NOAA FISHERIES

Reducing Juvenile Sea Turtle Bycatch through Development of Reduced Bar Spacing Turtle Excluder Devices (TEDs)

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Project Background

- Project was selected for sea turtle restoration funding in 2019
  - Restoration is non-regulatory and engages with industry participants on a voluntary basis
- Project activities began in 2021 with industry outreach meetings and the formation of a stakeholder working group with industry representatives from each Gulf state
- During 2022 and 2023 a series of TED testing was done
- 2024 Industry outreach meetings held

Project Background

This project is:

- Developing and evaluating reduced bar spacing in TEDs to better exclude small sea turtles in the shrimp otter trawl fishery
- Informing future restoration projects, which may include voluntary incentivized use of new TEDs developed

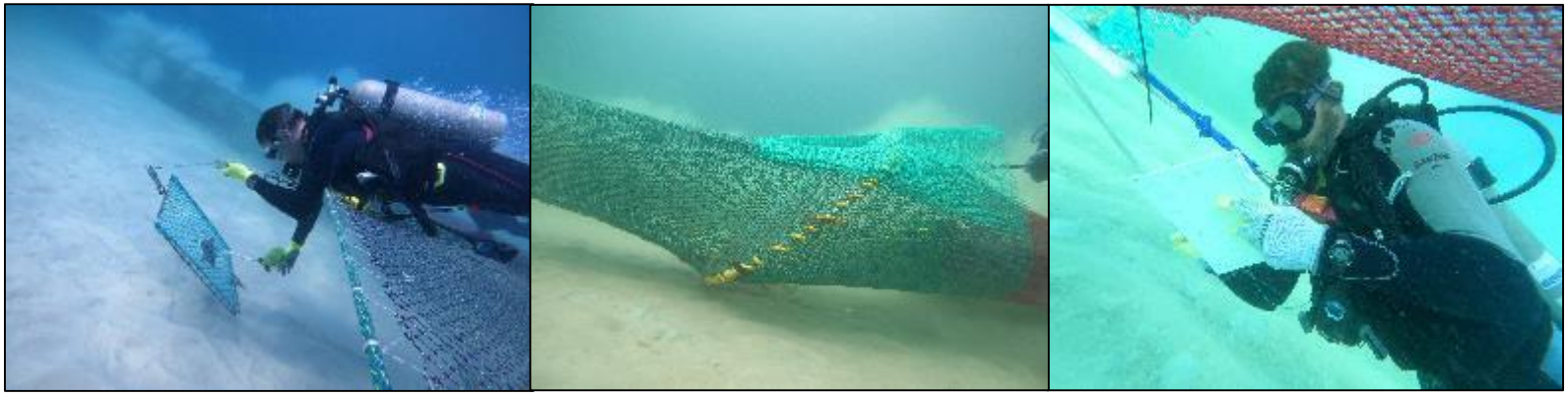
- **NOT** regulatory in nature
- **NOT** establishing new TED regulations on the shrimp otter trawl fishery
- **NOT** changing any existing TED regulations

Acronyms and Abbreviation Definitions

- TOSS = Top Opening Super Shooter TED
- BOSS = Bottom Opening Super Shooter TED
- TSBR = Top Opening Straight Bar Rectangular TED
- DC = Double Cover TED Flap
- 55° = 55 degree TED angle
- 45° = 45 degree TED angle
- 4.0" = 4-inch TED deflector bar spacing
- 2.5" = 2.5-inch TED deflector bar spacing

Small Turtle TED Testing

- All TED designs were evaluated utilizing the NOAA Science Center small turtle testing protocol with one year old captive-reared loggerheads
- Testing completed: June 6-14, 2022 & June 17-25, 2023
- Seven TED designs and an industry standard control were evaluated



Small Turtle TED Testing

Year	Top/Bot	Shape	Bent/ Straight	Bar Spacing	Angle	Flap Twine	Escape	Capture	%Escape	Testing Priority
2022	Top	Oval	Bent	3.5"	55	#30	6	17	26.1%	Ind Std
	Top	Oval	Bent	2.5"	45	#30	24	1	96.0%	Control
	Top	Oval	Straight	2.5"	45	#30	21	4	84.0%	
	Top	Rectangular	Straight	2.5"	55	#30	25	0	100.0%	3
	Top	Oval	Bent	2.5"	55	#30	24	0	100.0%	1
	Top	Oval	Straight	2.5"	45	#15	23	0	100.0%	
	Bot	Oval	Bent	2.5"	55	#30	10	3	76.9%	
	Bot	Oval	Bent	2.5"	45	#30	21	3	87.5%	2
2023	Top	Oval	Bent	3.5"	55	#30	3	22	12.0%	Ind Std
	Top	Oval	Bent	2.5"	45	#30	24	1	96.0%	Control
	Bot	Rectangular	Straight	2.5"	45	#30	0	4	0.0%	

