have occurred at Navarre Beach Pier.
- Through continued study of these variables and other environmental factors, sea turtle usage of piers as habitats will be better understood.
- The results of the study will also be used to inform management decisions piers and artificial reefs that could reduce sea turtle bycatch, which is a costly event for piers, fishermen, and sea turtles.

## ACKNOWLEDGEMENTS

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