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IMPACTS OF BYCATCH REDUCTION DEVICES ON DIAMONDBACK TERRAPINS AND BLUE CRABS

PROPOSED CHANGES TO REGULATIONS

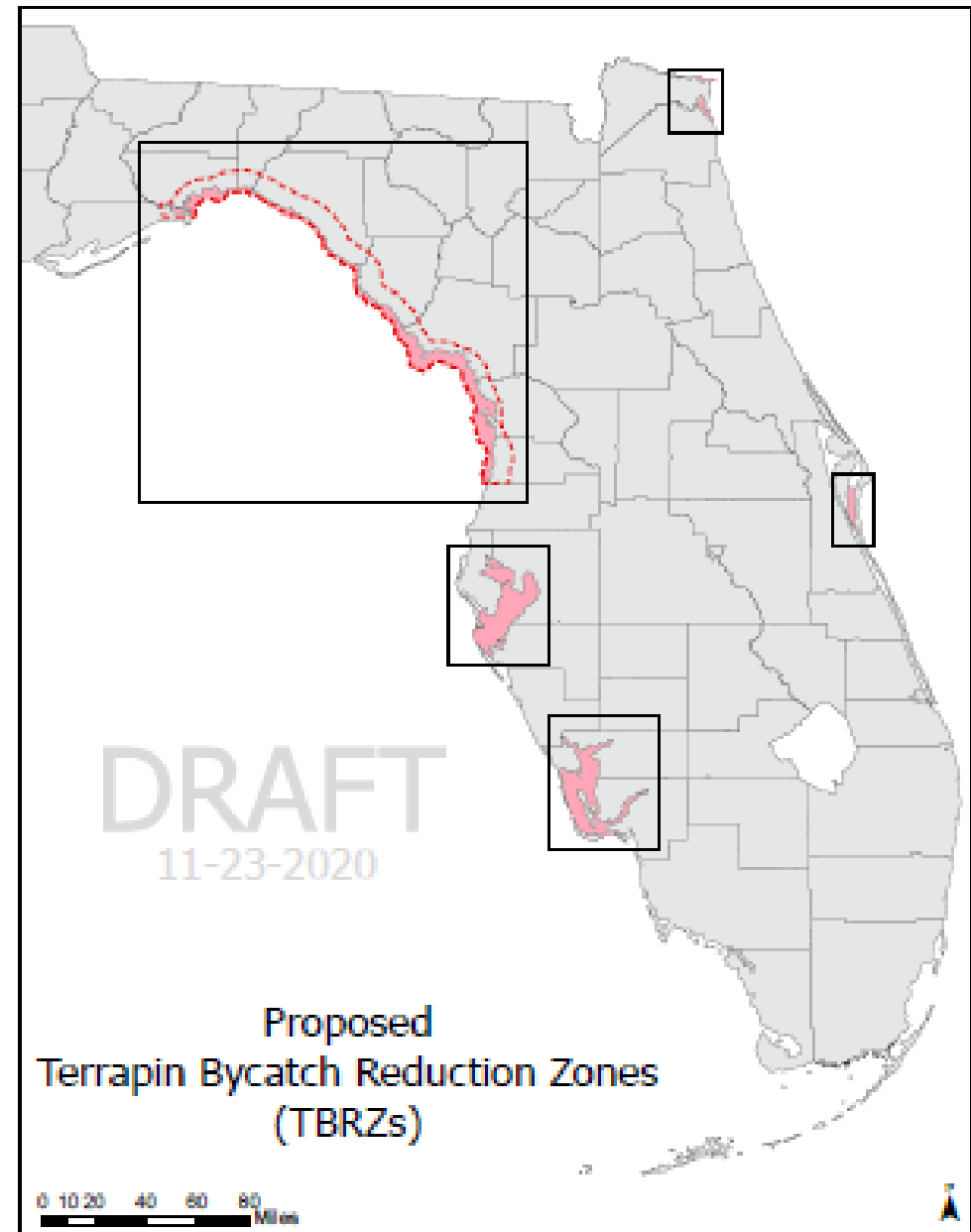
- Prohibit take of terrapins from wild
- Prohibit possession without a permit
- Require bycatch reduction device (BRD)
 - For blue crab traps, require rigid funnel openings no larger than 2 x 6 inches at the narrowest point or 2 x 6-inch BRD
Recreational: statewide
 - Commercial: in TBRZs from Mar. – Oct.

FWC COMMISSIONERS REQUEST FOR RESEARCH

- Wide variety of public opinion on the proposed regulations
- Commissioners requested additional research
 - Quantity of terrapins caught in blue crab traps
 - Potential reduction in commercial catch if BRDs are implemented
- Regulations put into rule
 - Illegal to possess a terrapin without a permit after March 1, 2022
 - All recreational blue crab traps required to have fixed funnel size no larger than 2"x6"

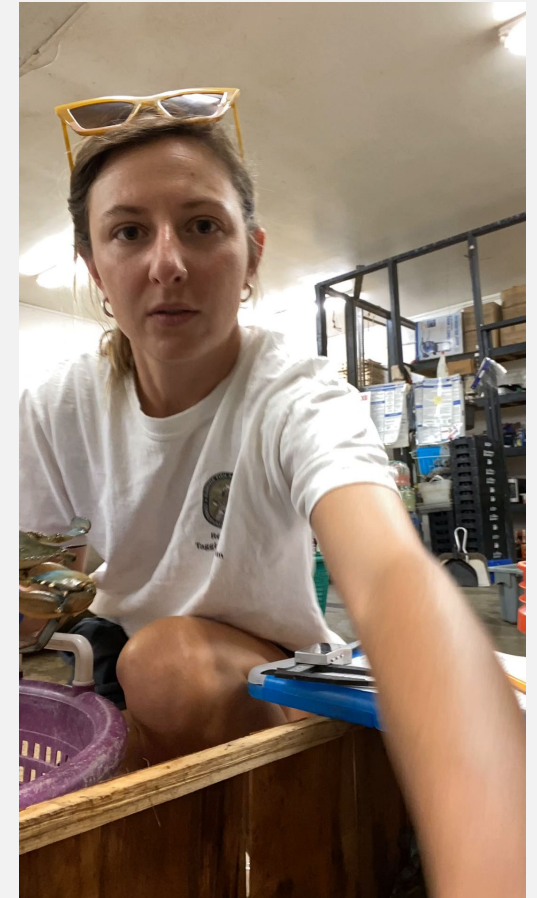


TERRAPIN BYCATCH REDUCTION ZONES (TBRZS)



NORTHEAST FL FIELD RESEARCH

- Commercial Observers
 - As available, within and outside TBRZ
 - Measure commercial catch and determine terrapin capture rates
 - March – November
- Statewide TIP data (2002-2022)
- Blue crab FIM trapping data
- Independent survey of trap distributions within TBRZ
 - Geospatial mapping
 - Active terrapin sightings
- Examine the performance of BRDs in captive setting