TED Configurations

- Three TEDs tested:

1. TED #1: Top Opening Super Shooter, Double Cover, 55° 2.5"
2. TED #2: BOSS DC 45° 2.5"
3. TED #3: TSBR DC 55° 2.5“

- Control TEDs:

1. TED #1: Top Opening Super Shooter, double cover 55° 4.0"
2. TED #2: Bottom Opening Super Shooter, double cover, 55° 4.0"

TED Configurations

- Three TEDs tested:

1. TED #1: TOSS, DC 55° 2.5"
2. TED #2: Bottom Opening Super Shooter, double cover, 45° 2.5"
3. TED #3: TSBR DC 55° 2.5“

- Control TEDs:

1. TED #1: Top Opening Super Shooter, double cover, 55° 4.0"
2. TED #2: Bottom Opening Super Shooter, double cover, 55° 4.0"

TED Configurations

- Three TEDs tested:
  1. TED #1: TOSS DC 55° 2.5"
  2. TED #2: BOSS DC 45° 2.5"
  3. TED #3: Top Opening Straight Bar Rectangular, double cover, 55° 2.5“
- Control TEDs:
  1. TED #1: Top Opening Super Shooter, double cover 55° 4.0"
  2. TED #2: Bottom Opening Super Shooter, double cover, 55° 4.0"

Proof of Concept Testing

NOAA RV CARETTA – 10 to 15 nm South of Horn Island Pass, Mississippi

- Aug 6-11, 2022

Top Opening Super Shooter, Double Cover 55°, 2.5”

VS

Top Opening Super Shooter, Double Cover 55°, 4.0”

- Sep 8-13, 2022

Bottom Opening Super Shooter, Double Cover 45°, 2.5”

VS

Bottom Opening Super Shooter, Double Cover 55°, 4.0”

