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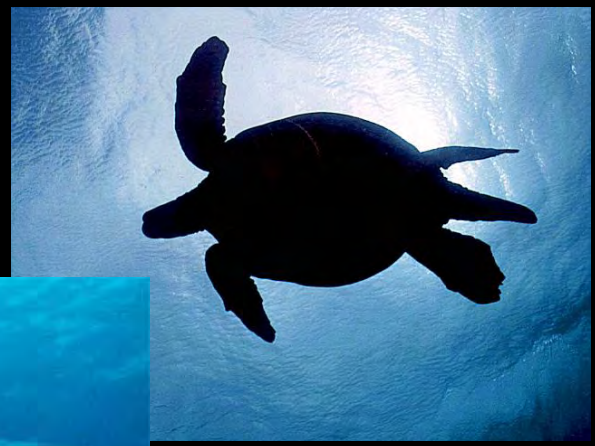
# Addressing Shrimp Trawl Bycatch




Dan Foster

NOAA Fisheries

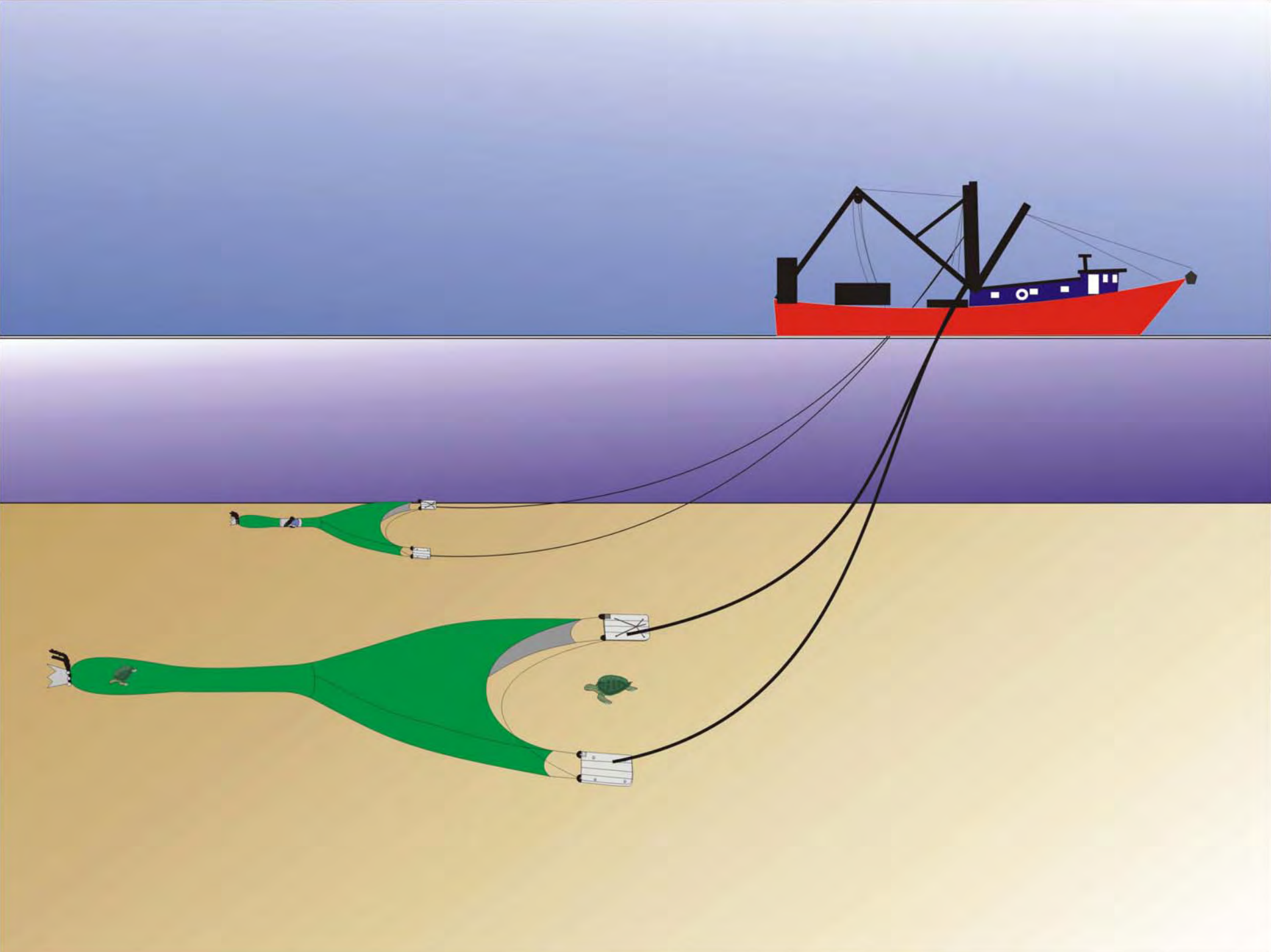
Engineering and Harvesting Branch

Pascagoula, MS

# NOAA Fisheries

**Engineering and**
**Harvesting Branch**
**Pascagoula, Mississippi USA**

- **Working with industry to develop selective fishing gear**
  - ***Trawl Gear***
  - ***Pelagic Longlines***
  - ***Gill nets***
  - ***Trap Gear***



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# Bycatch Reduction Strategies

