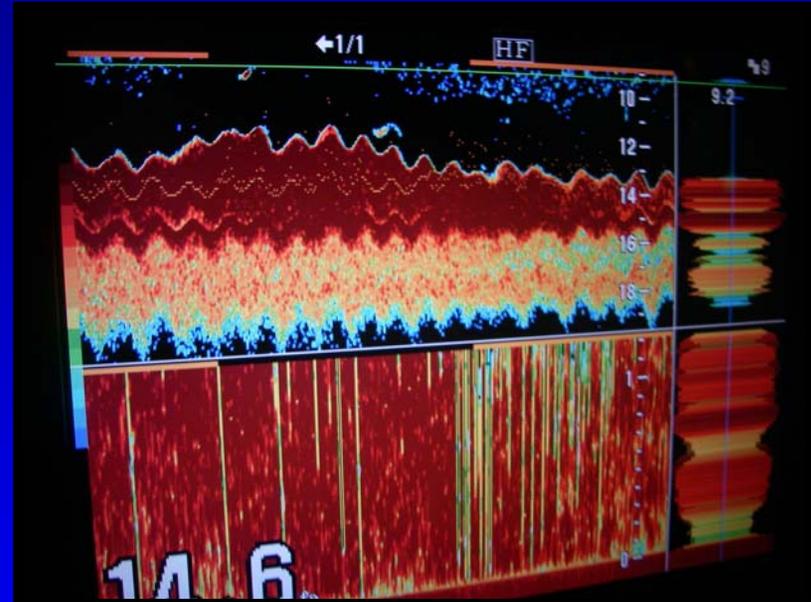


# Evaluation of a Turtle Excluder Device (TED) Designed for use in the U.S. Mid-Atlantic Atlantic Croaker Trawl Fishery



NOAA Fisheries, Southeast Fisheries Science Center  
Harvesting Systems and Engineering Branch  
Pascagoula, Mississippi



# Background

**1994** Observers monitoring the summer flounder fishery documented several sea turtle takes in tows targeting Atlantic croaker.

Vessels were utilizing a high opening bottom trawl locally known as a “Flynet” to target croaker.