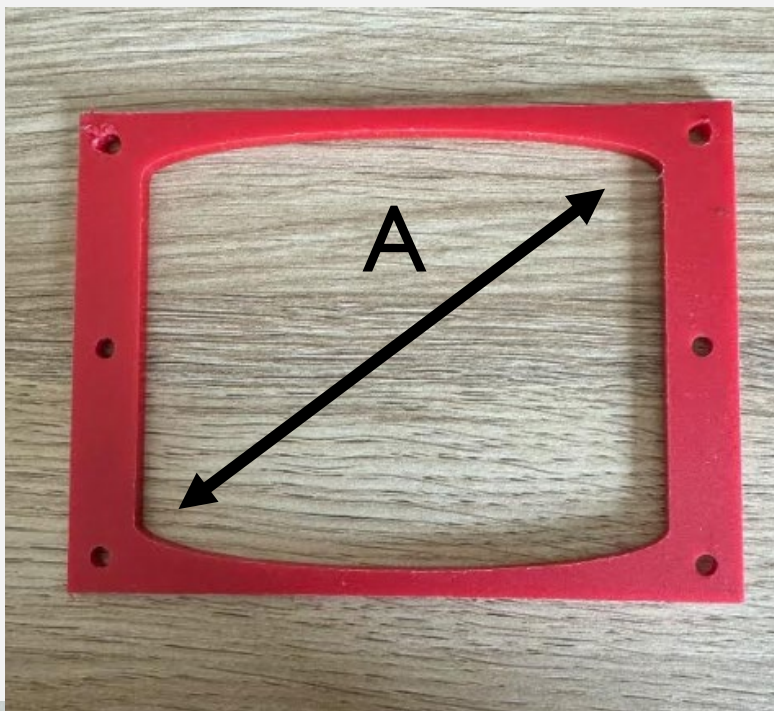
BODY SIZE

- Attempting to accumulate comprehensive database of Florida terrapin morphology
 - Researchers, museums, wildlife rehabbers
- Using Arendt et al. (2018) equations to determine BRD design for Florida terrapins



CAPTIVE TRIALS

- Two BRD designs and Control
- Travis Thomas, PhD & Shea Husband, Master's student
- Exclusion probabilities for terrapin and blue crabs
- Capture probabilities and size of blue crabs and terrapins
- Escapement probabilities of blue crabs



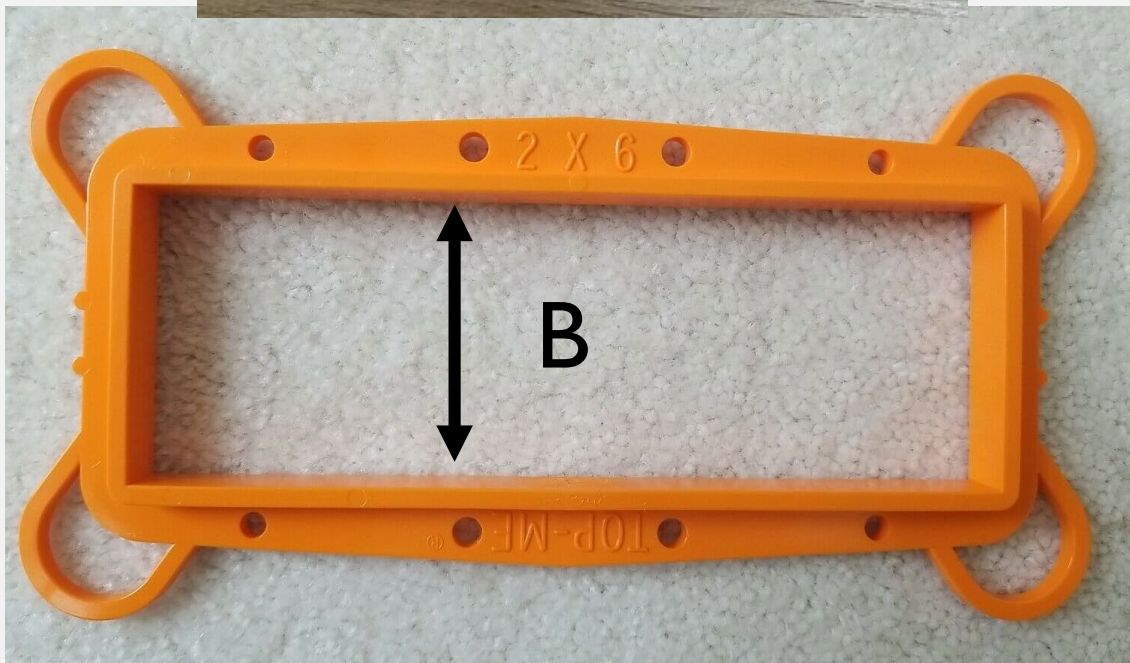
51-64 mm x 76 mm

2-2.5" x 3"

Crab entry limited by carapace length



Crab entry limited by carapace height



51 mm x 152 mm

2" x 6"