Separation by Size

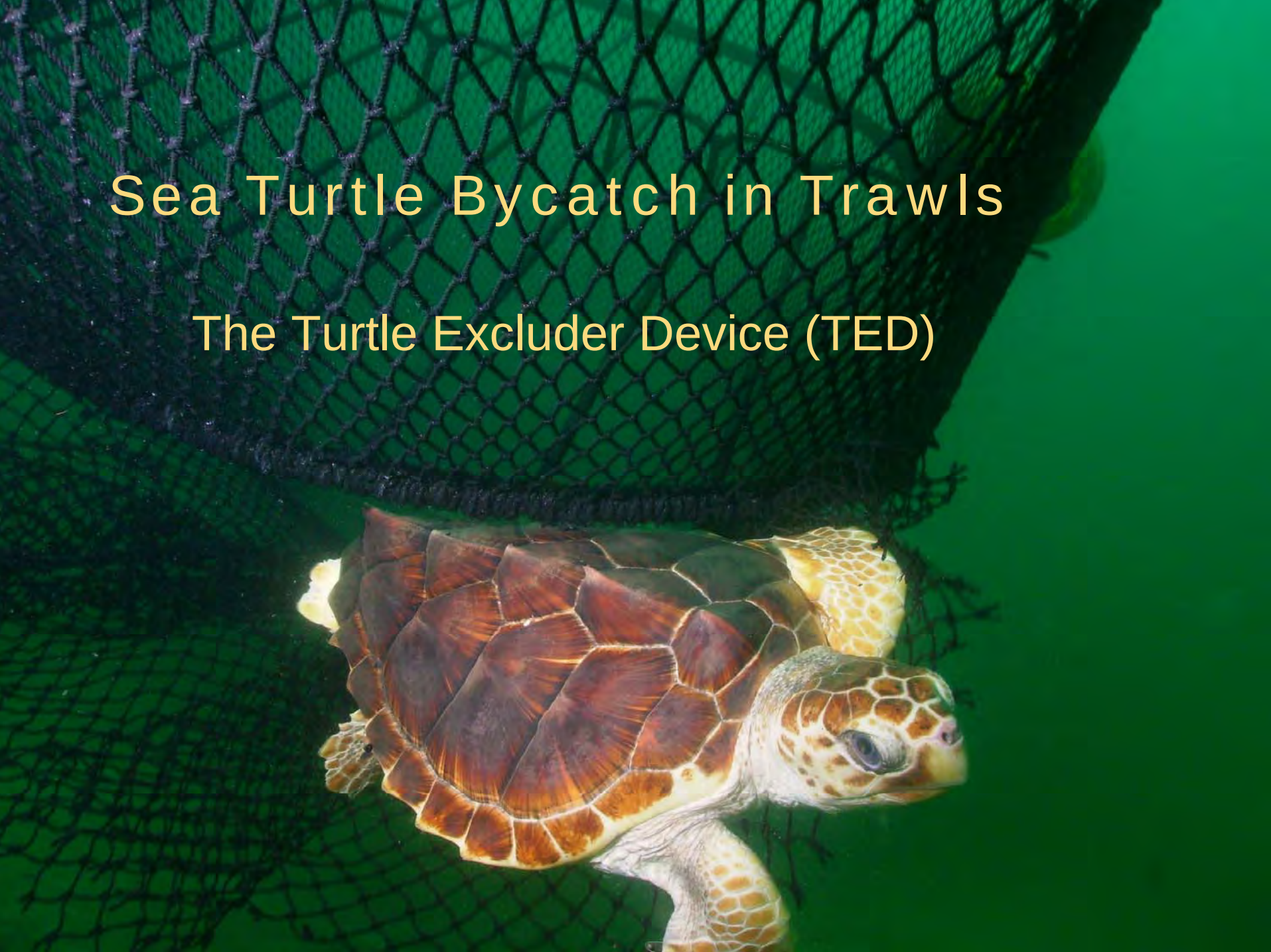
- —Codend Mesh Size
- —Sorting Grids

Separation by Behavior

- —Bycatch Reduction Devices

# Sea Turtle Bycatch in Trawls

## The Turtle Excluder Device (TED)



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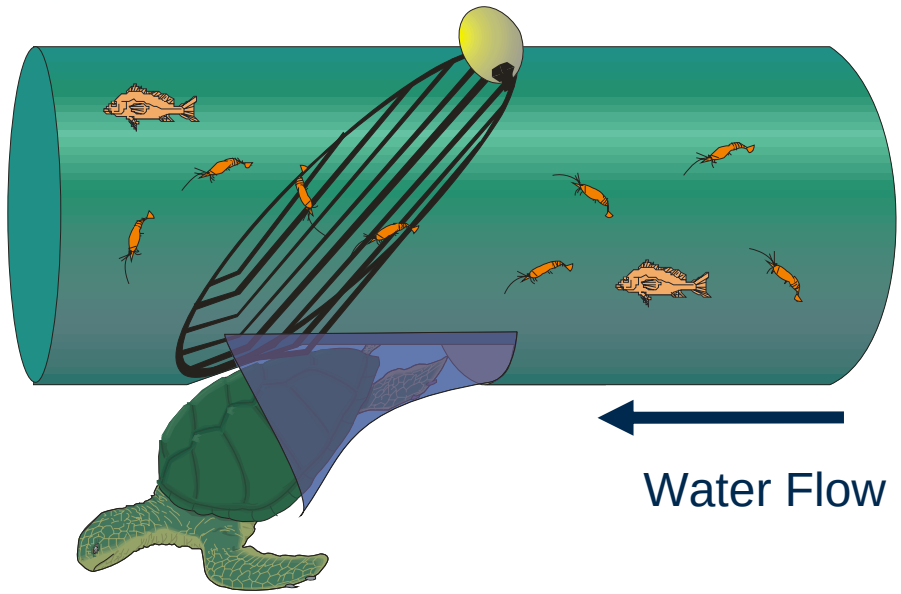
# Turtle Excluder Device (TED)




United States: 1988-1993

97% turtle exclusion

4% bycatch reduction

0-6% shrimp reduction (early designs)

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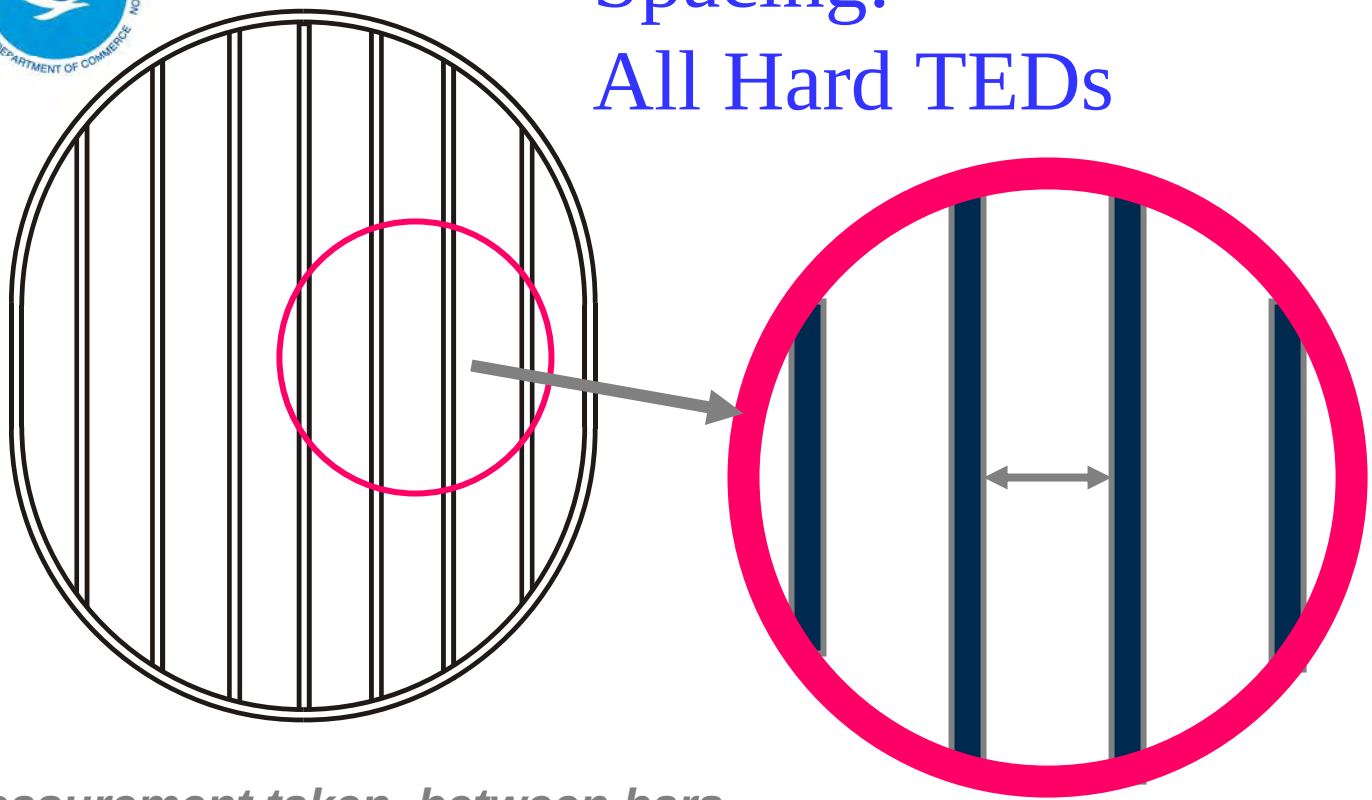
# Minimum TED Deflector Bar Spacing: All Hard TEDs