**1998** NMFS SEFSC initiated research to develop a TED designed for use in the Flynet fishery.

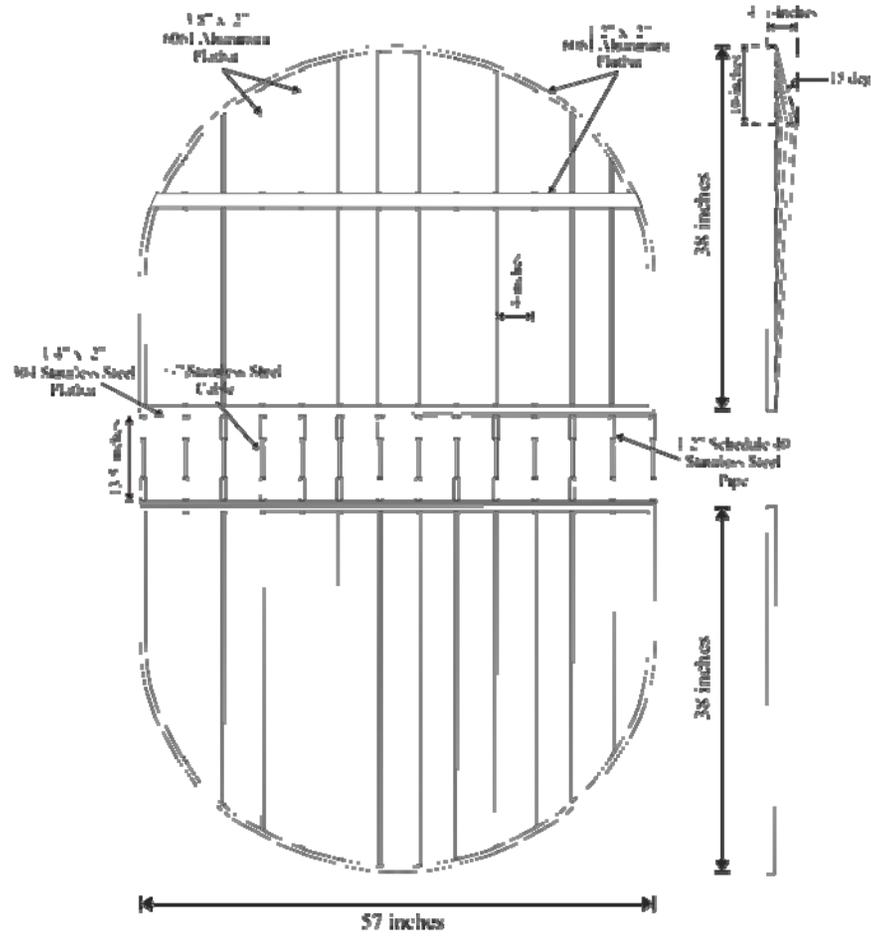


# Background

Research has been concentrated on the Atlantic croaker fishery off NC with numerous prototypes trialed between 1998 and 2010



# Flexible Flat Bar Flynet Cable TED



- Installation:**
- extension* – 80mm x 3mm Euroline (250m x 50m)
  - exit hole cut* – 53M x 27H x 32M Trapezoid Cut
  - flap* – 1 5.8" x 30 poly. 150m x 50m. sewn 3:2 along the leading edge inside opening to posterior edge of grid extending 20" beyond posterior edge of grid
  - floatation* (6) #508 8-inch Hard Plastic
  - flashing angle* – 17M diff top and bottom – ~48 degrees
  - riblines* – 3/8" poly prop gore. 3/8" poly prop ribline from bars at corner of opening down bars to gores

# Objectives

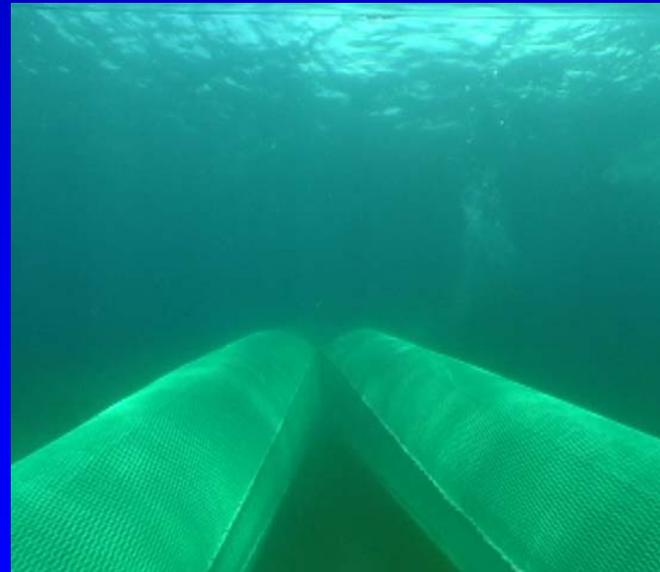
- Quantify catch loss of target species associated with TED use in flynet gear
- Quantify catch loss of key bycatch species associated with TED use in flynet gear
- Identify handling problems or specialized handling techniques required when utilizing a TED in flynet gear