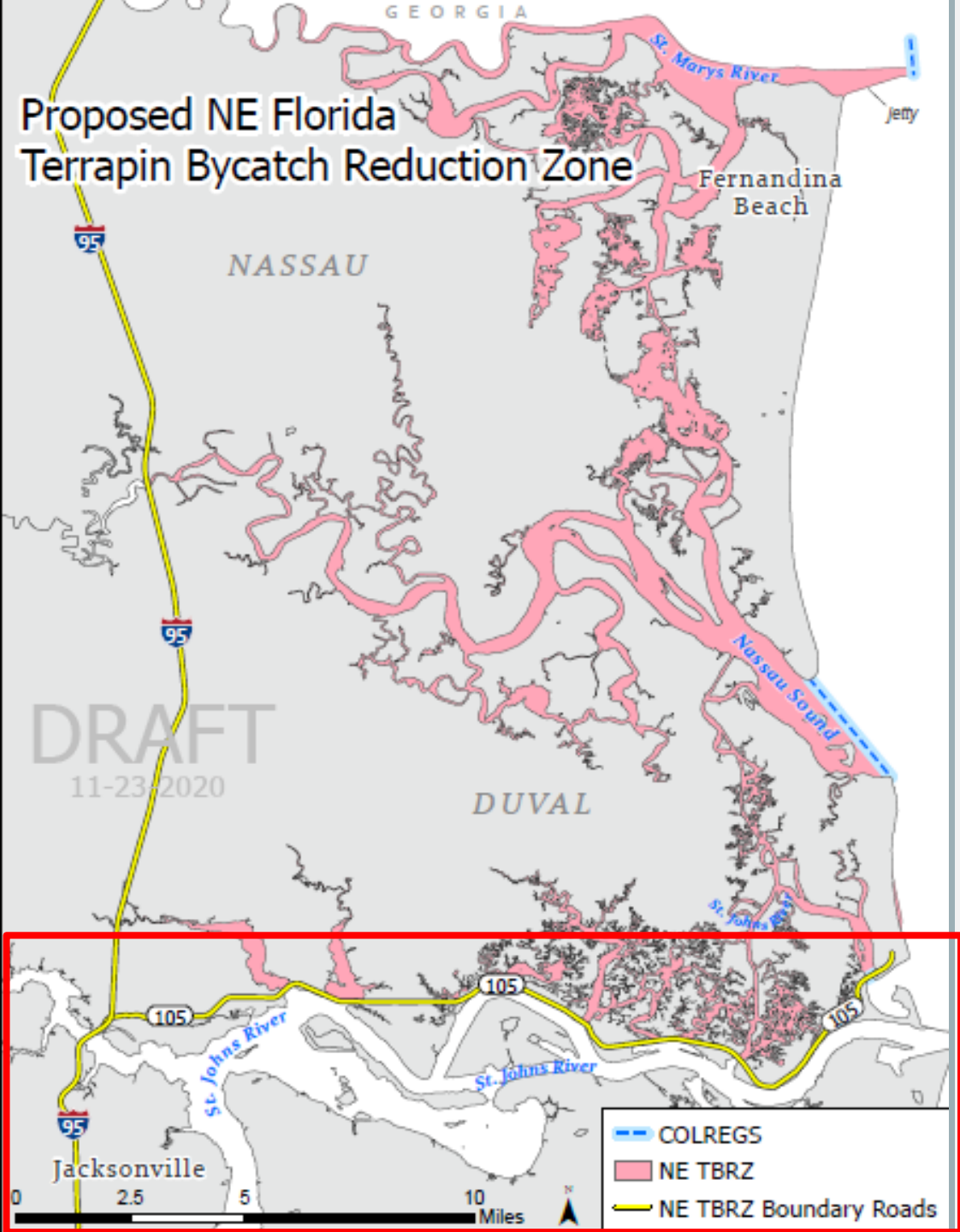
MARKET STANDARDS

Jumbo: CW \geq 190 mm

Number 1: CW 165- 190 mm

Number 2: CW 127- 165 mm



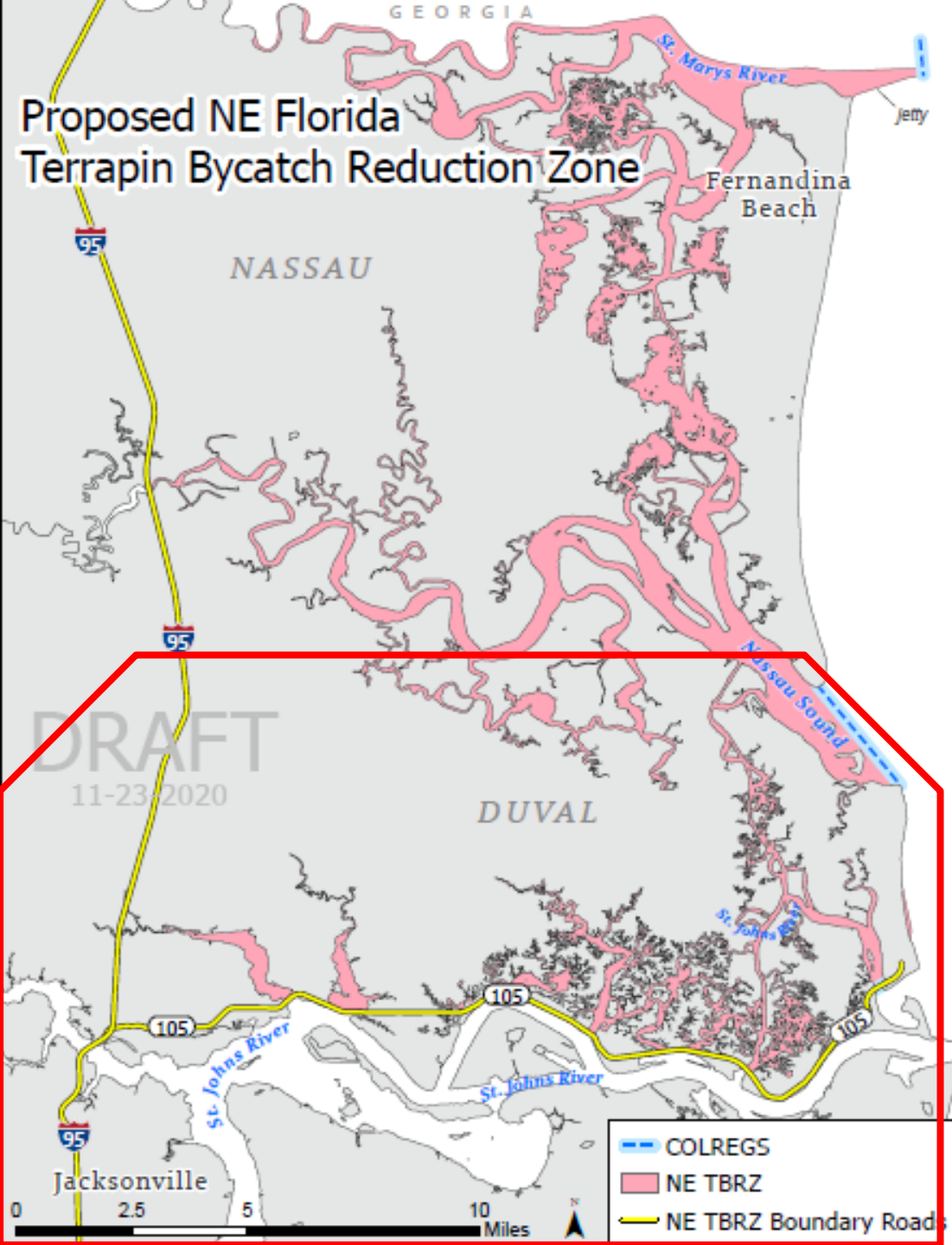


- Northeast Fishery Independent Monitoring (NE FIM)
 - Sampled in quadrant of St. Johns closest to or within TBRZ
 - February 2019 – December 2022
 - 1,552 traps sampled
 - 15,064 crabs measured

Size Class	Crabs sampled (N)	Sex (N)		Proportion of Total Catch W (%)
		Male	Female	
Jumbo	213	143	70	2.4
Number 1s	4,460	1,341	3,119	36.7
Number 2s	10,391	3,898	6,493	60.9
All	15,064	5,382	9,682	100