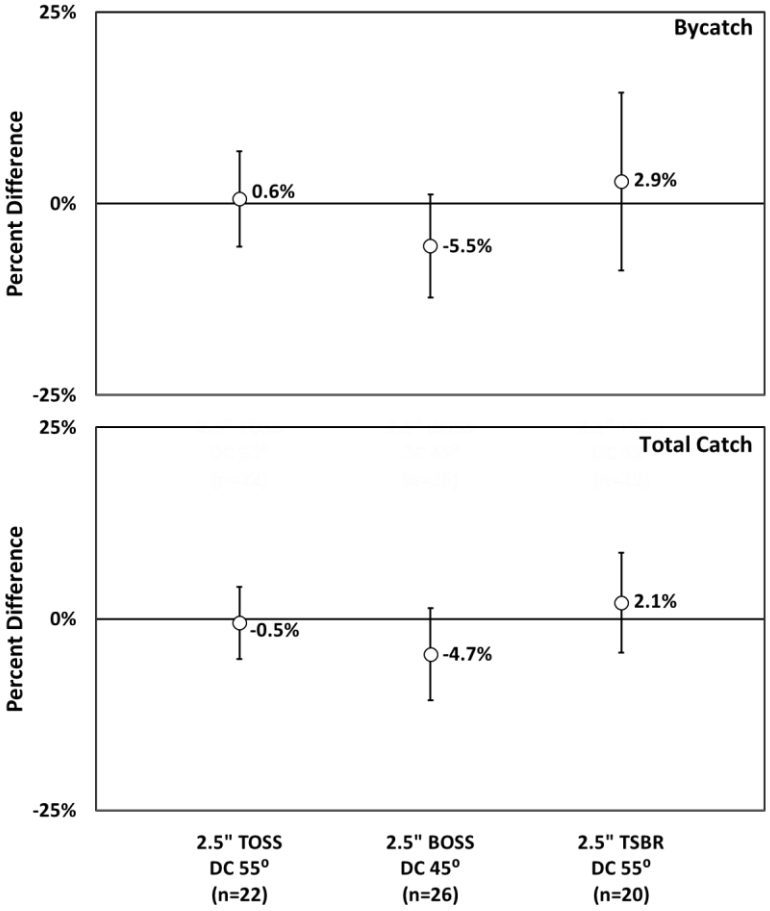
- Aug 11-17, 2023

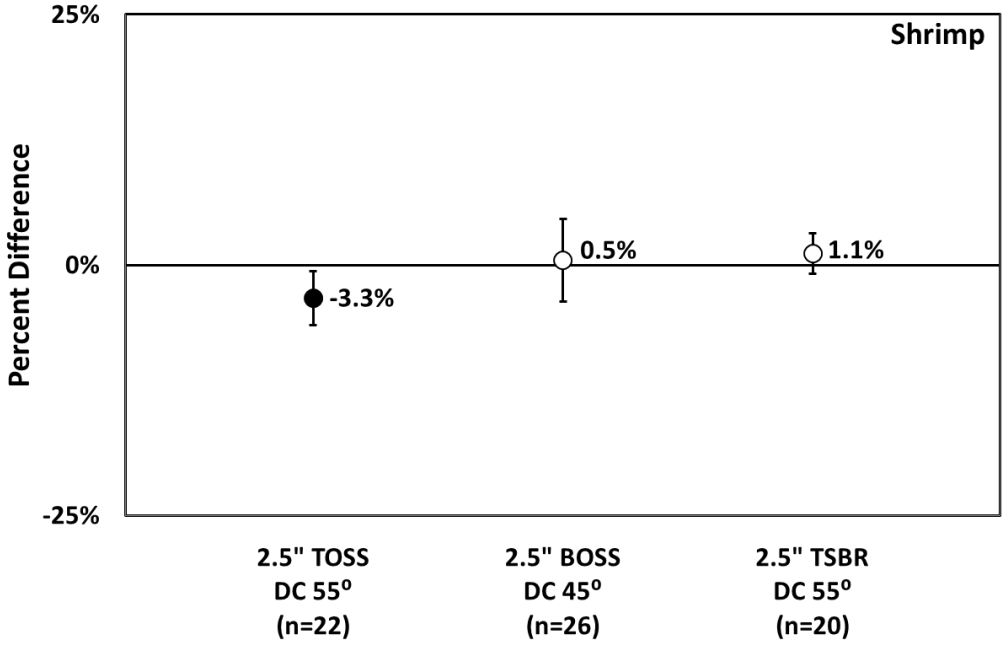
Top Opening Straight Bar Rectangular, Double Cover 55°, 2.5”

VS

Top Opening Super Shooter, Double Cover 55°, 4.0”