## Methods

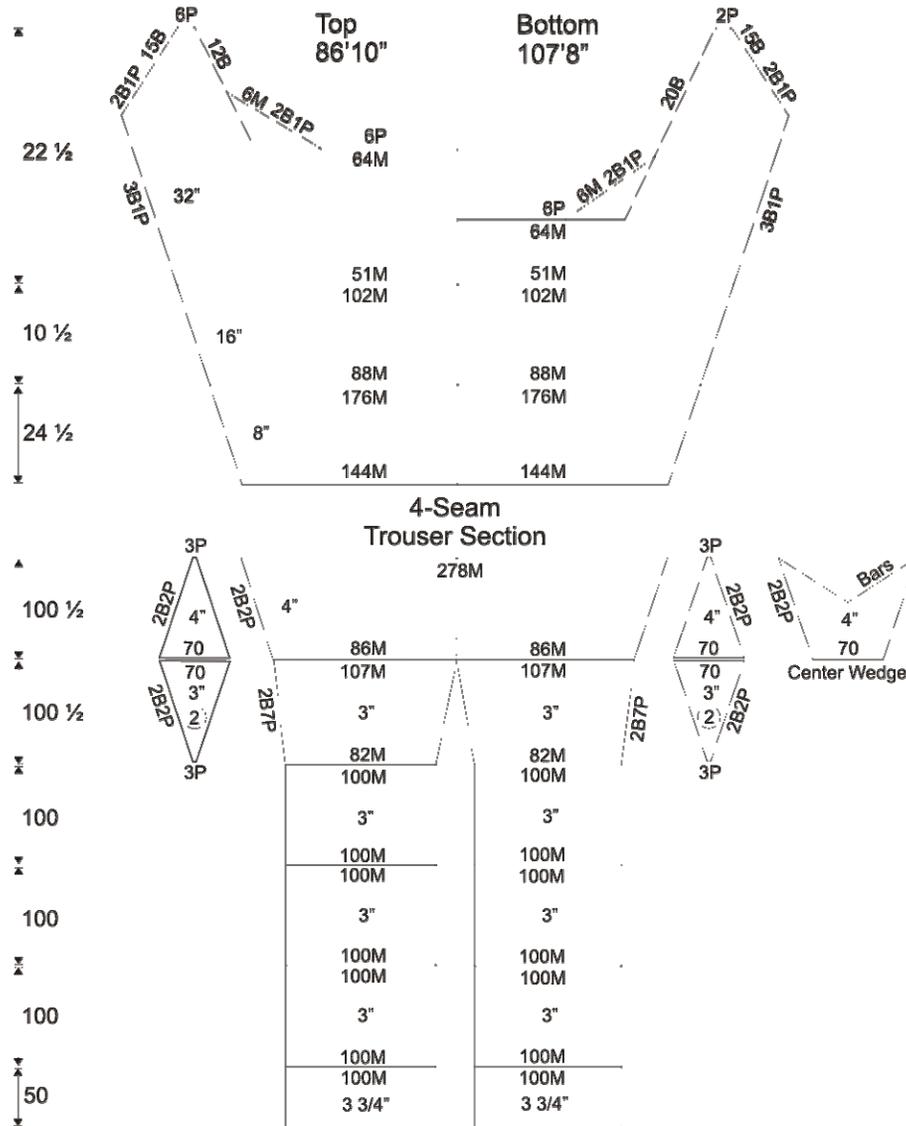
High between tow variability prevented the use of traditional comparative towing techniques.

Specialized “Trouser Trawl” technique was required to conduct catch retention testing.

“Usability Testing” was employed to examine TED handling



# 85' Flynet with 32" Wings and Trouser Trawl Modification



# Methods

“Usability Testing” consisted of conducting trips aboard contracted commercial vessels with TEDs installed in traditional flynet gear and documenting deployment and retrieval problems and specialized techniques.