Percent of crabs potentially excluded by each bycatch reduction device

BRD Type	Excluded (N)	Excluded (%)
A	1	0.007
B	0	0.000

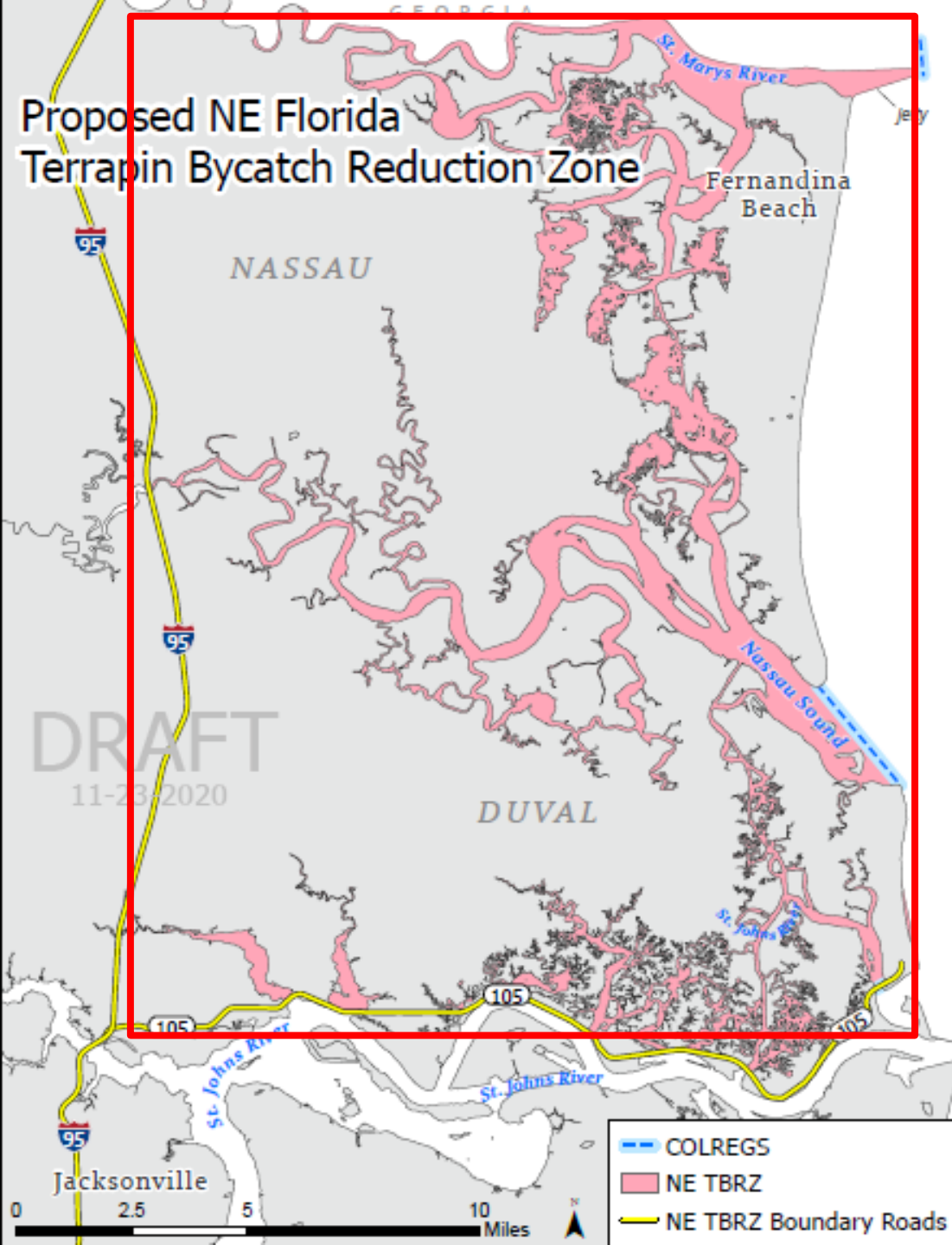


- Northeast Dependent Monitoring (NE FDM)
 - Sampled in quadrant of St. Johns closest to or within TBRZ
 - January 2019 – December 2022
 - 556 traps sampled
 - 2,949 crabs measured

Size Class	Sample Size	# Crabs by Sex		Proportion of Total Catch W (%)
		Male	Female	
Jumbo	72	44	28	3.8
Number 1s	1,150	470	680	46.5
Number 2s	1,727	729	998	49.7
All	2,949	1,243	1,706	100

Percent of crabs potentially excluded by each bycatch reduction device

BRD Type	Excluded (N)	Excluded (%)
A	0	0.00
B	0	0.00



- Northeast Dependent Monitoring (NE FDM)
 - Sampled in quadrant of St. Johns closest to or within TBRZ
 - May 2022 – November 2022
 - 29 sampling days
 - 563 crabs measured

Size Class	Number of Crabs (N)	Sex		Proportion of Total Catch W (%)
		Male	Female	
Jumbo	5	5	0	1.4
Number 1s	195	125	70	39.5
Number 2s	363	310	53	59.1
All	563	440	123	100

Percent of crabs potentially excluded by each bycatch reduction device

BRD Type	Excluded (N)	Excluded (%)
A	0	0.00
B	0	0.00

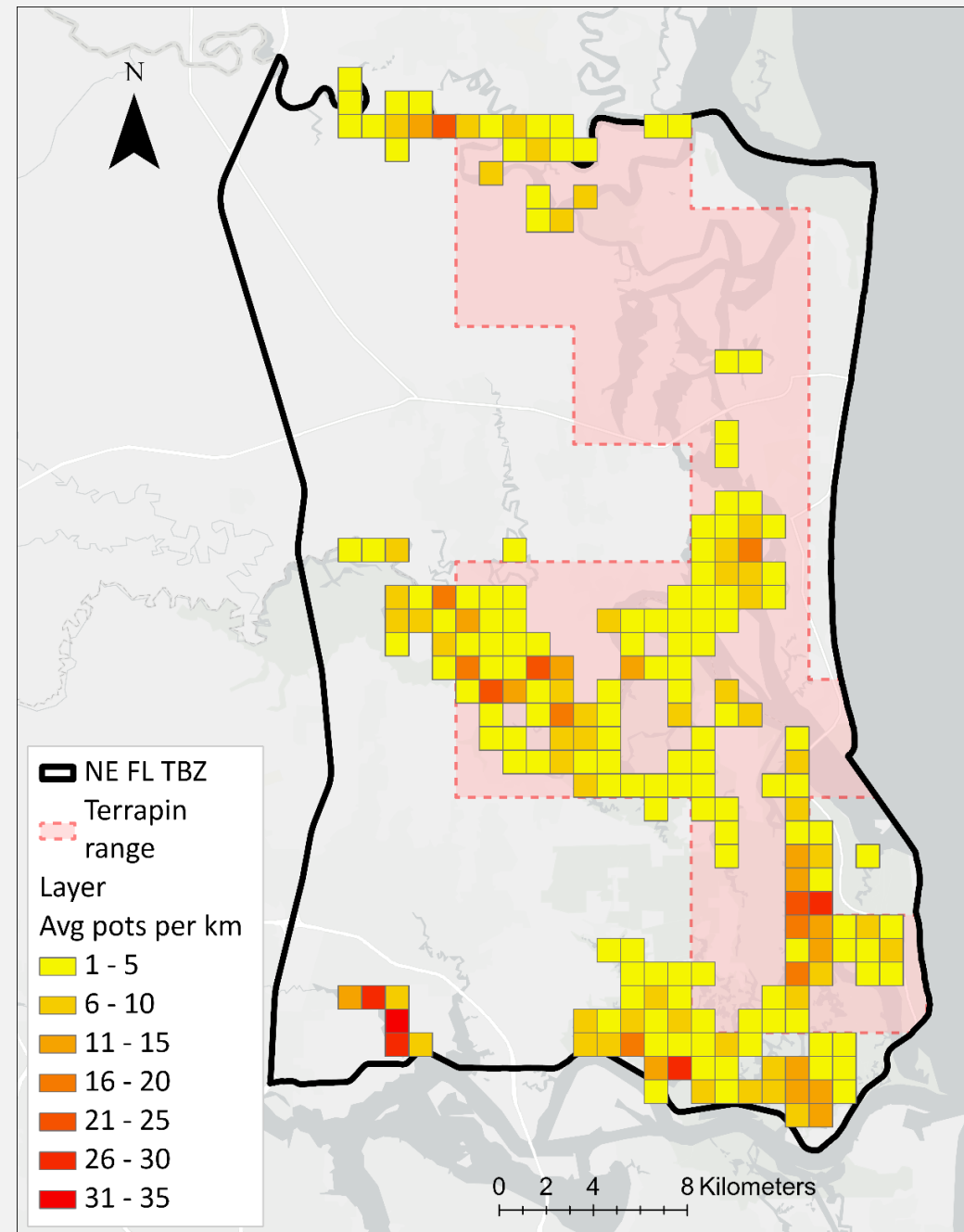
RESULTS – TRIP INTERVIEW PROGRAM & LANDINGS

- Subsampled 2000-2022
- 12,728 crabs measured
- Smallest CW – Destin, Tampa, Ft. Ierce
- Largest CW – Pensacola, Apalachee Bay, Tarpon Springs, Jacksonville, Cape Canaveral.

