Depredation Rates and Release Mortality of Red Snapper, Gray Triggerfish, and Greater Amberjack Released Using Fish Descending Devices

Erik Lang and Zach Zuckerman

Effectiveness of Fish Descending Devices in Red Snapper, Gray Triggerfish, and Greater Amberjack

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Background

DESCEND Act 2020

- Venting tool or descender device mandatory
  - Device choice is left to the angler
- Minimize post-release mortality

What devices are effective, and what device is easiest for the angler?

- Factors my influence effectiveness
  - Species
  - Ease of use
  - Condition specific
    - Depth
    - Fight Time
    - Fish Length
    - Barotrauma Assessment

Objectives

Test biological effectiveness of FDDs

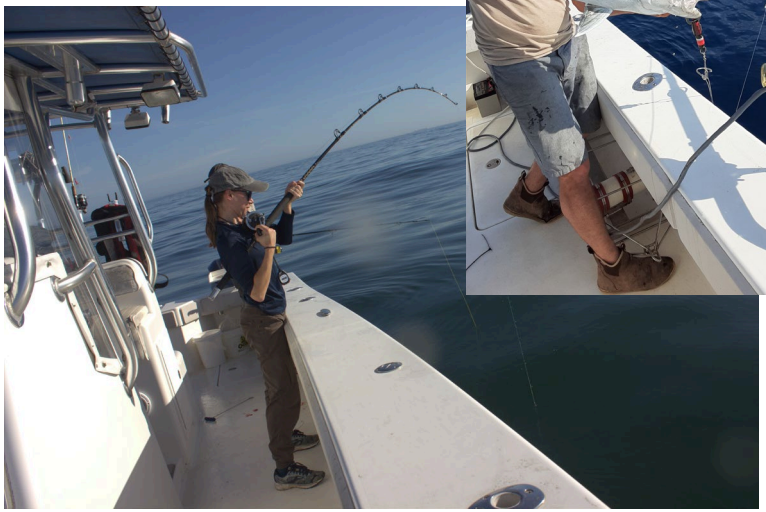
- Rate of immediate post-release depredation from FDDs
- Identify effectiveness of FDDs in recompression/releasing fish

Test logistical effectiveness of FDDs

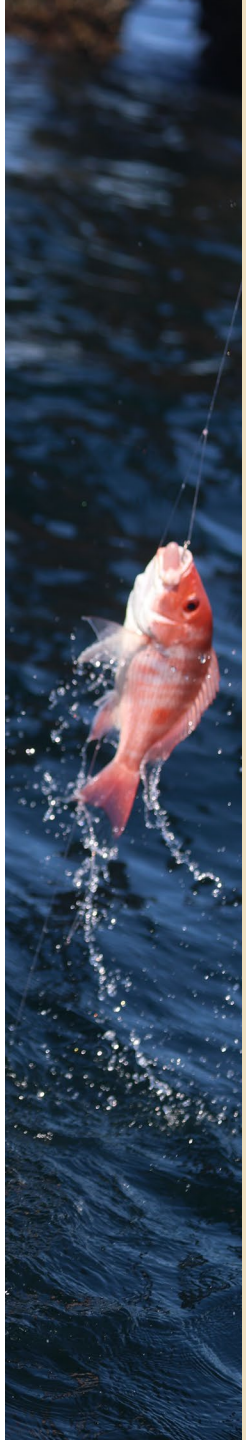
- Angler preference for device type

Methods

Capture



- Capture depth
- Fight time
- Length
- Barotrauma Assessment

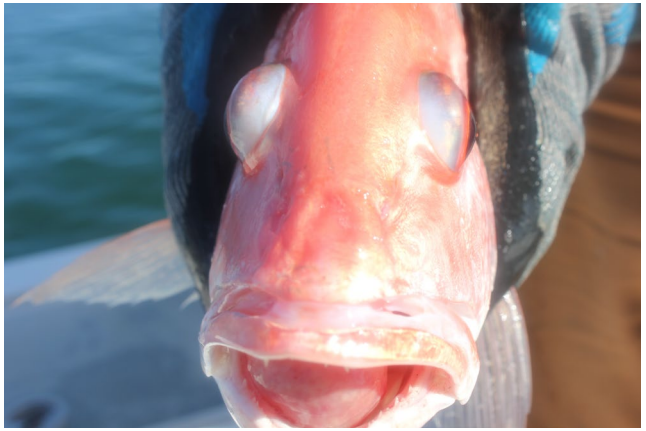


Methods

1 = Good Response

0 = Bad Response

Barotrauma assessment



Barotrauma symptoms

- Stomach eversion
- Intestinal protrusion
- Expanded abdominal cavity
- Exophthalmia
- Subcutaneous hemorrhaging
- Species specific responses

Stress reflex test

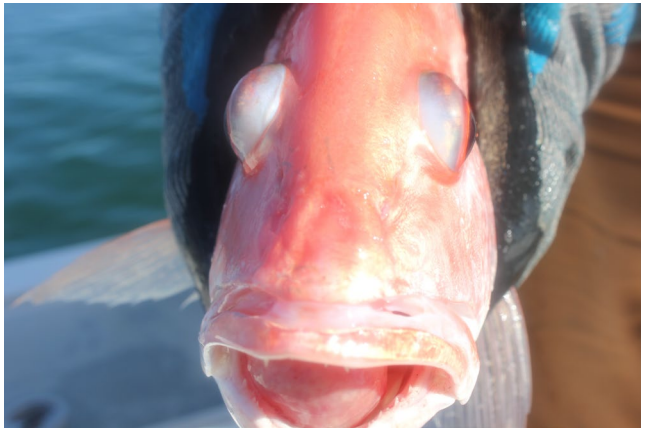
- Gag
- Dorsal spines
- Hypaxial muscle
- Opercular
- Vestibular-ocular
- Species specific responses