*Measurement taken between bars*

**4 inches (10.2 cm)**

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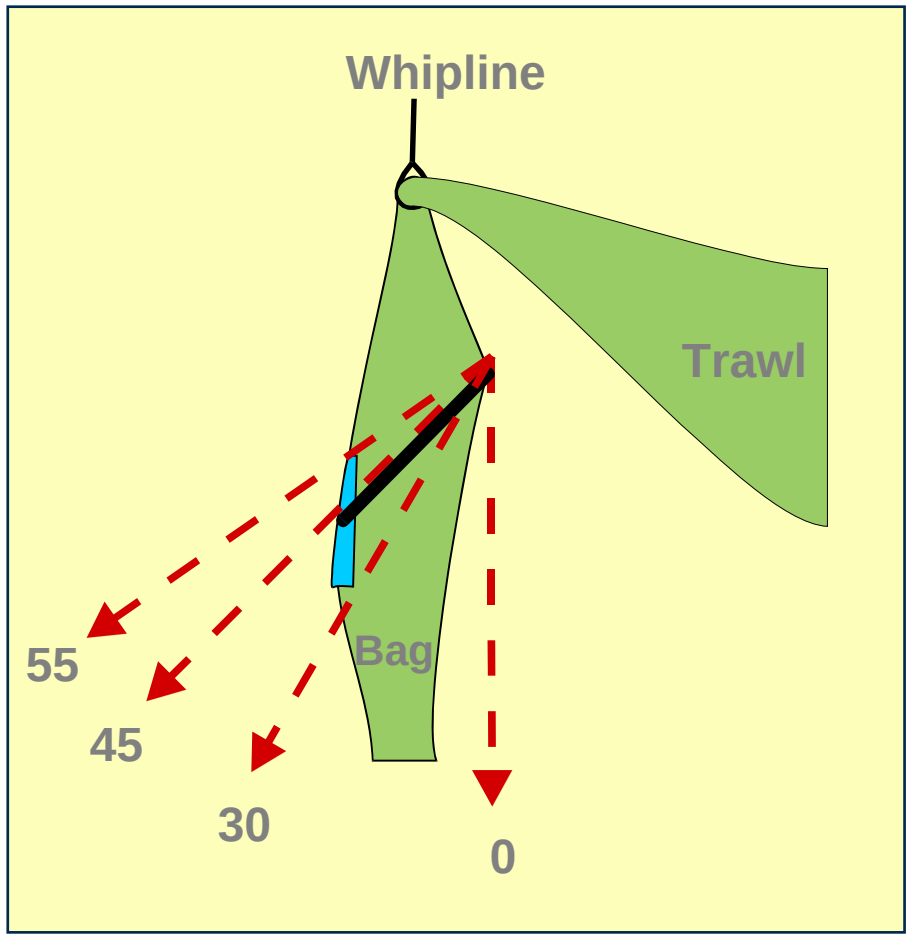
# TED Angle

**The angle of the deflector bars must be between 30 degrees and 55 degrees from normal, horizontal flow through the interior of the trawl.**



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# TED RULE REVISION

## 2003 – ESCAPE OPENINGS ENLARGED

**—Between 33 and 47% of stranded loggerhead turtles were too large to fit through old TED openings (Epperly and Teas 1999).**