FAC	Avg Landings (kg) per year	Crab Weight Excluded (%)		Crab Weight (kg) Excluded from Landings	
		BRD A	BRD B	BRD A	BRD B
Pensacola	32,730	0.00	0.00	0.0	0.0
Destin	21,735	0.00	0.00	0.0	0.0
Panama City	29,931	0.00	0.00	0.0	0.0
Apalachee Bay	900,782	0.00	0.00	0.0	0.0
Crystal River-Tarpon Springs	283,119	0.00	0.00	0.0	0.0
Tampa	183,831	0.00	0.00	0.0	0.0
Fort Myers	472,339	0.00	0.00	0.0	0.0
Fort Pierce	21,368	0.00	0.00	0.0	0.0
Cape Canaveral	145,928	0.04	2.38	64.2	3,479.7
St. Augustine	357,322	0.00	0.00	0.0	0.0
Jacksonville	411,507	0.00	0.00	0.0	0.0
All FACs	182,374	0.02	0.96	32.3	1,752.1

RESULTS – TRAP SURVEYS

- 23 surveys conducted March – November 2022
- Terrapin range based on historical sighting data of terrapins
- 6.0 ± 5.8 pots per km² (max-min: 1-32 pots per km²)
- 22 crabbers fishing in TBRZ
- 45.3 ± 56.2 pots per fisher

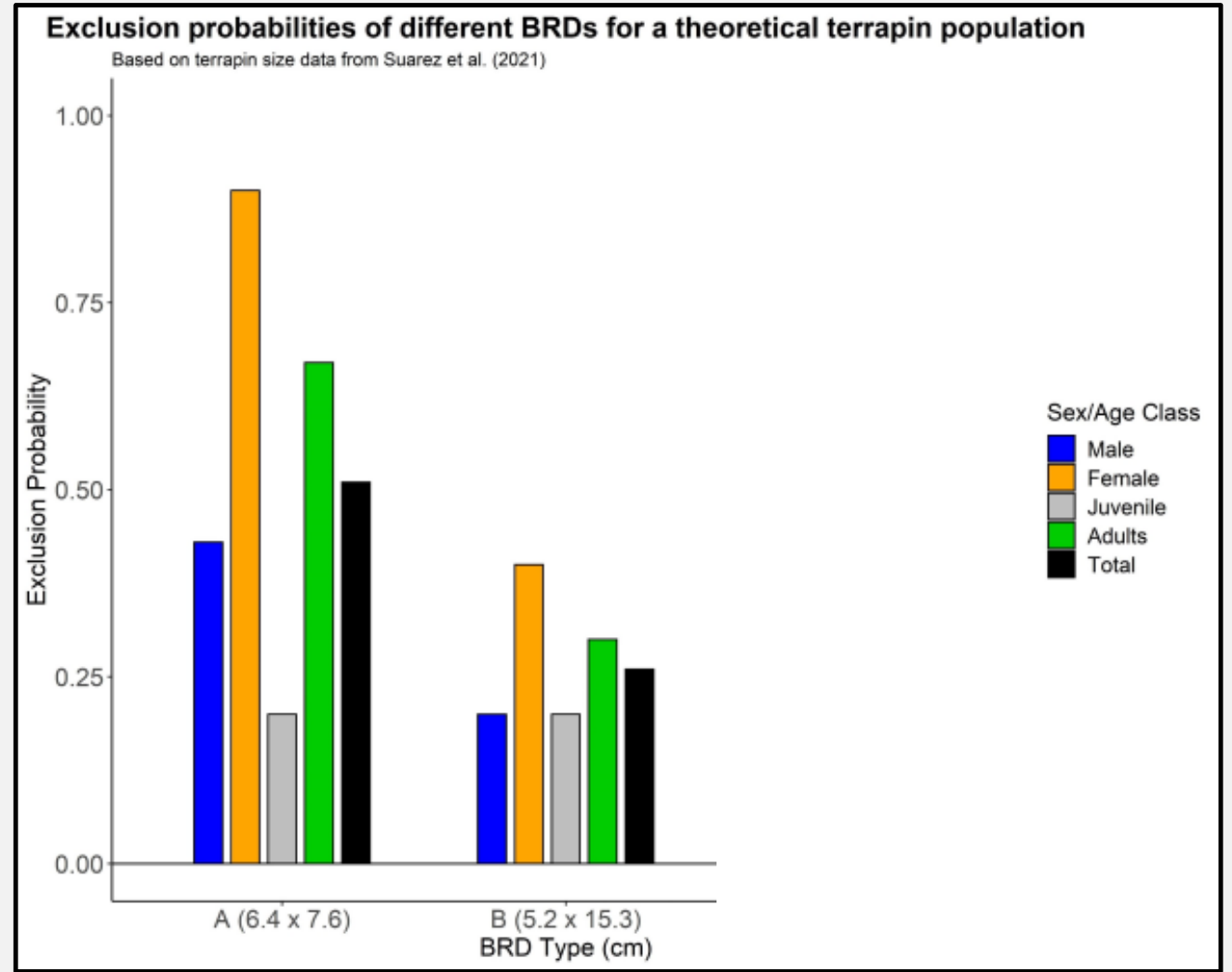


PRELIMINARY MODELING RESULTS

BRD A



BRD B



CAPTIVE TRIAL RESULTS - TERRAPINS

BRD A

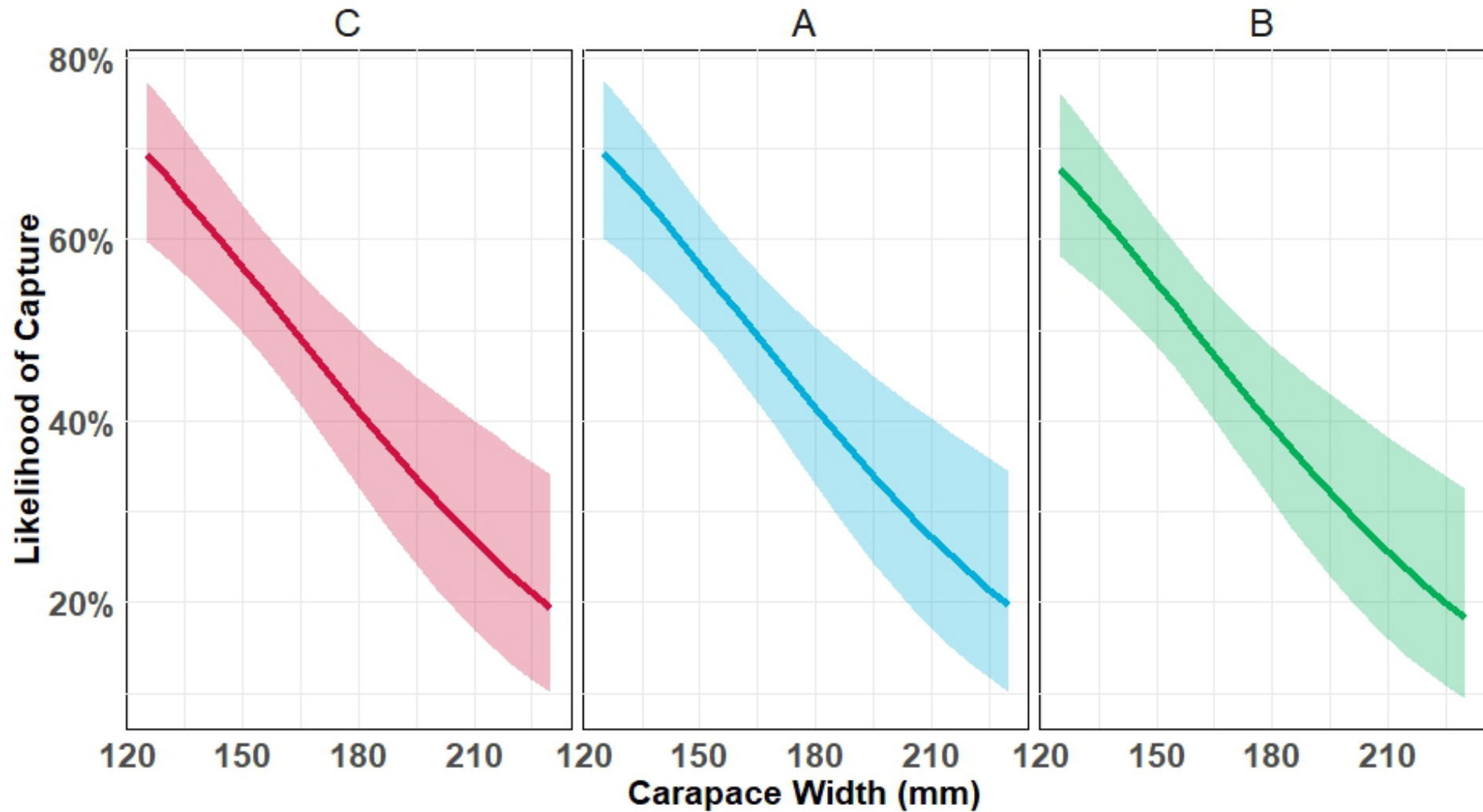


BRD B



Treatment	N	# Caught	Catch Percentage	Mean CL of Captures (mm)
A	30	2	6.7%	99
B	30	1	3.3%	97
C	30	4	13.3%	107