Methods

Barotrauma assessment

Barotrauma score =

$$1 - \left(\frac{sum\ of\ responses}{total\ impairments\ possible} \right)$$



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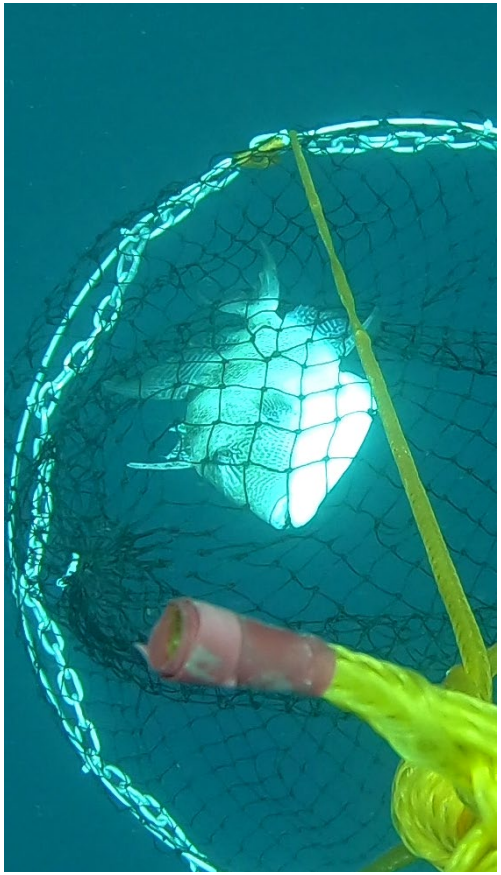
Methods