Proof of Concept Testing Results 2022-2023





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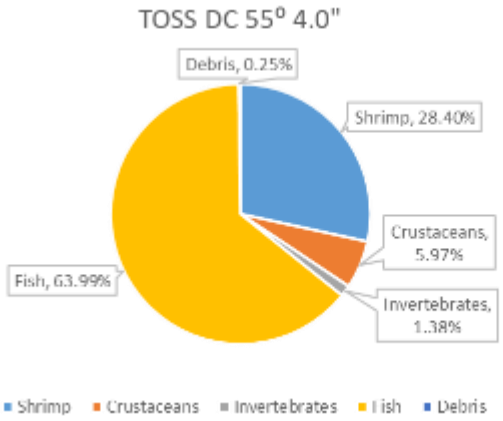
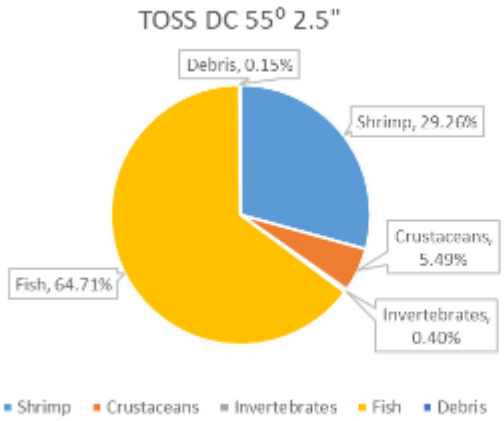
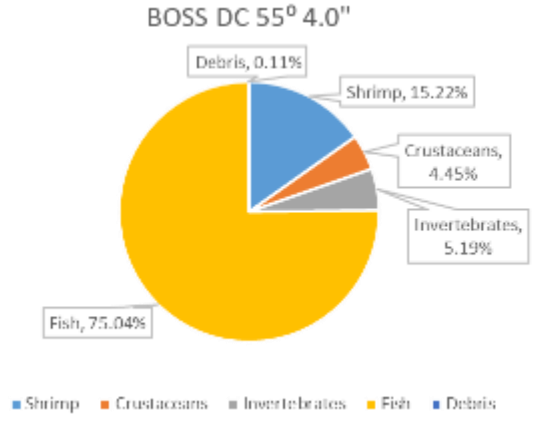
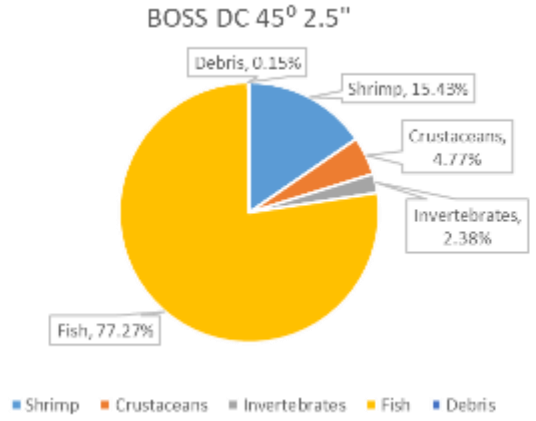
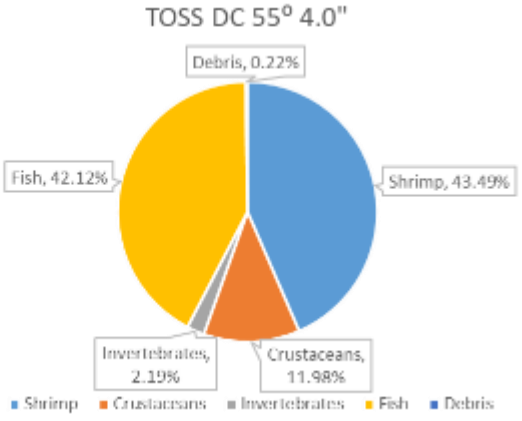
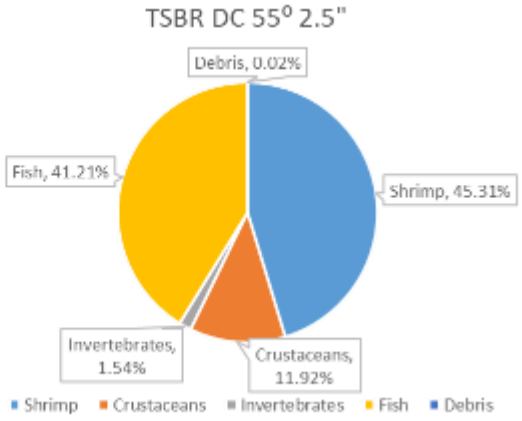