**—Continued take of reproductive turtles needed to be stopped.**

**—Larger openings needed to protect leatherback turtles.**



modern

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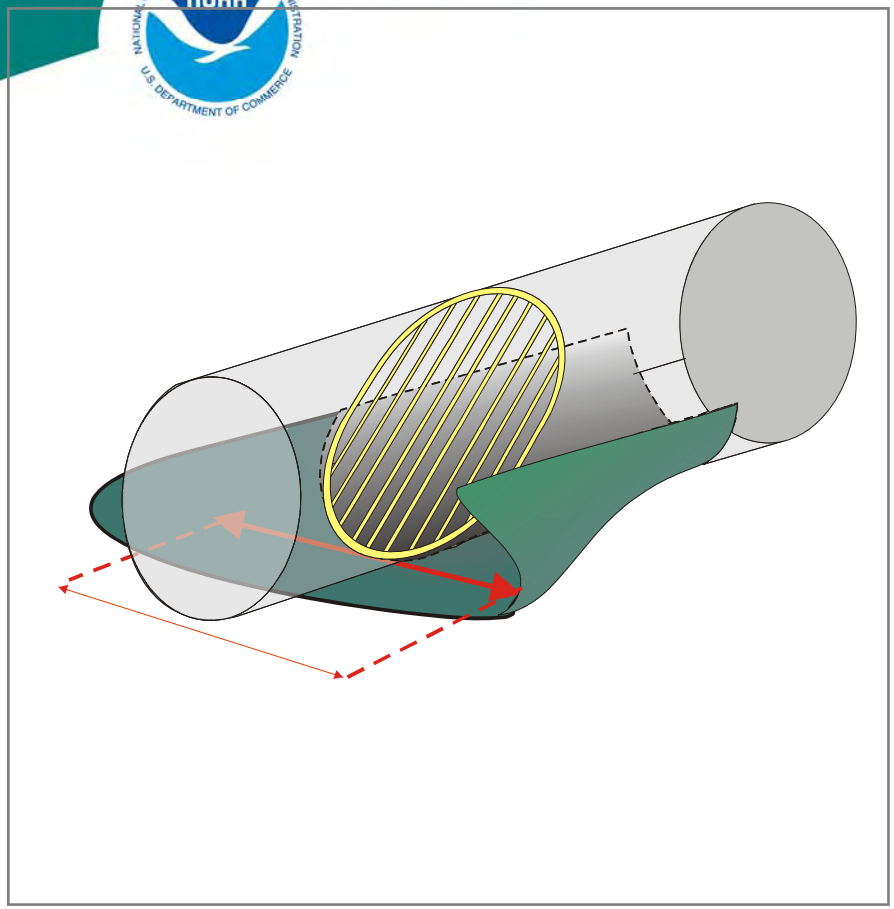
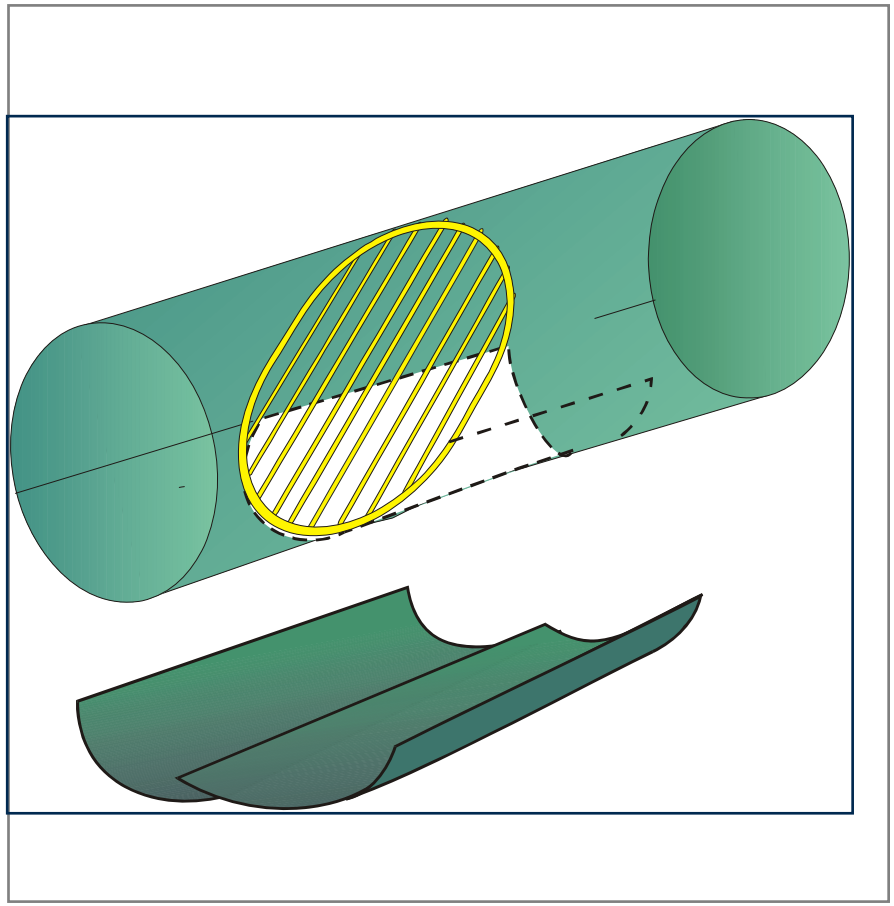
# Escape Opening Options



71” (181 cm)



Double Cover

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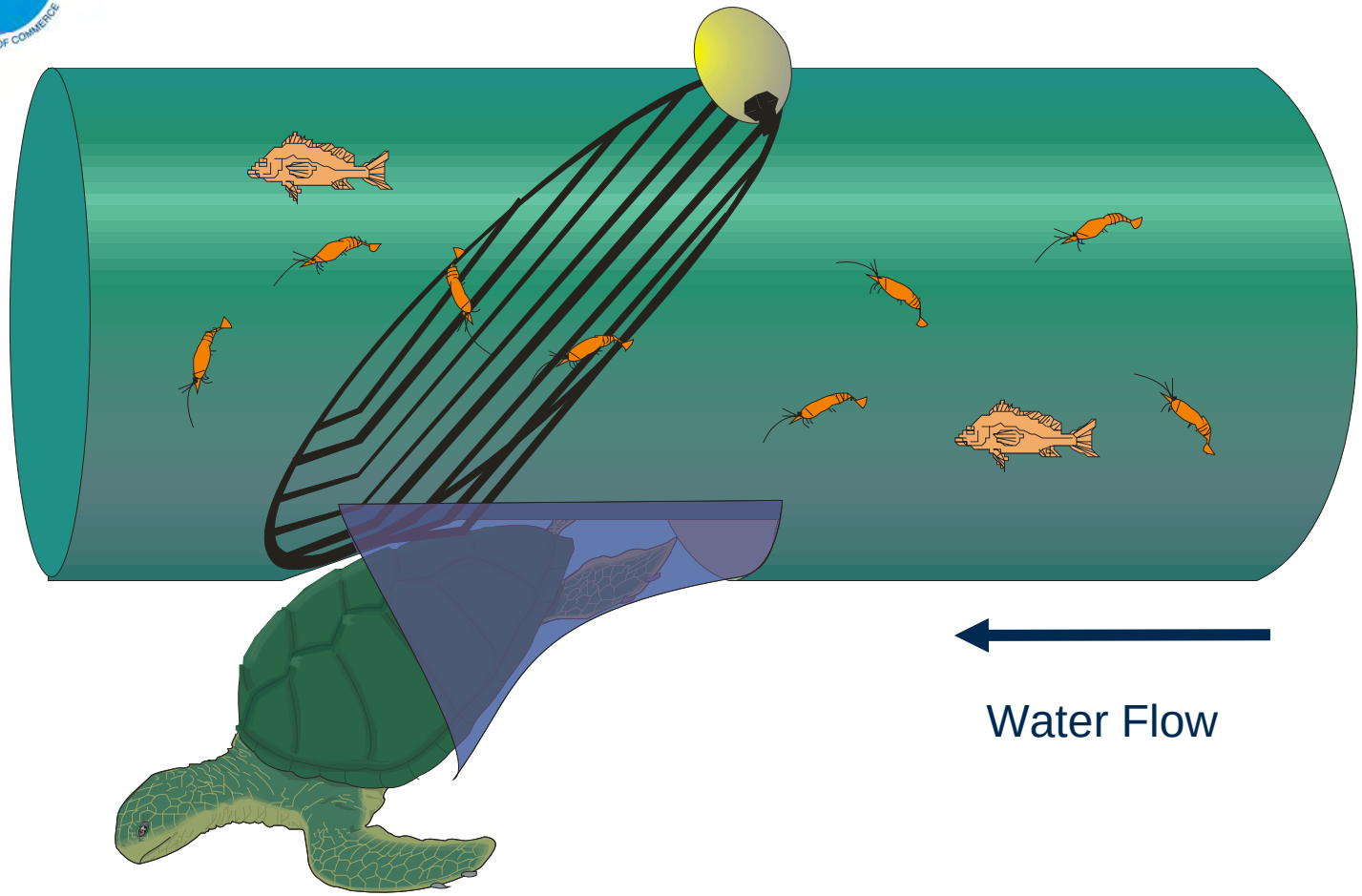
# Turtle Excluder Device (TED)