Release

SeaQualizer

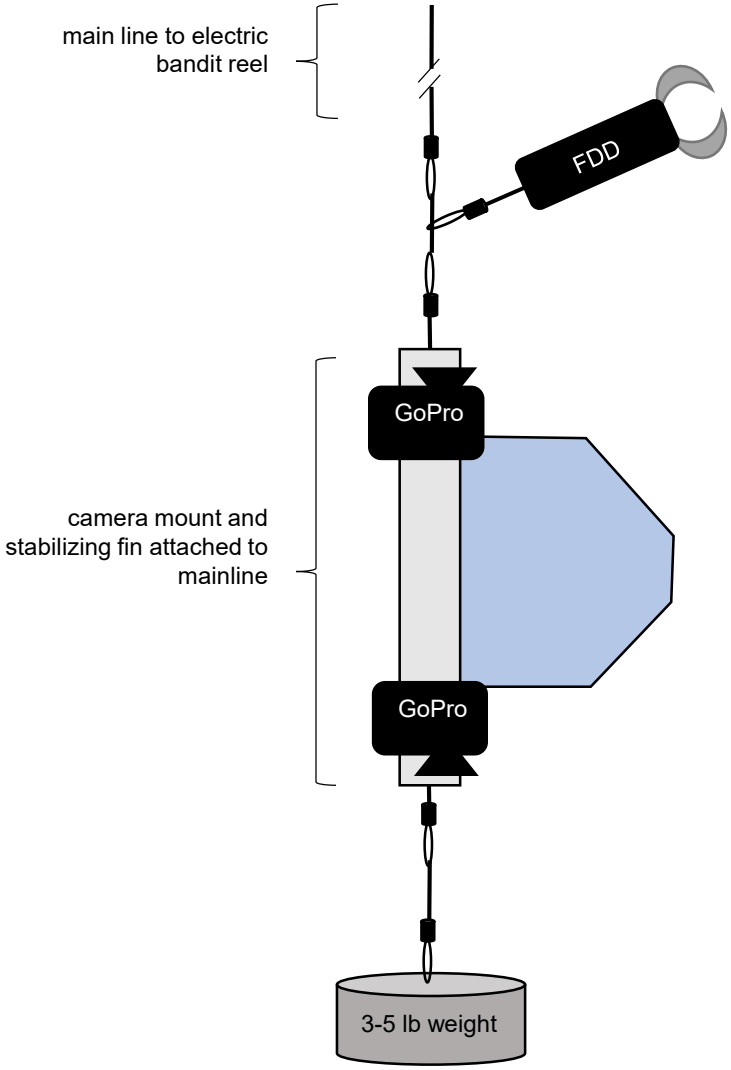
SeaYaLater

Elevator



Methods

Recompression and release



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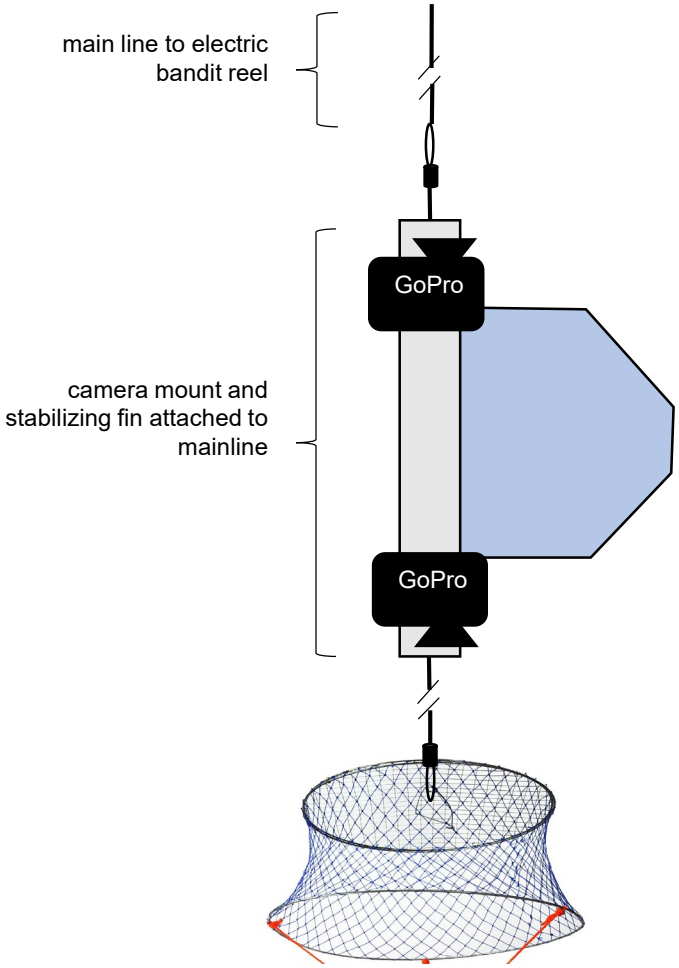
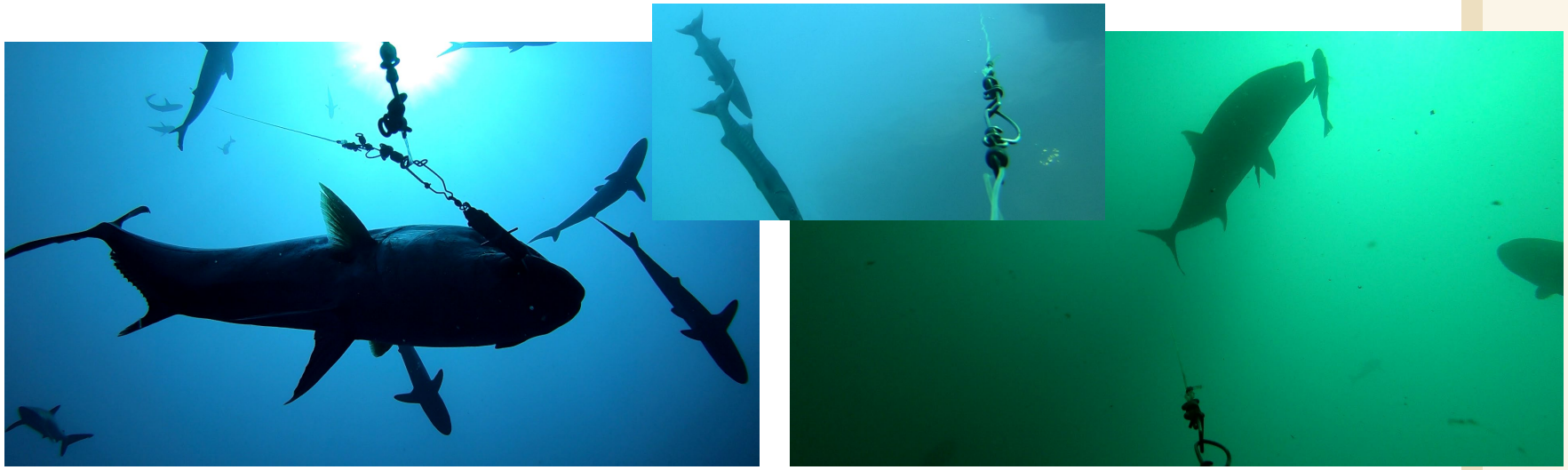