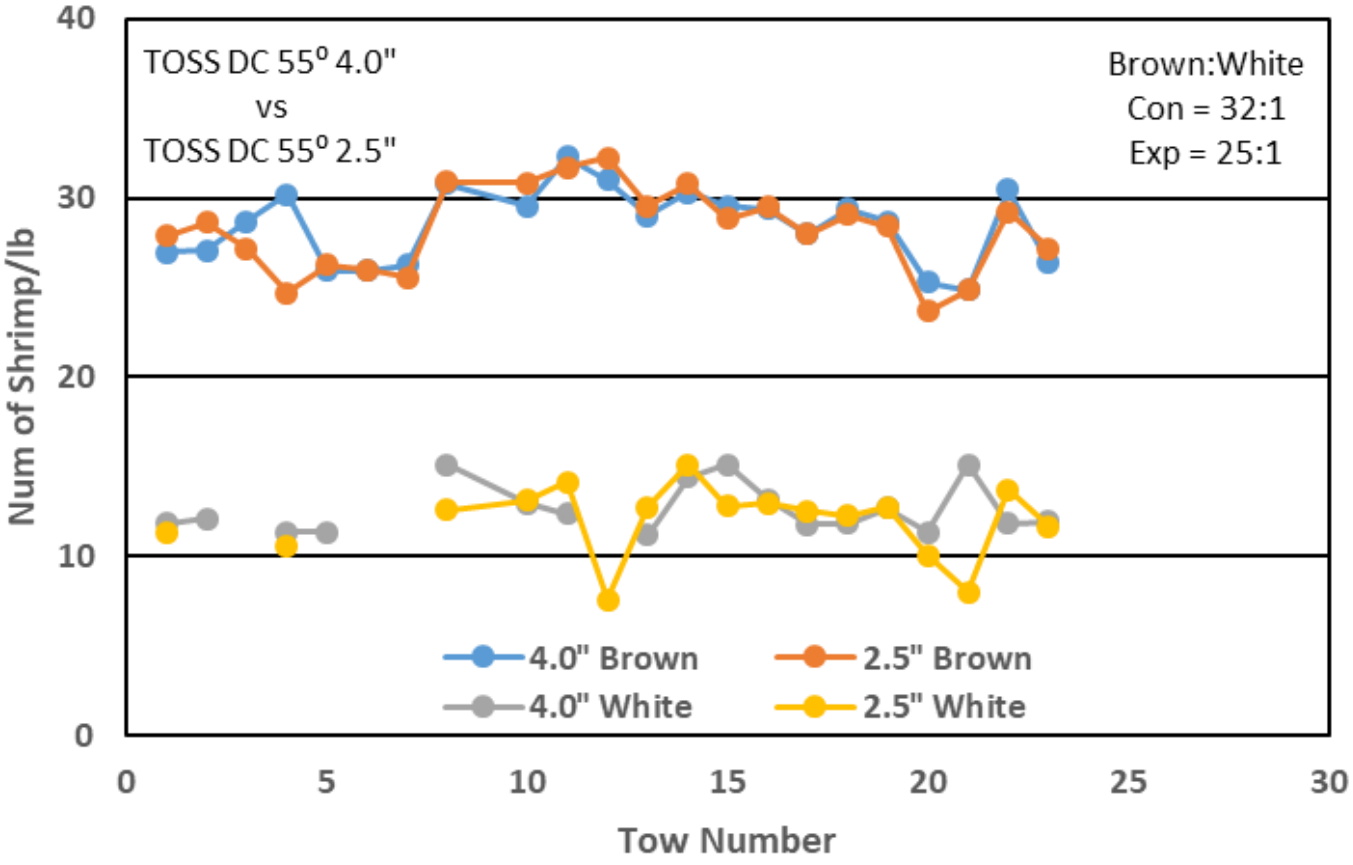


Proof of Concept Testing Results 2022-2023

Top Opening Super Shooter, Double Cover, 55° 4.0”

Vs

Top Opening Super Shooter, Double Cover, 55° 2.5”