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# Modern TED Designs

- High shrimp retention rate
- Efficient exclusion of sea turtles including leatherbacks
- More efficient debris exclusion



today

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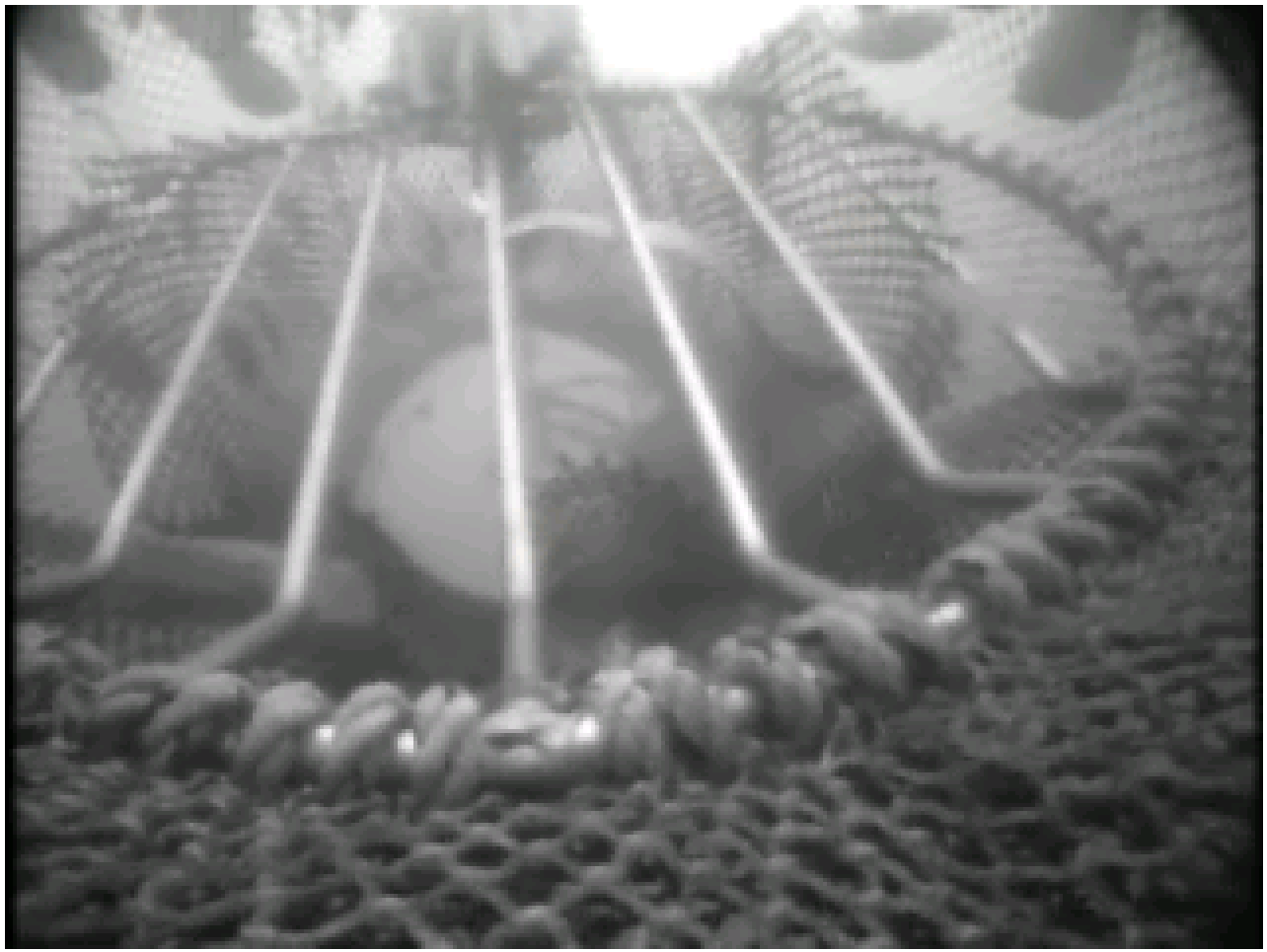
# Sharks and TEDs



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# 2009 National Bycatch Reduction Engineering Program

Engineering and Harvesting Branch

Research on TEDs with reduced bar spacing as a possible mitigation measure to reduce finfish bycatch in shrimp trawls.

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# Finfish Bycatch Reduction in Shrimp Trawls

## Behavioral Response

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# Finfish Bycatch Reduction in Shrimp Trawls

1990 Amendments to the Magnuson Act

—Three year project to evaluate the impact of shrimp trawling on bycatch species

—Regional Bycatch Program

- Partnership between NOAA Fisheries and the Gulf and South Atlantic Fisheries Foundation

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# Finfish Bycatch Reduction in Shrimp Trawls

1998, Amendment 9

—Reduce the bycatch mortality of juvenile red snapper by a minimum of 44% from the average level of mortality for the years 1984 – 1989