Methods

Post-release video analysis

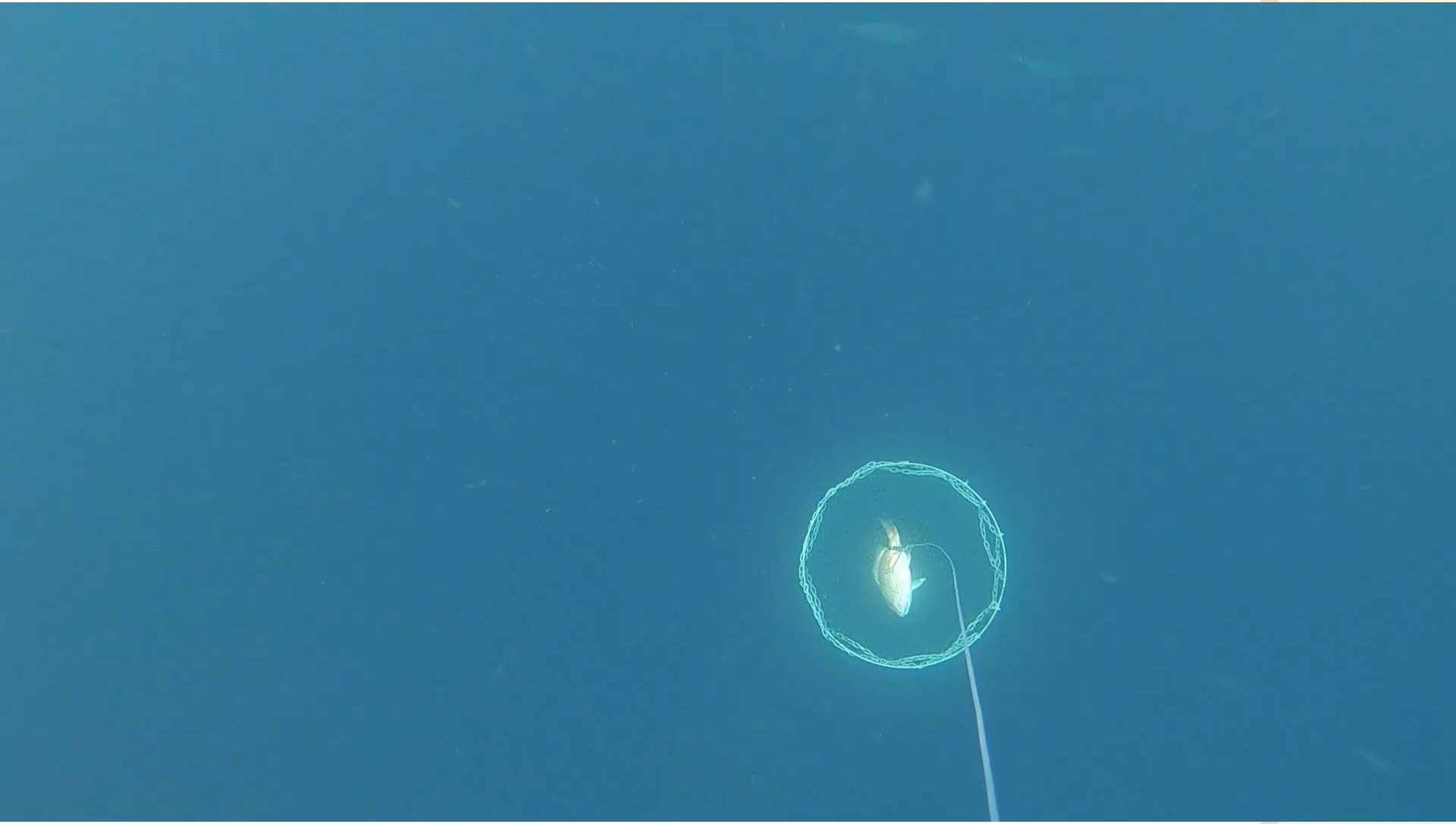
Video reads

- Predators
  - Presence/absence
  - Species and count
  - Interaction/depredation/predation
- Post-release behavior
  - 1 – strong swim
  - 2 – sluggish/impaired swim
  - 3 – loss equilibrium



Methods

Post-release video analysis



Methods

Logistical effectiveness

Angler preference

- Supply volunteer anglers with FDDs
- Determine angler preference:
  - Cost
  - Ease of use
  - Would an angler keep device rigged for use or prefer another option

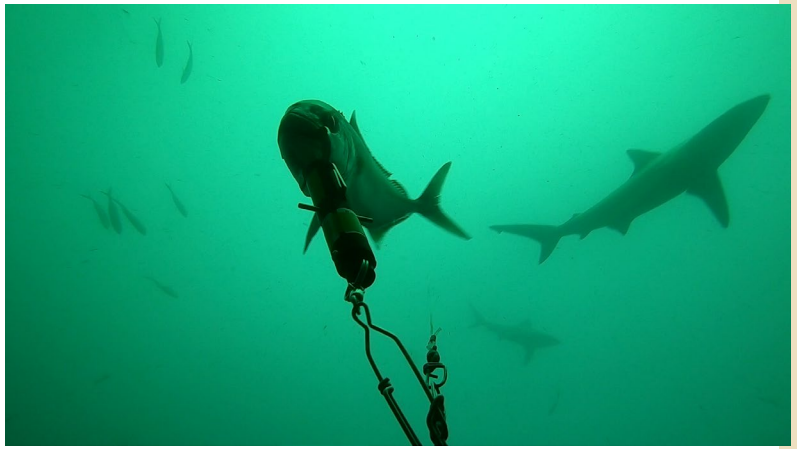
Results

Biological effectiveness

Species	# videos	Analysis n	Impairment	Likely Predation observed	Predator Interaction	Negative Result
Greater Amberjack	53	50	89.2% (33)	1	30% (15)	2.7% (1)
Gray Triggerfish	99	92	30.7% (23)	1	15.2% (14)	6.7% (5)
Red Snapper	267	172	70.2% (106)	11	19.8% (34)	13.5% (19)

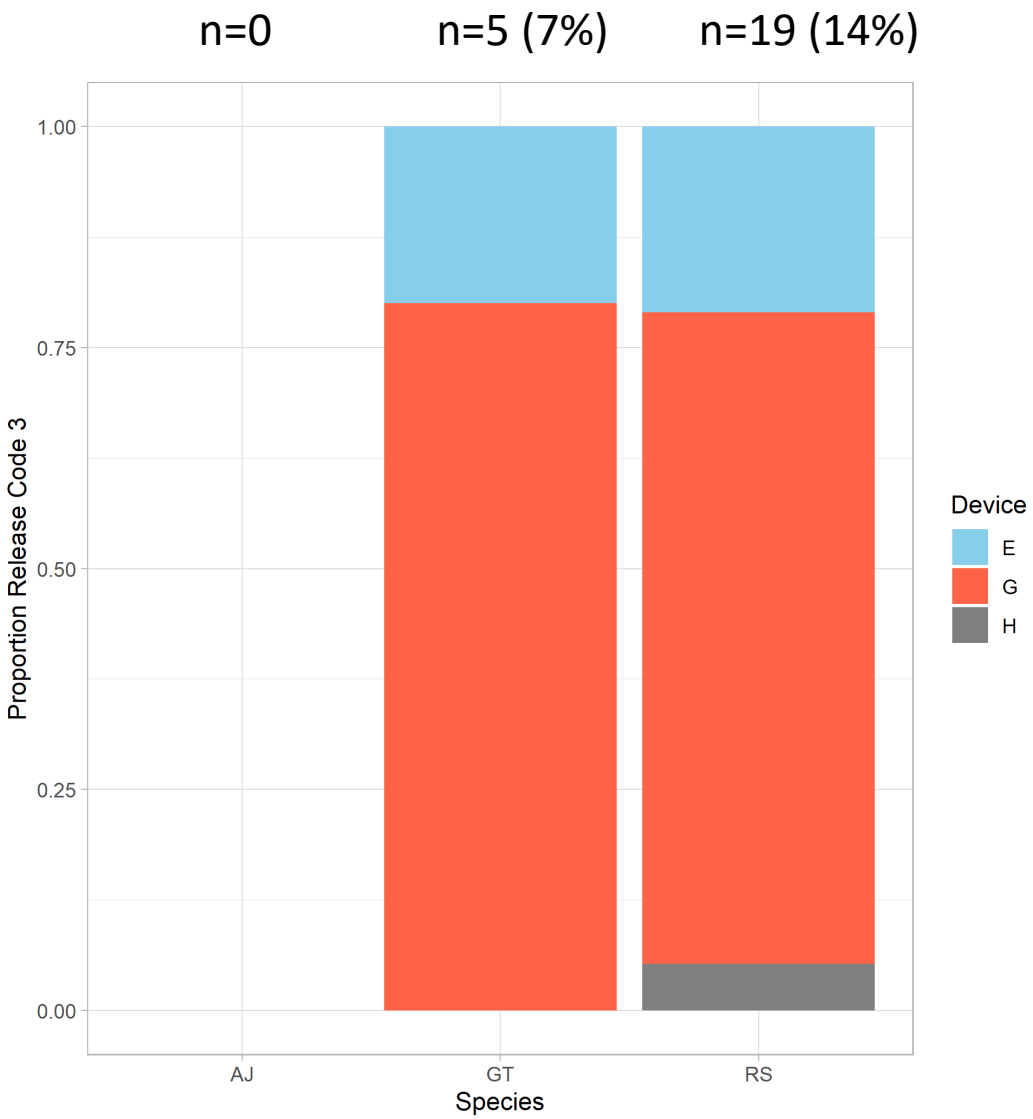
Species	Total # Amberjack	Total # Sharks	Total # Barracuda	Total # Cobia
Greater Amberjack	NA	52	6	0
Gray Triggerfish	32	9	10	0
Red Snapper	122	54	27	4