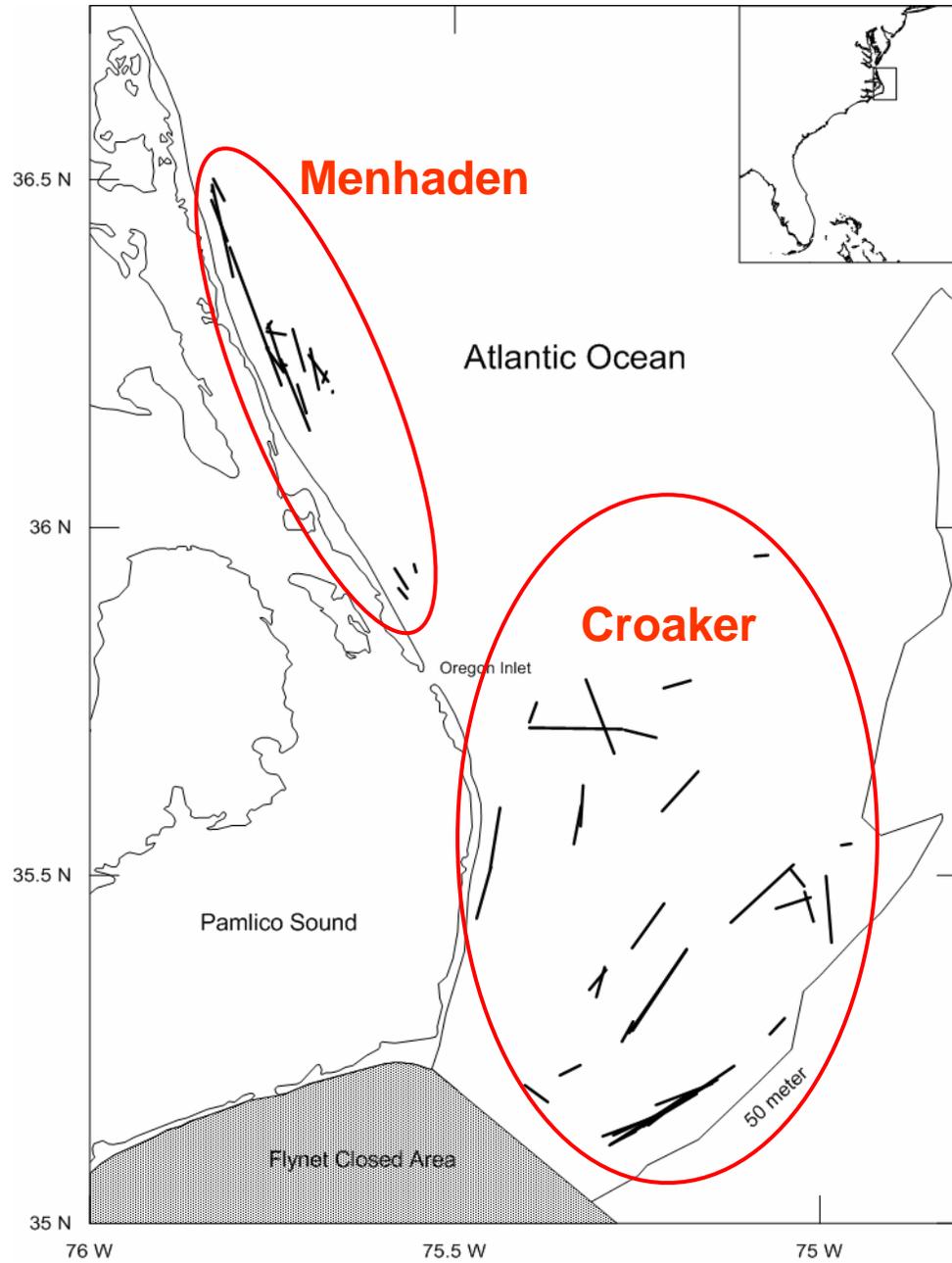


# Trouser Trawl Results

37 successful tows were completed along the NC coast aboard the F/V Bridgot Denise originating from Wanchese, NC

23 tows targeting croaker  
12 tows targeting menhaden  
2 tows targeting bluefish





# Trouser Trawl Results

Catch category mean CPUE (lbs/hr) by target species

Target spp	n	Total Catch (lbs/hr)			Target Catch (lbs/hr)			Bycatch (lbs/hr)		
		TED	Control	%Diff	TED	Control	%Diff	TED	Control	%Diff
<b>Croaker</b>	23	3,193.2	4,018.0	-20.5%	1,864.5	1,939.5	-3.9%*	1,688.6	2,655.9	-36.4%
<b>Menhaden</b>	12	8,490.9	14,961.5	-43.2%	8,414.2	14,764.0	-43.0%	153.4	394.9	-61.2%
<b>Bluefish</b>	2	128.7	467.8	-72.5%	128.7	467.8	-72.5%	0.0	0.0	-