Fisheye and Jones-Davis certified

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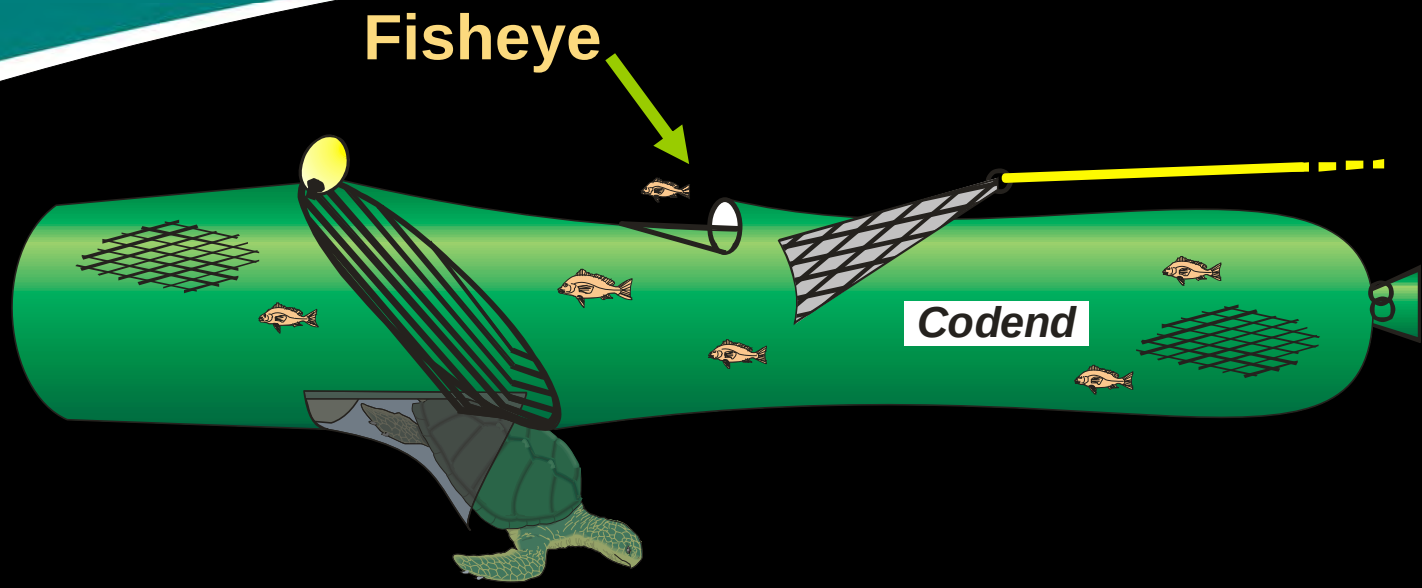


# Gulf Fisheye BRD

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# Finfish Bycatch Reduction in Shrimp Trawls

1998 – Present: NOAA fisheries continues to work with industry to improve BRD technology

1998 - 2003: Voluntary observer program to evaluate the performance of certified BRDs

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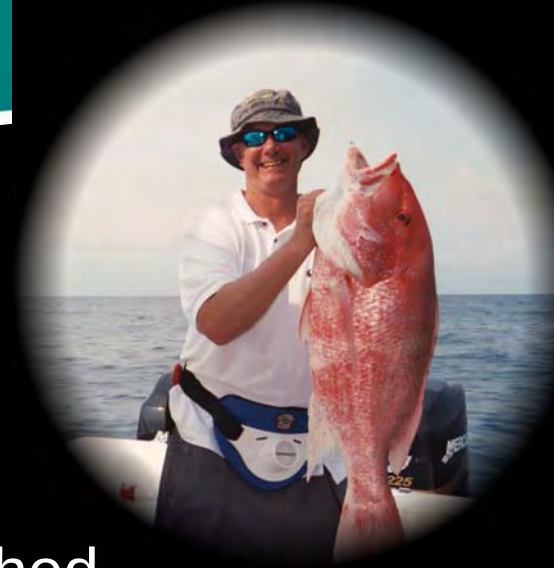
# 2005 Red Snapper Stock Assessment



Gulf of Mexico red snapper stock is over fished

Recommends 74% reduction in shrimp trawl bycatch mortality compared to levels experienced during the 2001-2003 period.

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# Fisheye 2001 - 2003

| Species | n | Mean CPUE Control | Mean CPUE BRD | Reduction rate (%) | 95% C.I. |
|---|---|---|---|---|---|
| Total Fish wt. | 2089 | 24.61 | 20.54 | 16.5 | 15.2 – 17.8 |
| Shrimp wt. | 2190 | 4.80 | 4.71 | 2.0 | 1.1 – 2.9 |
| Red Snapper (F) | 1226 | - | - | 11.7 | 4.3 – 19.1 |

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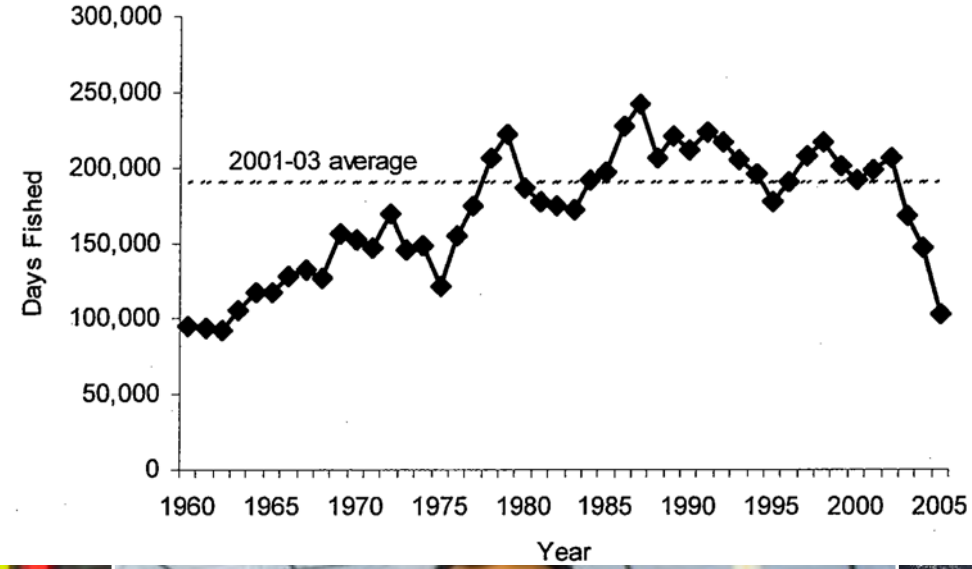
# Gulf of Mexico Shrimp Effort