Predators present for 34% of releases



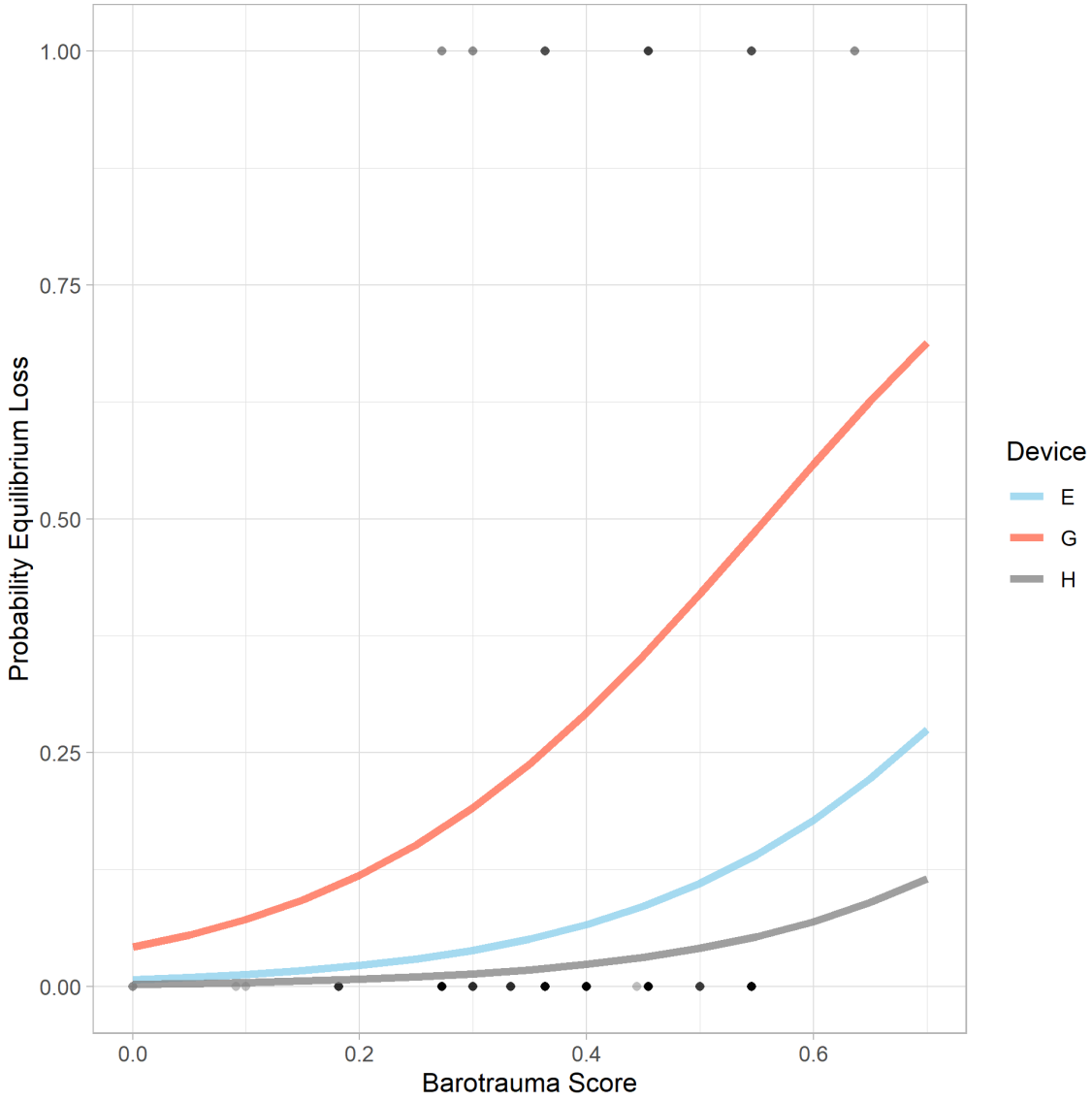
Results

Loss of Equilibrium (release code 3)