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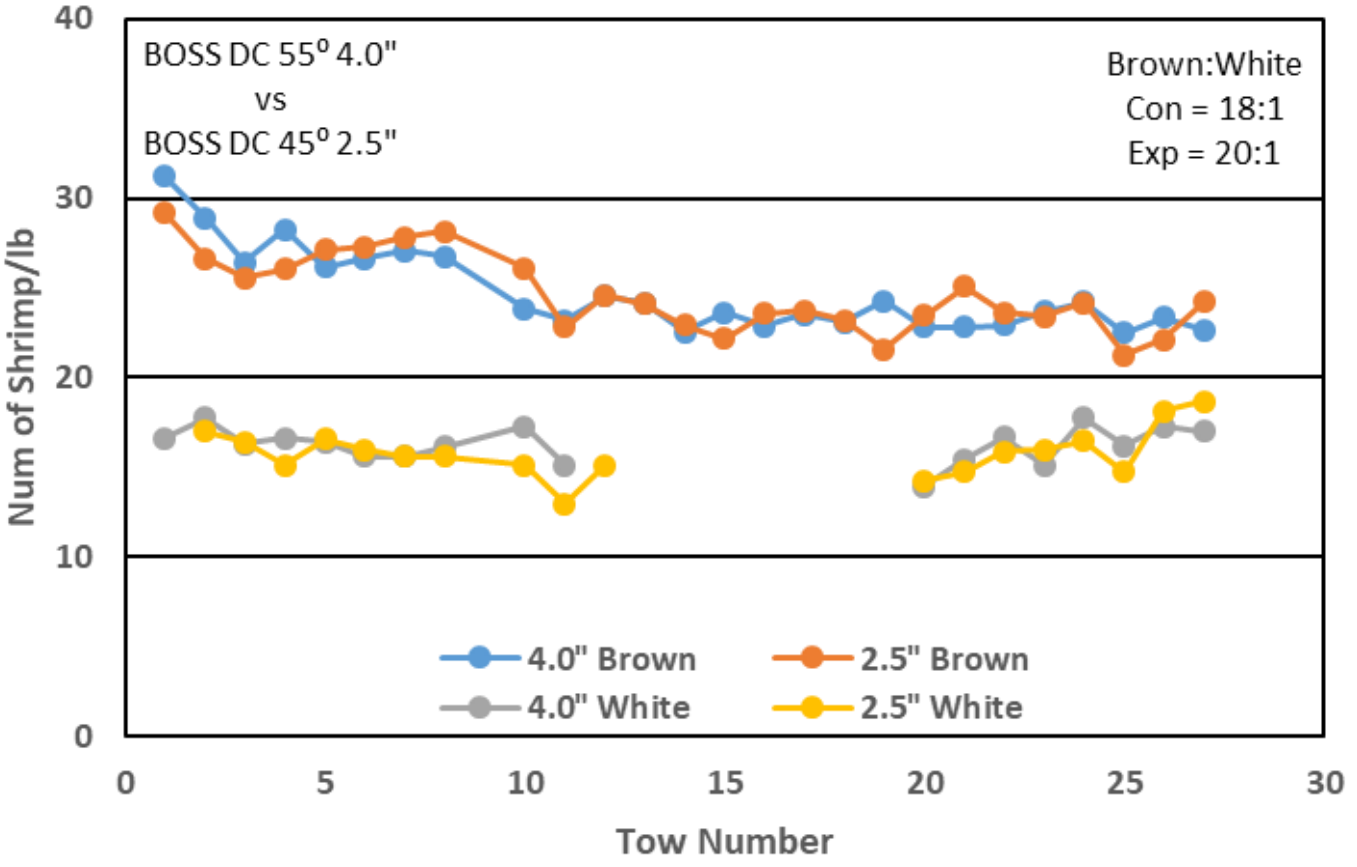
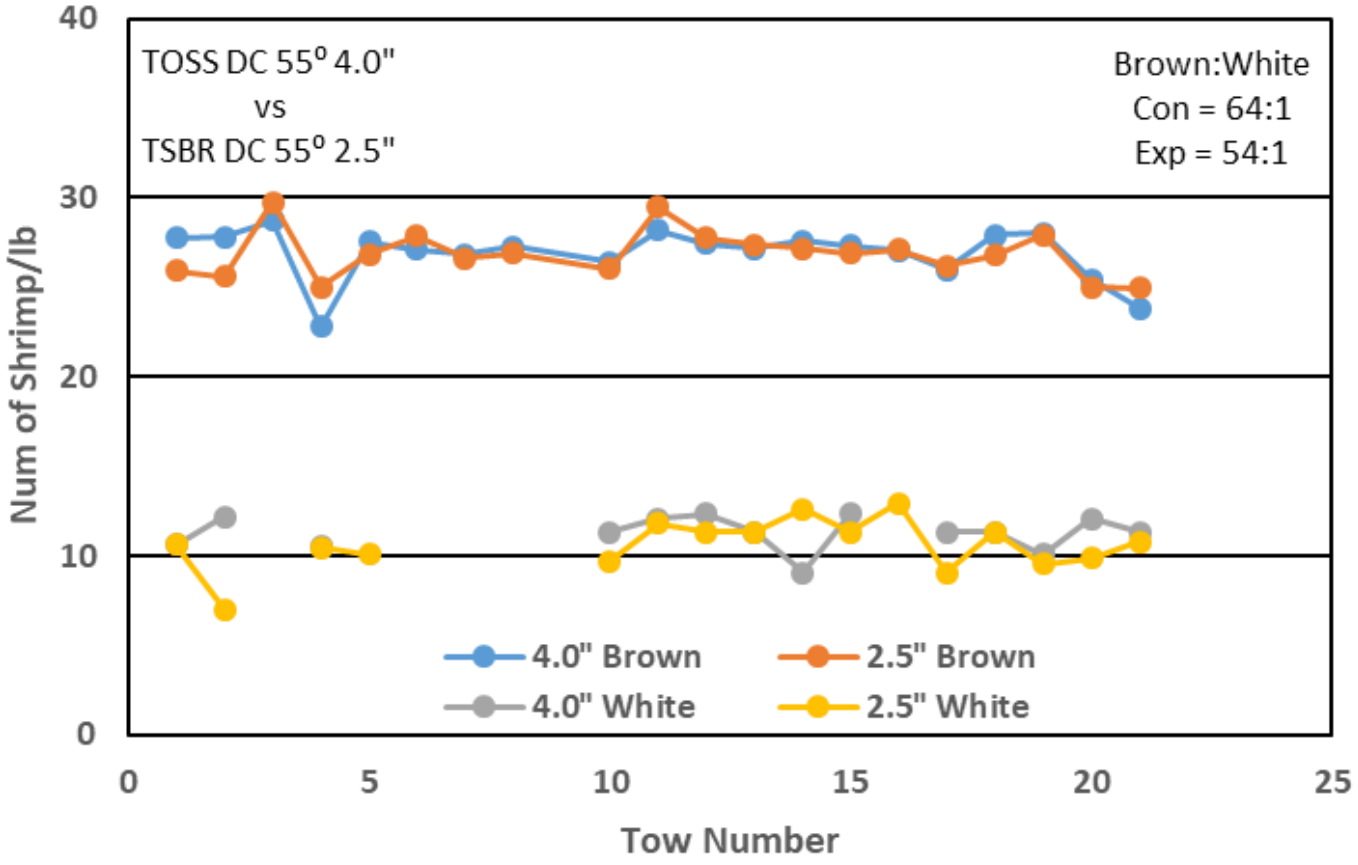