## Gulf Council Ad Hoc Shrimp Effort Working Group





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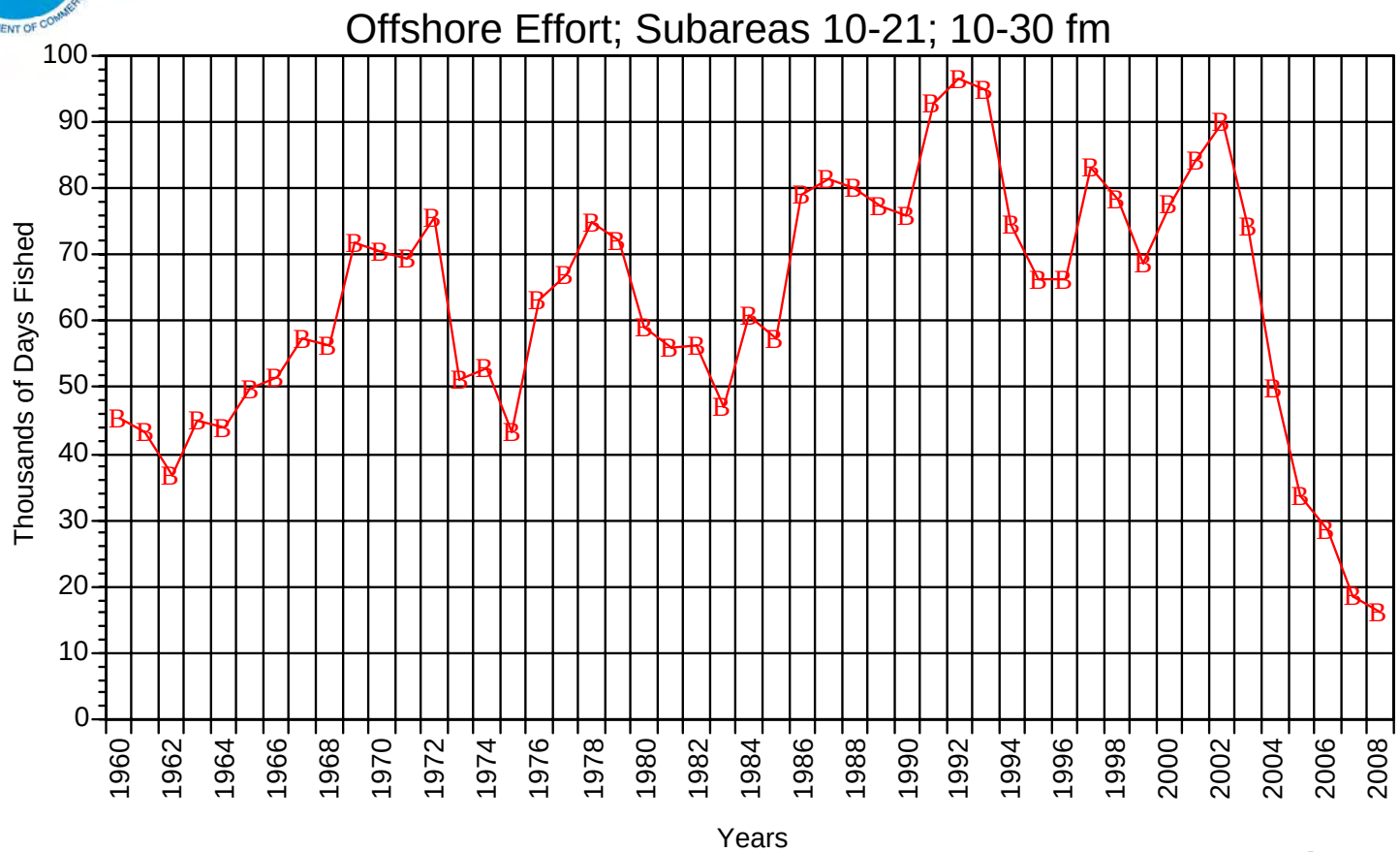


80.4% Reduction

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# 2008 modifications to the BRD certification criterion

Gulf and South Atlantic

—Demonstrate a 30% reduction in finfish by weight

- Modified Jones Davis

Provisional Certification

—BRDs demonstrating a 25% reduction in finfish (2 years)

- Extended Funnel
- Composite Panel

May 2009, restrictions for the use of fisheyes.

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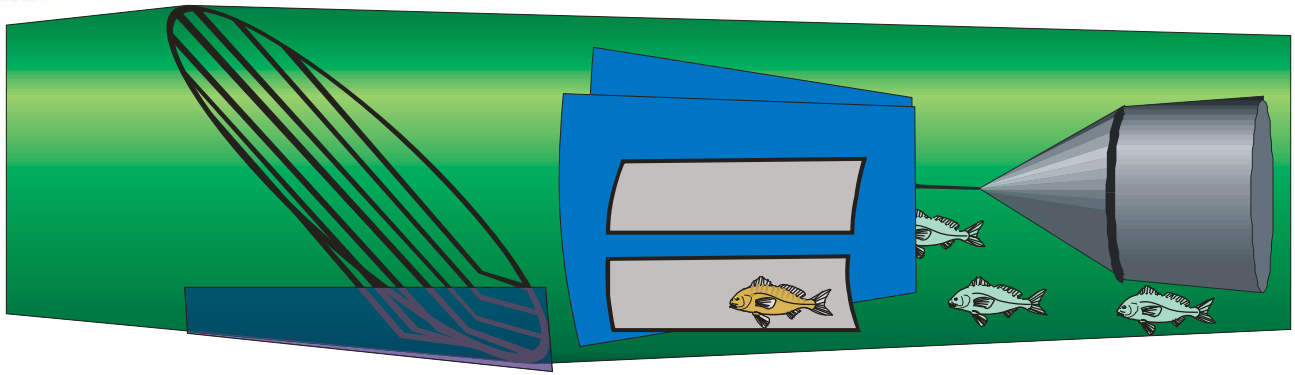
# Modified Jones Davis



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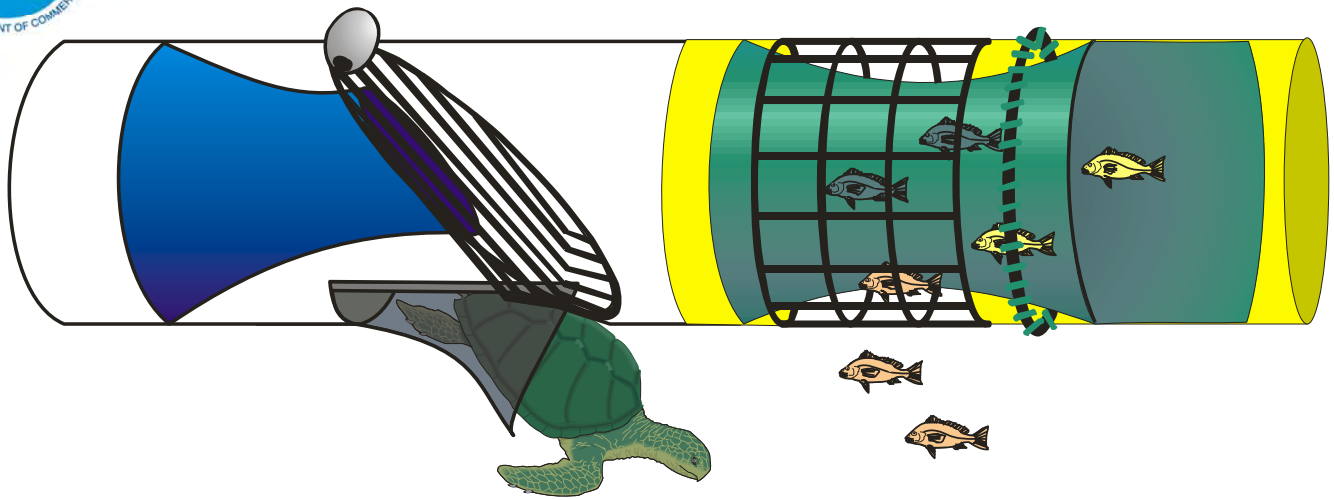
***Provisional Certification**