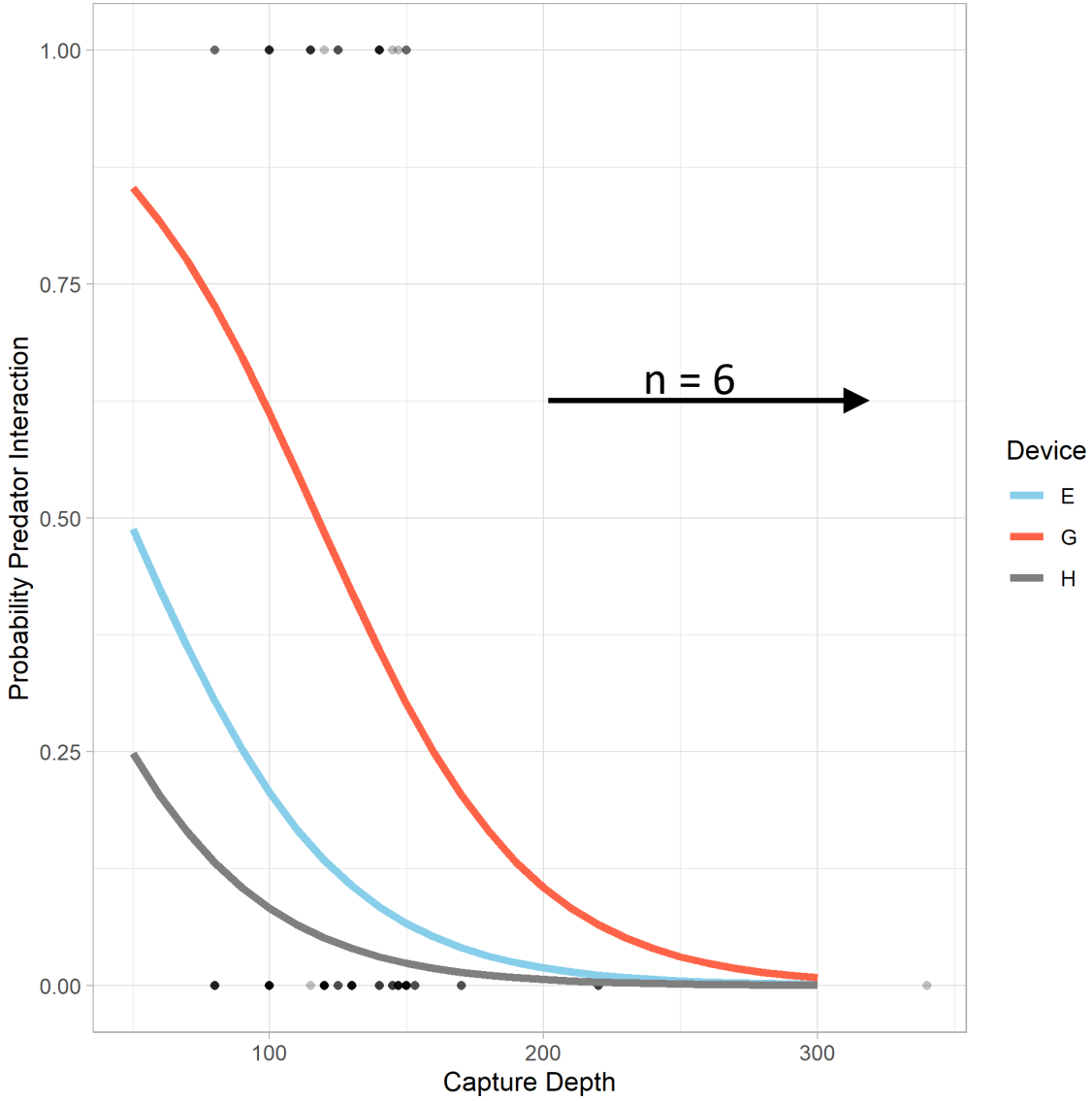
Results

Loss of Equilibrium (release code 3) – Red Snapper (AUC = 0.802)