CAPTURE BLUE CRABS



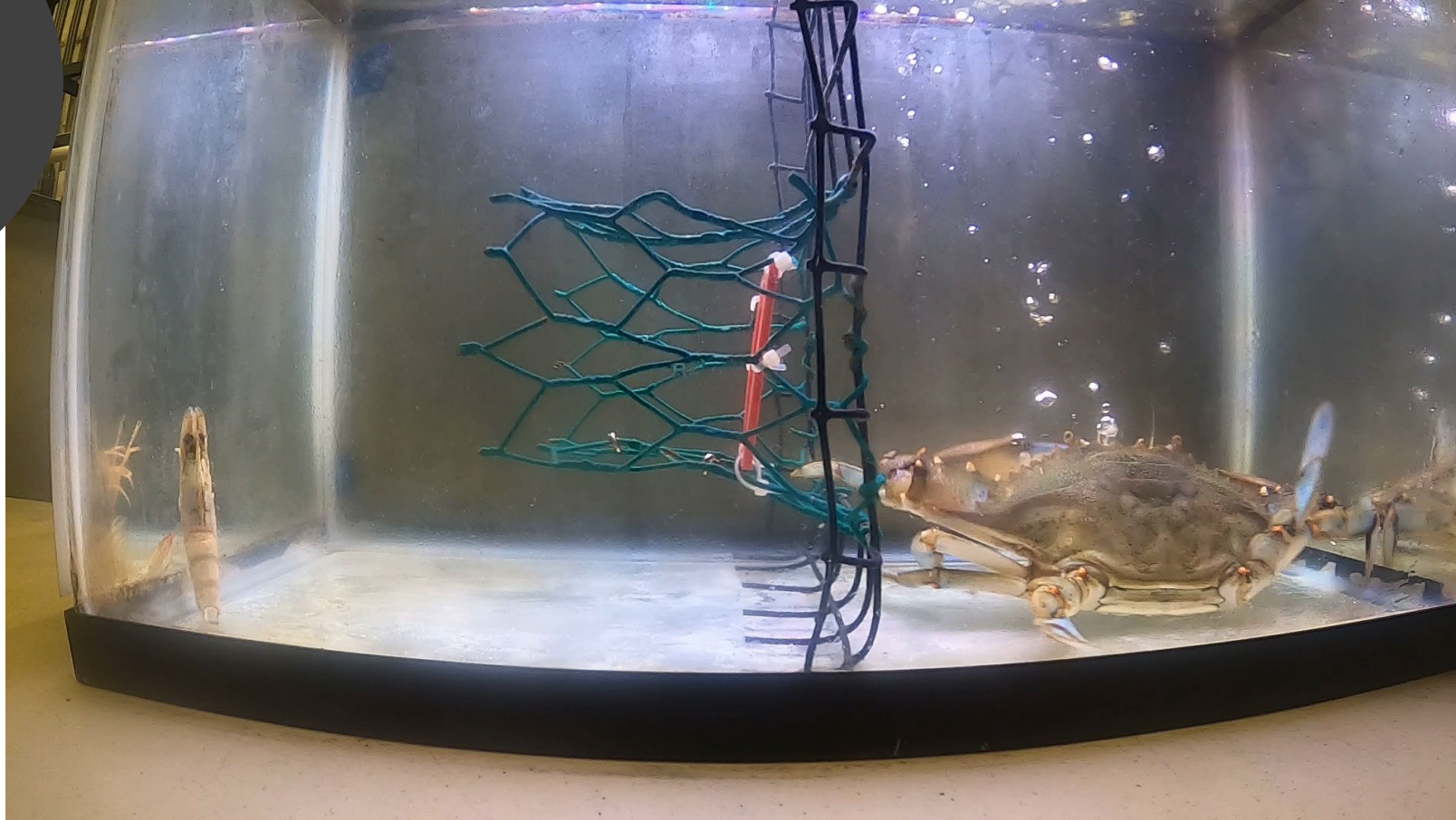
A (B)
B (B)
C (C)
Total

CW of captures
.08
.02
.16
.75

ESCAPEMENT BLUE CRABS

Treatment	n	# of escapements	Percent crabs escaped	Mean CW (mm)	Mean CW of escaped crabs (mm)
A	189	3	1.6%	156.4	155.7
B	191	64	33.5%	156.4	159.3
C	194	40	20.6%	156.3	156.0