# Extended Funnel



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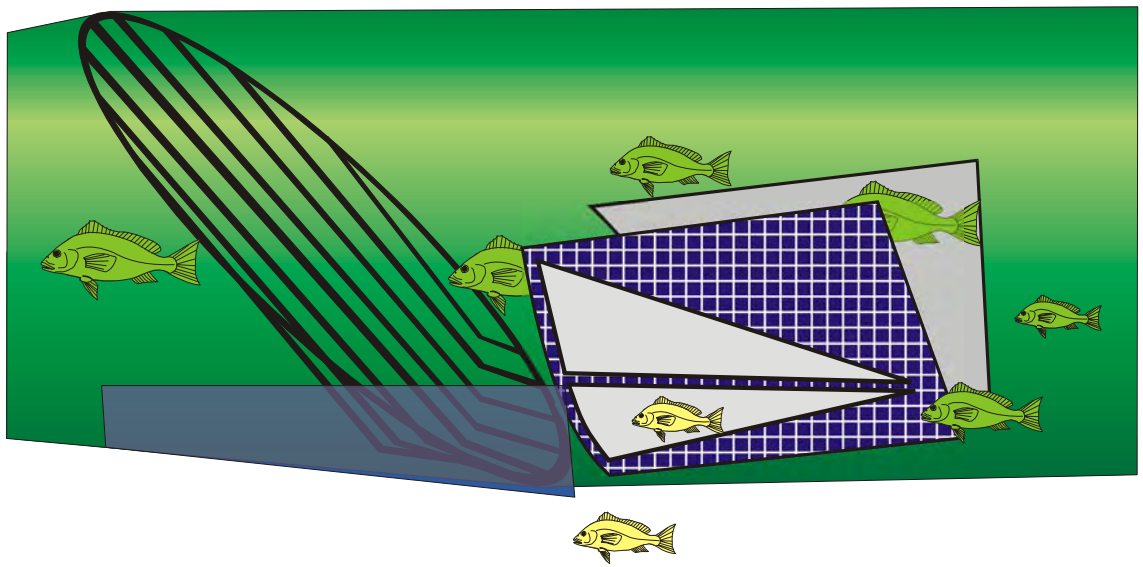
# Composite Panel BRD



***Provisional Certification**

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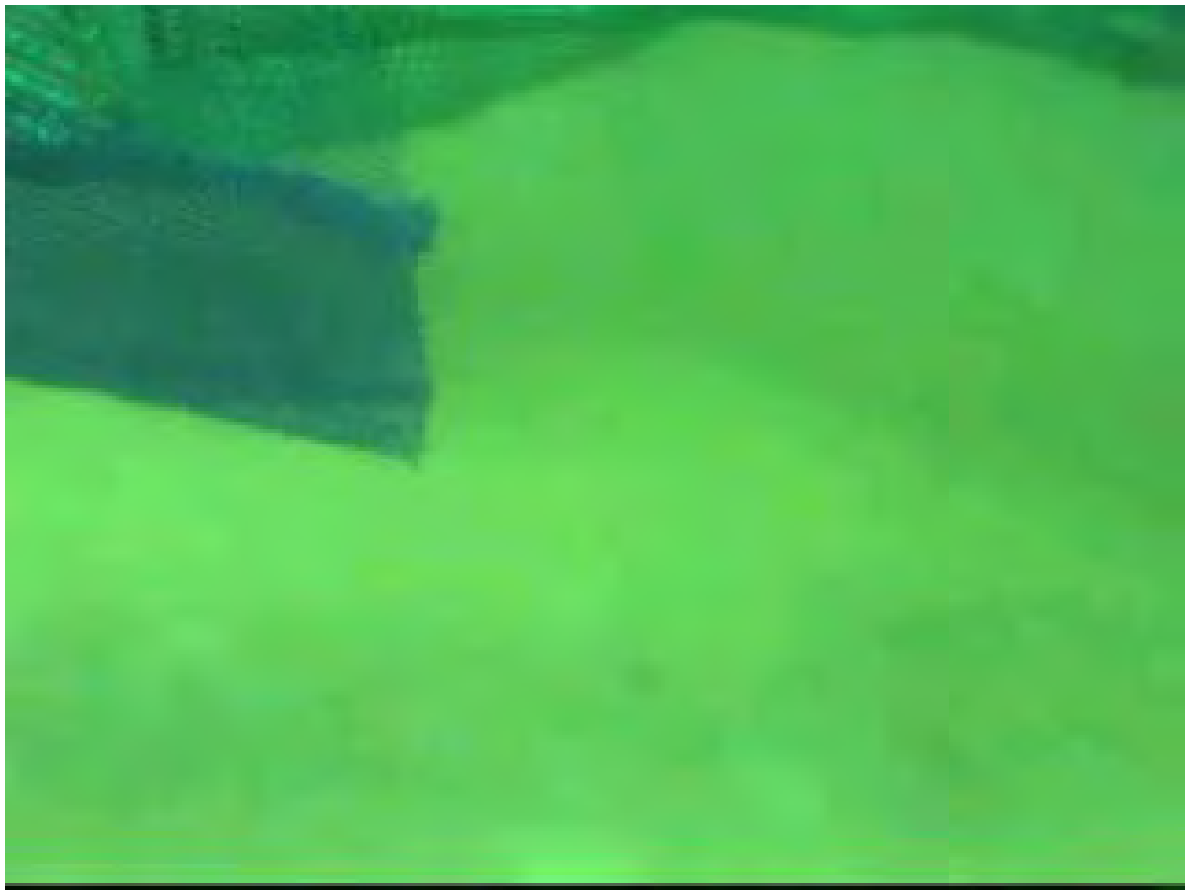
# BRDs and Sharks



# Shark Reduction Rates (Carcharhinus ssp.)

| | n | % Red. Number | % Red. Weight |
|---|---|---|---|
| Fisheye | 605 | 18.96 (s) | 17.14 (s) |
| Modified Jones Davis | 161 | 26.50 (s) | 45.53 (s) |

(s) Denotes statistically significant difference ($p < 0.05$)

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# Summary

TEDs

- Effectively reduce bycatch of larger sharks
- Reduce some small sharks

BRDS

- New BRDs designs may have an increased shark bycatch reduction capability as compared to older designs

Effort Reduction

- The dramatic decline in shrimping effort in the Gulf of Mexico has had a substantial effect on the bycatch mortality of fish species incidentally caught in shrimp trawls