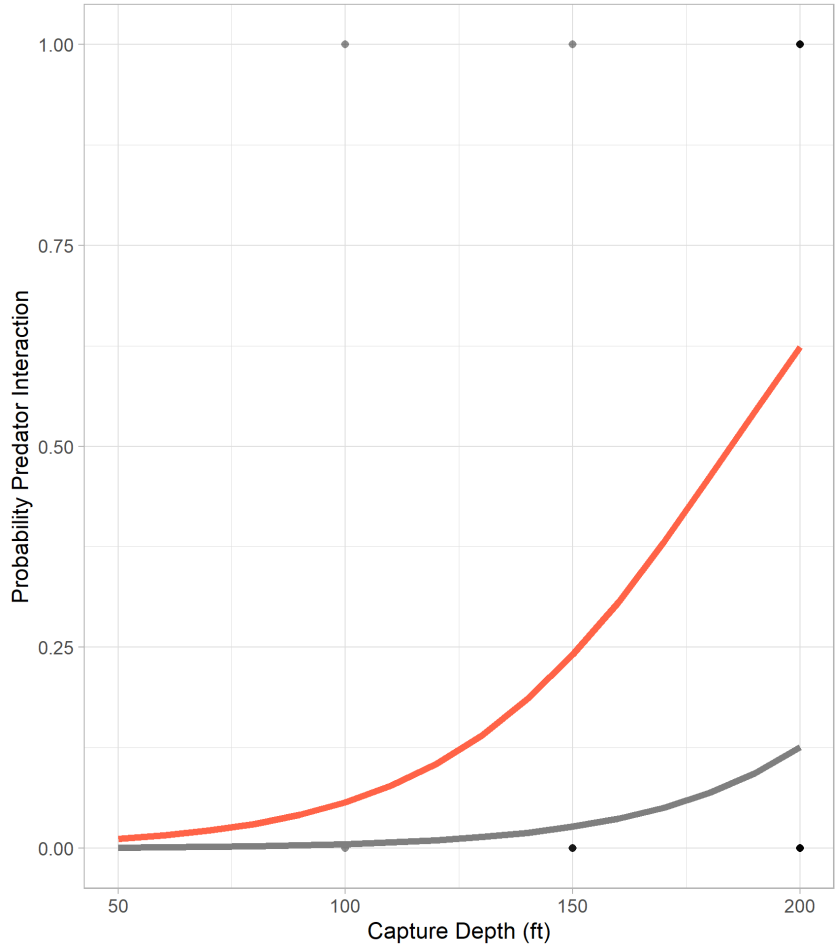
Results

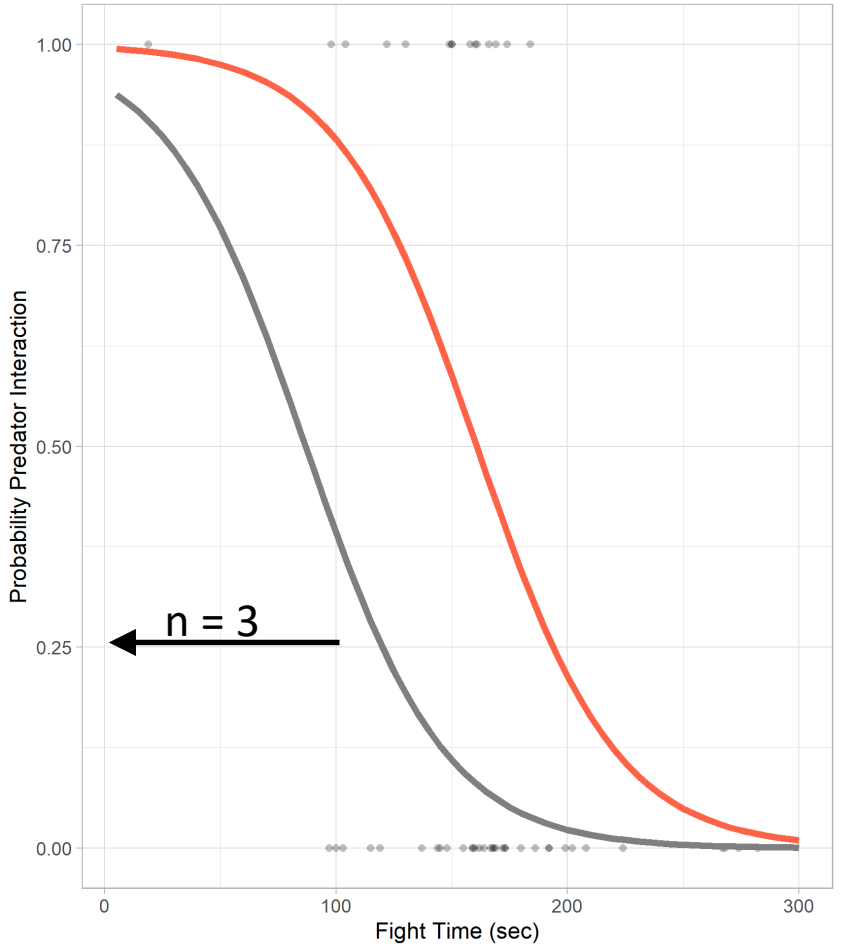
Predator Interaction – Red Snapper (AUC = 0.780)



Results

Predator Interaction – Greater Amberjack (AUC = 0.816)





Results

Logistical effectiveness

Angler surveys

- Familiar with lip grip devices
- Lip grips preferred due to ease of use
- Elevators deemed unrealistic – space requirement. cumbersome

Notes from research team:

- Preference matched that of anglers
- Elevator works well in theory, not in practice