CAPTURE
BRD A



CAPTURE
BRD A



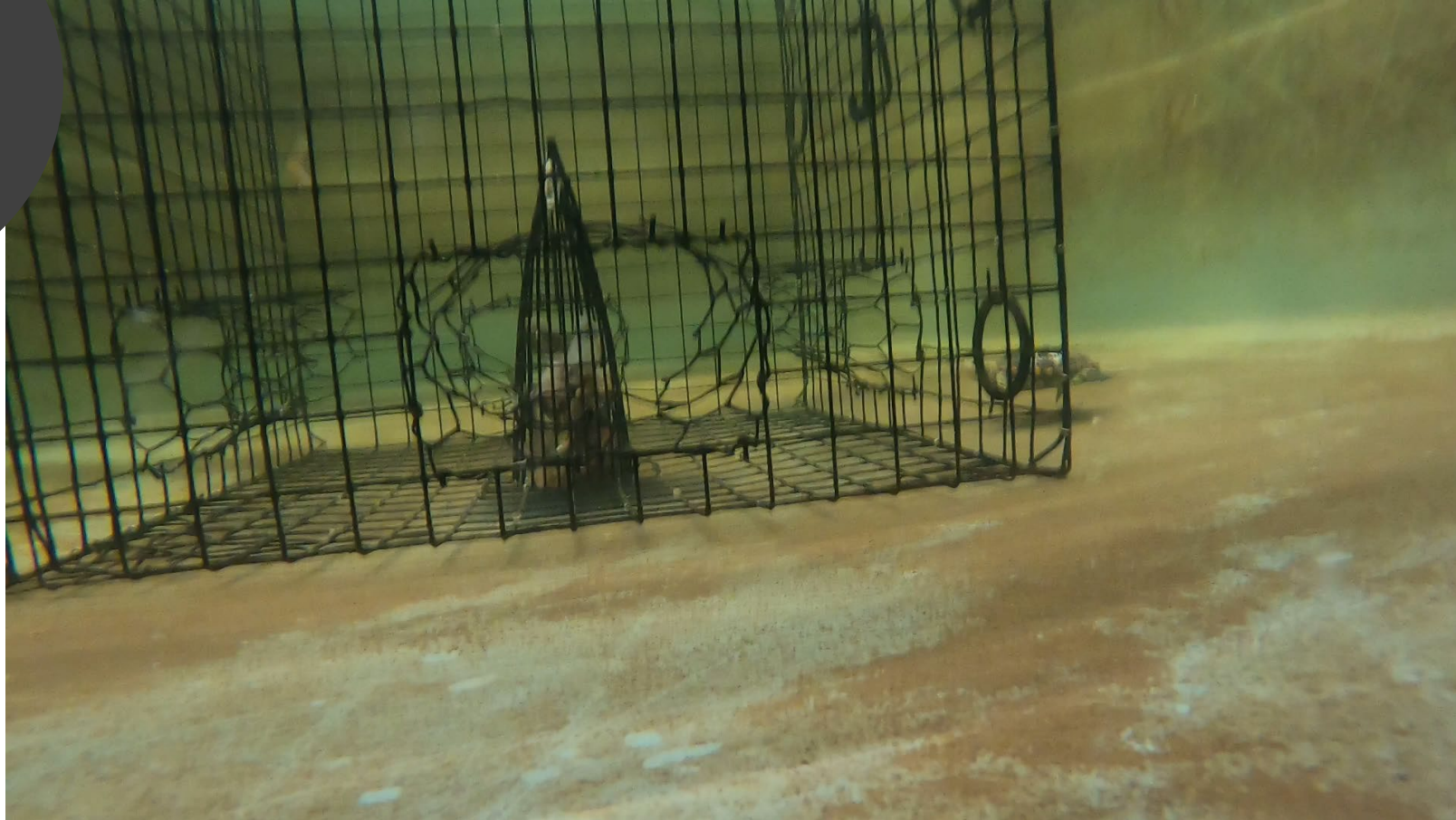
CAPTURE
BRD B



ESCAPEMENT
BRD B



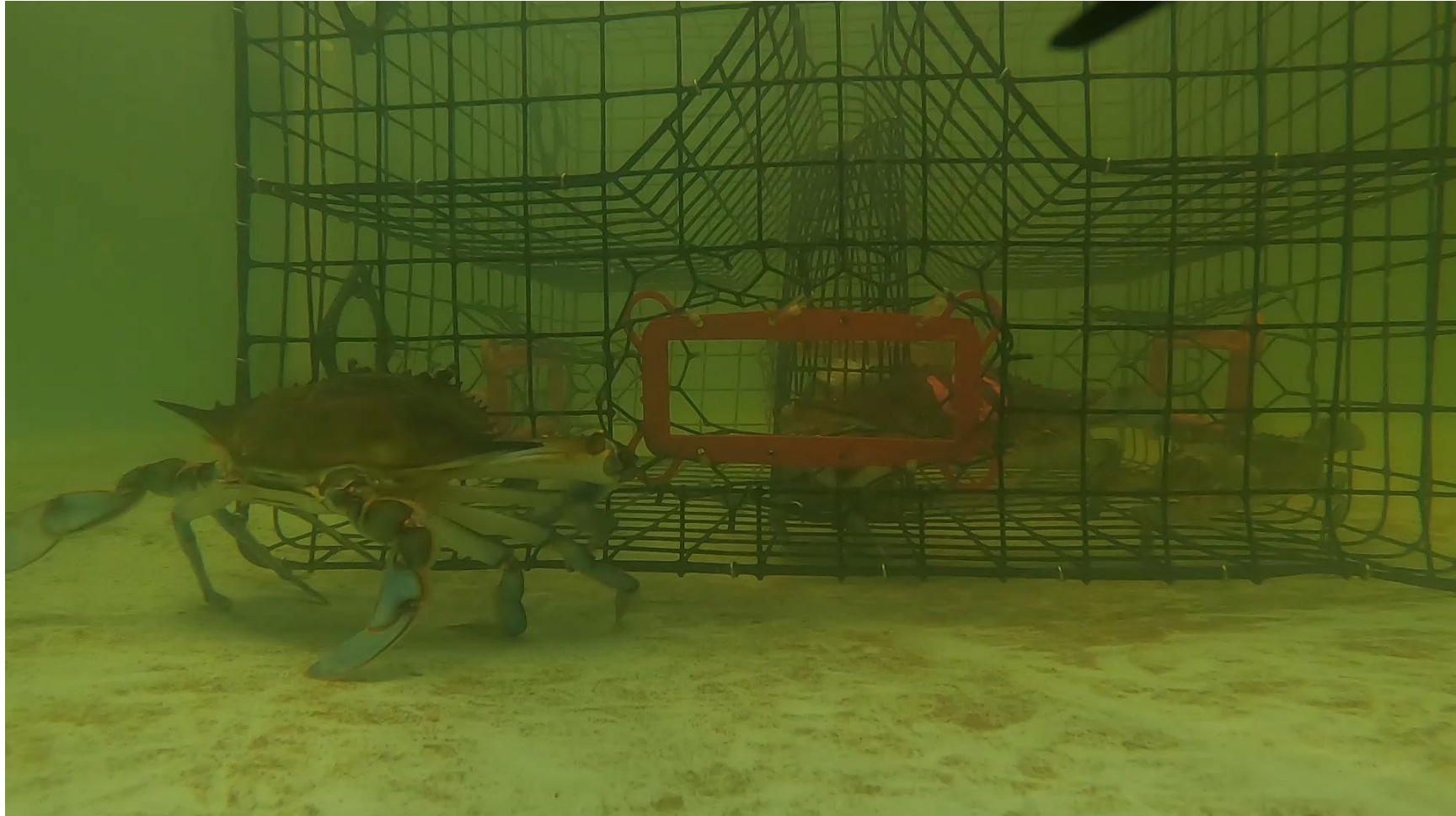
TERRAPIN
CAPTURE -
CONTROL

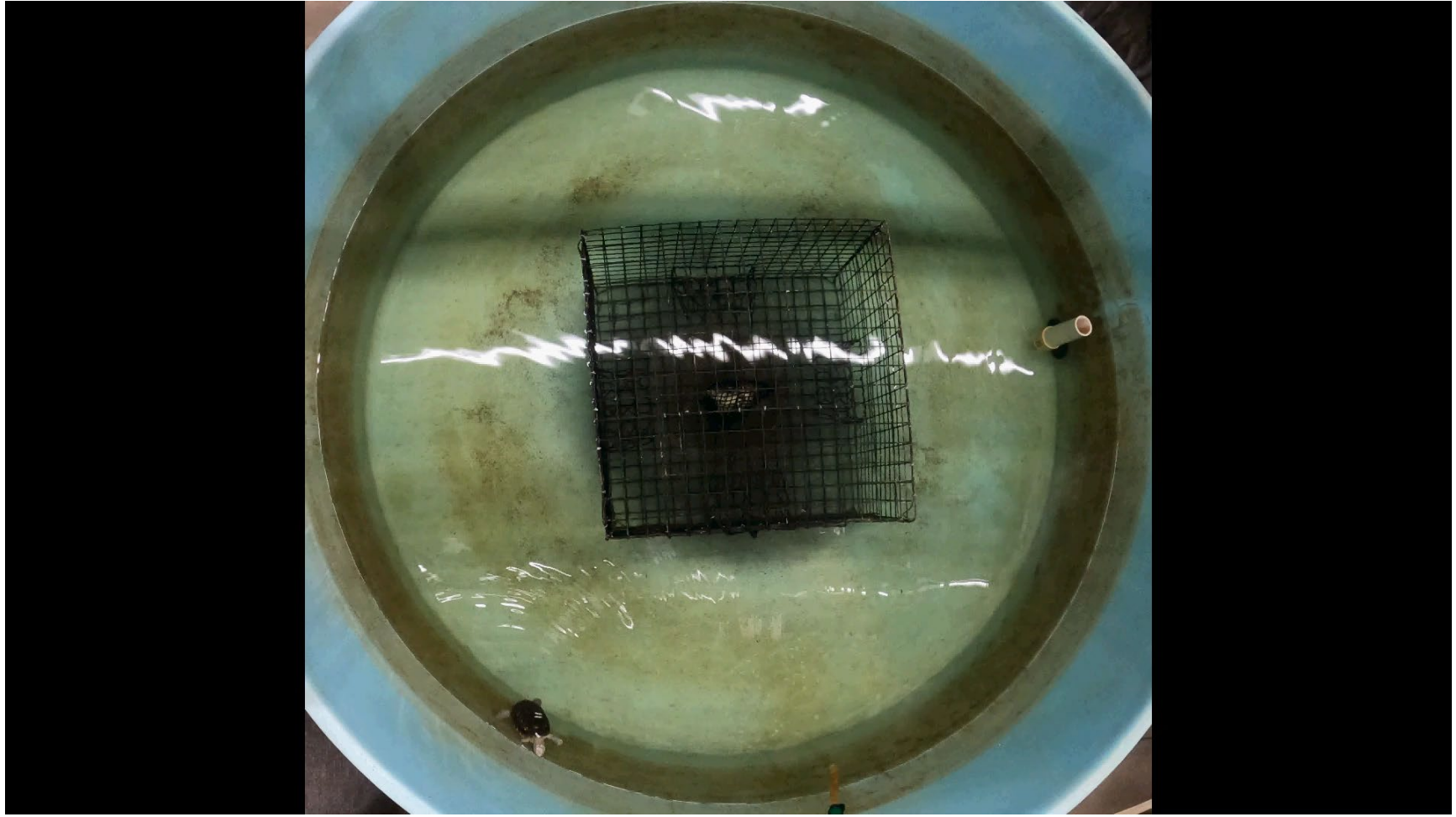


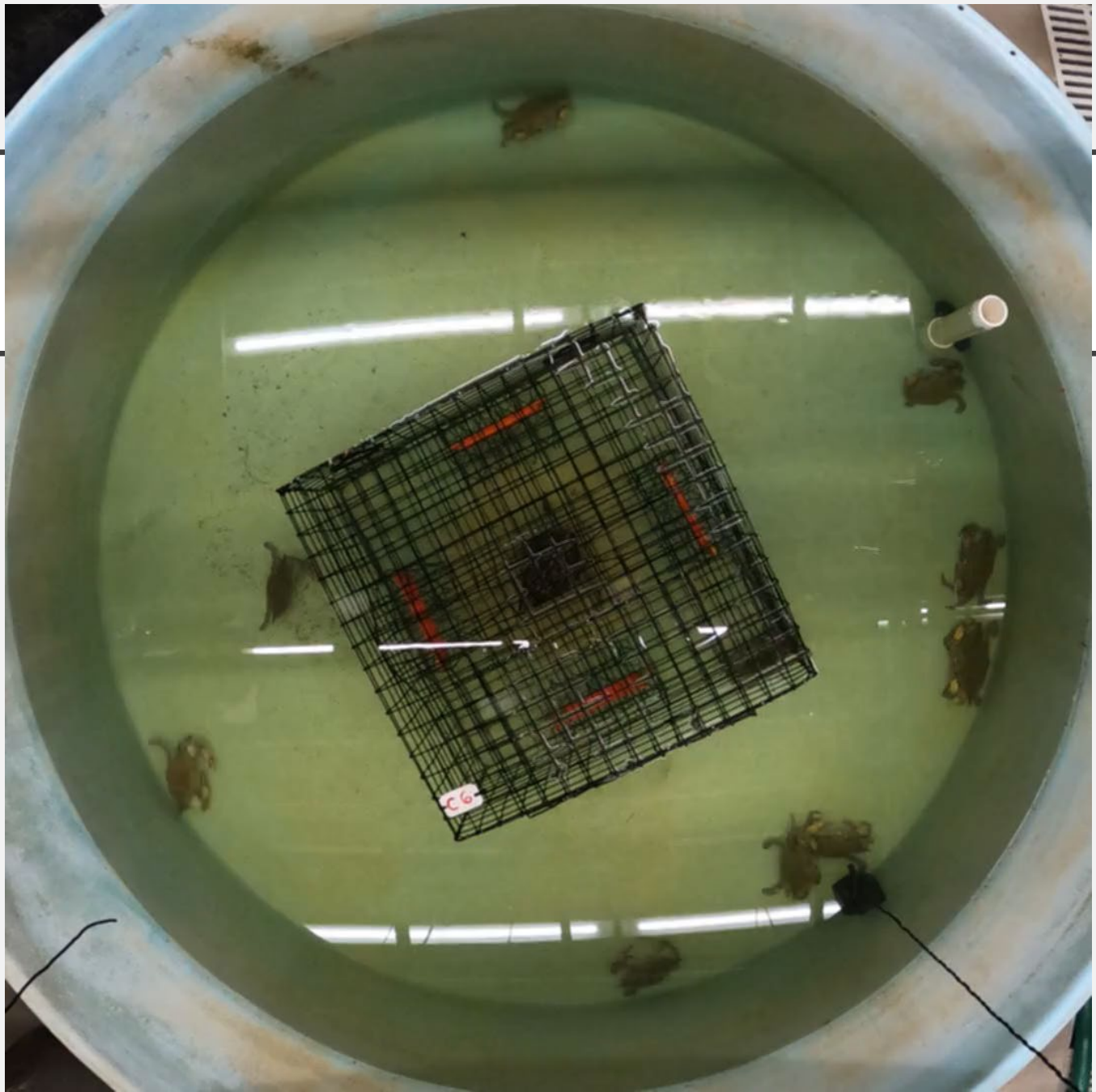
FUNDING AND PARTNERS

- Conserve Wildlife Tag Grants
- NMFS Interjurisdictional Grant
- State of Florida Commercial Trap Licensing
- FWC Wildlife Section
- University of Florida – Nature Coast Biological Station
- Commercial blue crab fishers









A sunset scene over a body of water. The sun is low on the horizon, creating a bright orange and yellow glow that reflects on the water's surface. The sky is filled with scattered, dark grey clouds. A white rectangular box with a black border is centered in the upper half of the image, containing the word "QUESTIONS?".

QUESTIONS?







- Interactions between diamondback terrapins, crabs, and proposed bycatch-reduction-devices (BRDs) are currently of great interest to Florida stakeholders. In response, the Florida Fish and Wildlife Conservation Commission (with partners) is launching several lines of research to help inform this conflict. First, we will obtain and synthesize existing morphology data for terrapins within the state of Florida, then we will use previously published equations to determine the most appropriate BRD design(s). We will evaluate this design, together with the configuration currently recommended by the state, in a captive setting. Specifically, we evaluate whether BRDs restrict entry by both terrapins and crabs, as compared to a control trap with no BRDs, and assess whether the sex and size of either affects BRD performance. Finally, and concurrently, we will perform Fishery Dependent Monitoring onboard commercial vessels during fishing operations to evaluate the magnitude of DBT bycatch in commercial crab traps in subsections of the Terrapin Bycatch Reduction Zones (TBRZ) in both the Big Bend and Northeast Regions. Additional TBRZs may be sampled in future years.