Analysis on conducted only croaker and menhaden data. \* = not significant

Bycatch species mean CPUE (lbs/hr & #/hr)

Target spp	n	Catch (lbs/hr)			Catch (#/hr)		
		TED	Control	%Diff	TED	Control	%Diff
<b>Shark spp</b>	24	1,213.9	1,891.0	-35.8%	45	81	-44.3%
<b>Skate/Ray spp</b>	17	47.1	140.0	-66.4%	14	33	-57.5%



# Trouser Trawl Results

## Turtle takes during 2008-2009 flynet TED testing

Date	Species	CCL(mm)	Latitude	Longitude	Cond	Comments
2/28/08	Loggerhead	781	35 08.459	75 14.108	Alive	In control codend
2/29/08	Loggerhead	730	35 23.599	75 10.972	Alive	In control codend
2/29/08	Loggerhead	NA	35 23.599	75 10.972	Alive	Entangled wing of net
2/29/08	Loggerhead	781	35 17.400	75 15.356	Alive	In body of net
3/1/08	Loggerhead	648	35 27.584	75 12.810	Alive	In control codend
1/9/09	Loggerhead	700	35 40.513	75 16.913	Alive	In control codend
1/9/09	Loggerhead	760	35 42.620	75 16.251	Alive	In control codend
1/10/09	Loggerhead	NA	35 41.879	75 13.457	Alive	In control codend
1/11/09	Loggerhead	NA	35 37.757	75 19.470	Alive	Video escaping from TED
1/11/09	Loggerhead	NA	35 35.549	75 12.974	Alive	In control codend

All turtles were observed during tows targeting croaker

# Usability Results

Nine usability testing trips totaling 22 days were conducted during from 2008-2010 aboard 4 vessels originating from Wanchese, NC.

F/V Bridgot Denise  
F/V Capt. Ralph  
F/V Linda Gayle  
F/V Gulf Stream III



The Flexible Flat bar Flynet TED was tested for a total of 14 days on 6 trips

The Hopkins Cable TED prototype was tested for a total of 8 days on 3 trips

# Usability Results

Two vessels were equipped with single net reels and two were equipped with double net reels.

Two different size TEDS were used; 48-inch wide on narrow split reels and 57-inch wide on wider single reels



# Usability Results

To minimize TED damage:

Floats and webbing should be stored as evenly as possible across the reel prior to TED storage. This is especially critical on wider reels, which have short bending radiuses.

The TED needs to be orientated straight on the net reel with the hinge parallel with the center of the drum.



# Usability Results

TEDs installed in a top opening configuration almost always fall over when leaving the water resulting in a half twist.

The twist should be left in for storage and removed when deploying the TED.

This is done more easily when the net is retrieved under the reel.

Tag lines added to the sides of the TED make this process easier.

TEDs installed in a bottom opening configuration do not twist.

This configuration works best for vessels that retrieve the net over the reel.



# Usability Results

“Side Hauling” rather than retrieving the catch up the stern ramp may be used as an alternative hauling technique that minimizes the risk of TED damage during the hauling process.

However, utilization of this technique may be weather dependent.



# Continued TED Development

A new TED prototype “Hopkins Cable TED” was trialed during the 2009-2010 fishing season.

The TED, developed by SEFSC FMES Nick Hopkins, is designed to collapse on the reel and expand when fishing.

The TED is constructed entirely of cable and is installed in a top opening configuration in the final taper of the trawl.

Commercial trials yielded large catches and the TED successfully passed the small turtle test in June 2010.

Design changes that improve construction are underway and commercial trials are scheduled for the 2010-2011 season.

# Hopkins Cable TED



A photograph of a fishing boat at sunset. The boat is dark, and a large, circular, metal structure, possibly a net or a piece of equipment, is visible on the deck. The water is calm, and the sky is a warm, golden color. The text "Next Steps:" is overlaid on the right side of the image.

Next Steps:

Continue Working with  
Industry to Develop and  
Improve this Technology