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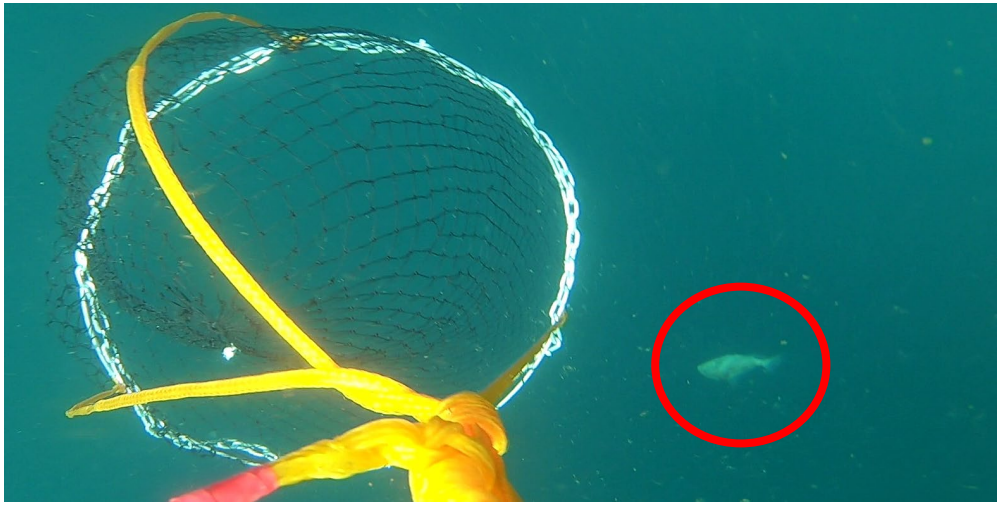
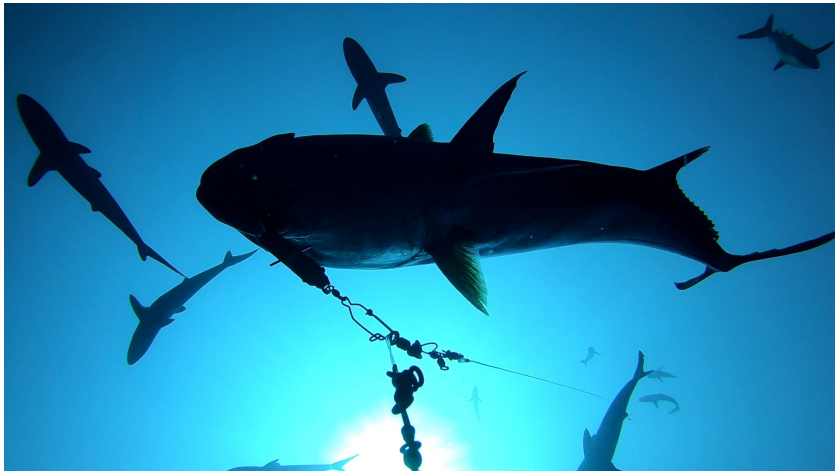
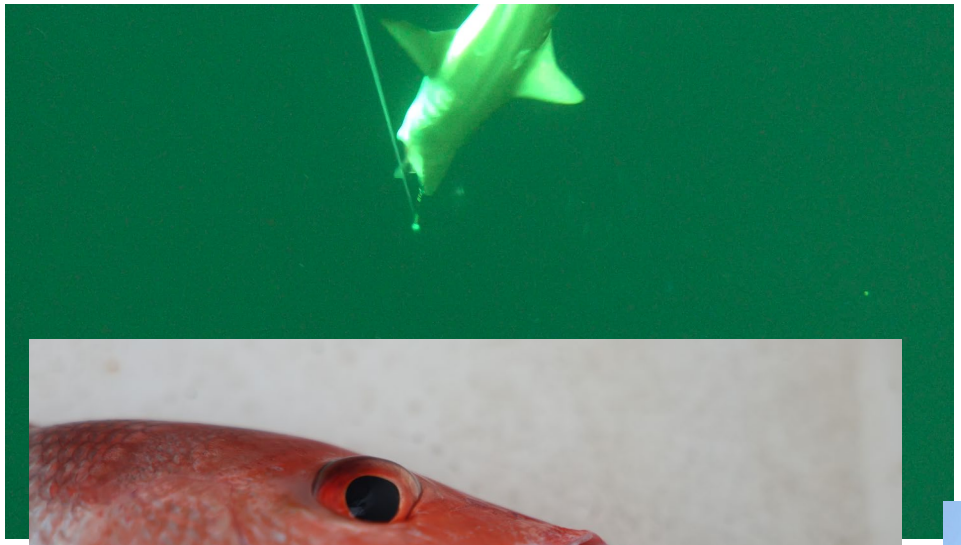
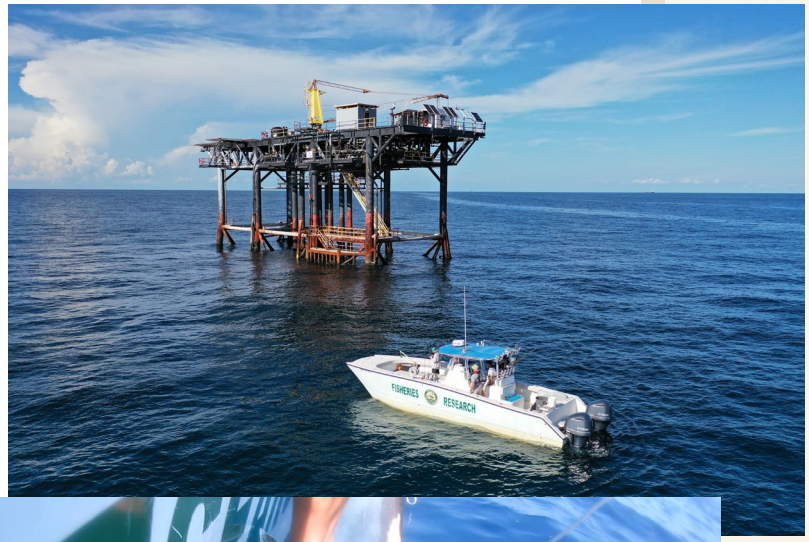


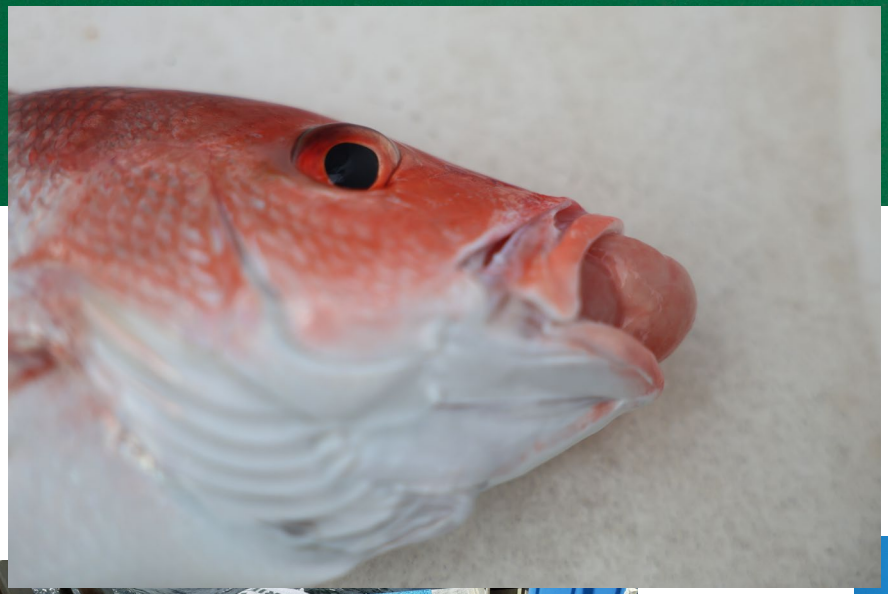
Summary and deviations

- Overall only 10% of releases ended in a negative result (depredation/predation/loss of equilibrium)
- Descending device with the most negative results?
  - Lip Grip (SeaQualizer™) resulted in most predator interaction and loss of equilibrium
    - May be due to predetermined release settings
      - Fishermen may have a problem with this as well
  - Fish Elevator
    - Consistently out performed by inverted hook
    - Cumbersome
- Most feasible on a boat and most biologically effective
  - Inverted Hook (SeaYaLater ™) for everything but Gray Triggerfish
    - Gray Triggerfish only had an 8% negative result on the lip grip device









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