Proof of Concept Testing Results 2022-2023

Top Opening Super Shooter, Double Cover, 55° 4.0”

Vs

Top Opening Straight Bar Rectangular, Double Cover, 55° 2.5”



Proof of Concept Testing Results 2022-2023

TED #1: Top Opening Super Shooter (TOSS DC 55° 2.5”)

- 283% increase in sea turtle exclusion compared to industry standard.
- 3.3% shrimp loss compared to industry standard.
- 0.6% increase in bycatch compared to industry standard.

TED #2: Bottom Opening Super Shooter (BOSS DC 45° 2.5”)

- 235% increase in sea turtle exclusion compared to industry standard.
- 0.5% shrimp gain compared to industry standard.
- 5.5% decrease in bycatch compared to industry standard.

TED #3: Top Opening Straight Bar Rectangular (TSBR DC 55° 2.5”)

- 283% increase in sea turtle exclusion compared to industry standard.
- 1.1% shrimp gain compared to industry standard.
- 2.9% increase in bycatch compared to industry standard.

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Commercial Testing Results

Two commercial vessels from Cocodrie and Chauvin, LA operating offshore of Port Fourchon, LA and West

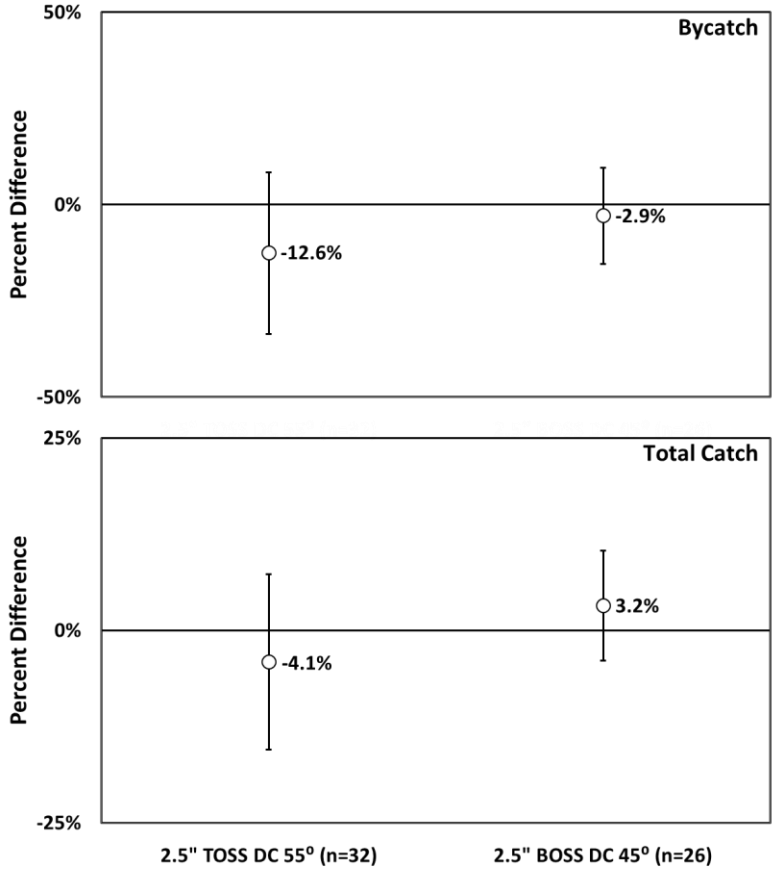
Jul 20 – Aug 6, 2023:

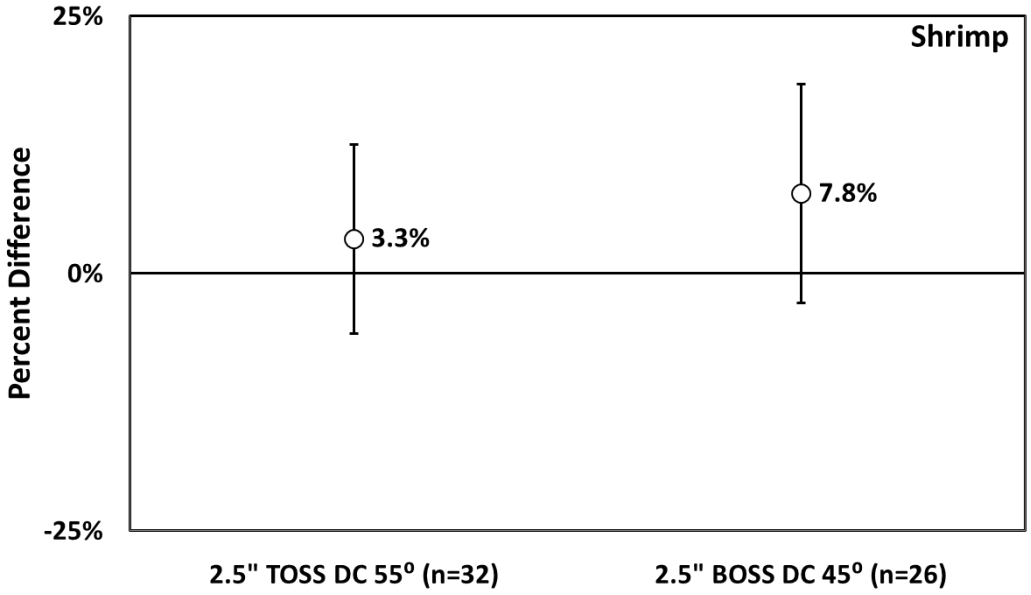
- Top Opening Super Shooter Double Cover 55° 4.0" vs Top Opening Super Shooter Double Cover, 55° 2.5"
  - 17 sea days with 25 tows sampled

Sep 15 – Oct 11, 2023:

- TOSS DC 55° 4.0" vs TOSS DC 55° 2.5"
- BOSS DC 55° 4.0" vs BOSS DC 45° 2.5"
  - 27 sea days with 54 tows sample

Commercial Testing Results 2023



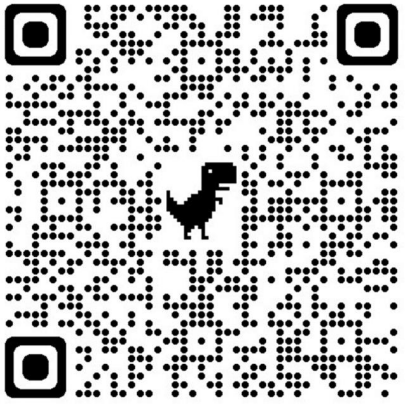


Commercial Testing Summary 2023

- Top Opening Super Shooter, Double Cover, 55° 2.5"
  - 12.6% decrease in bycatch
  - 4.1% decrease in total catch
  - 3.3% increase in shrimp
- Bottom Opening Super Shooter, Double Cover, 45° 2.5"
  - 2.9% decrease in bycatch
  - 3.2% increase in total catch
  - 7.8% increase in shrimp

Next Steps

- Future steps for small bar TEDs
  - Based on project results and success of reduced bar spacing TEDs, NOAA has put forward a project idea (not yet funded) for sea turtle restoration funding
    - If selected, the project would work with members of the shrimp fishing fleet to **voluntarily** outfit their vessels with TED designs from this project
    - If selected, this project could begin in 2026 or later



2024 Industry Outreach Meetings

- March – Shrimp Advisory Panel (Tampa, FL) and LA Sea Grant meeting (Abbeville, LA)
- April/May – MS, AL and FL
- June/July – Port Arthur Shrimp Association and Palacios meeting
- Unknown date: LA Shrimp Task Force

Information on upcoming locations will be shared

Questions?

Thank you for listening and for your feedback