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The effects of hanging ratio on the catch of harbor porpoise and targeted finfish species

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* Now with NMFS

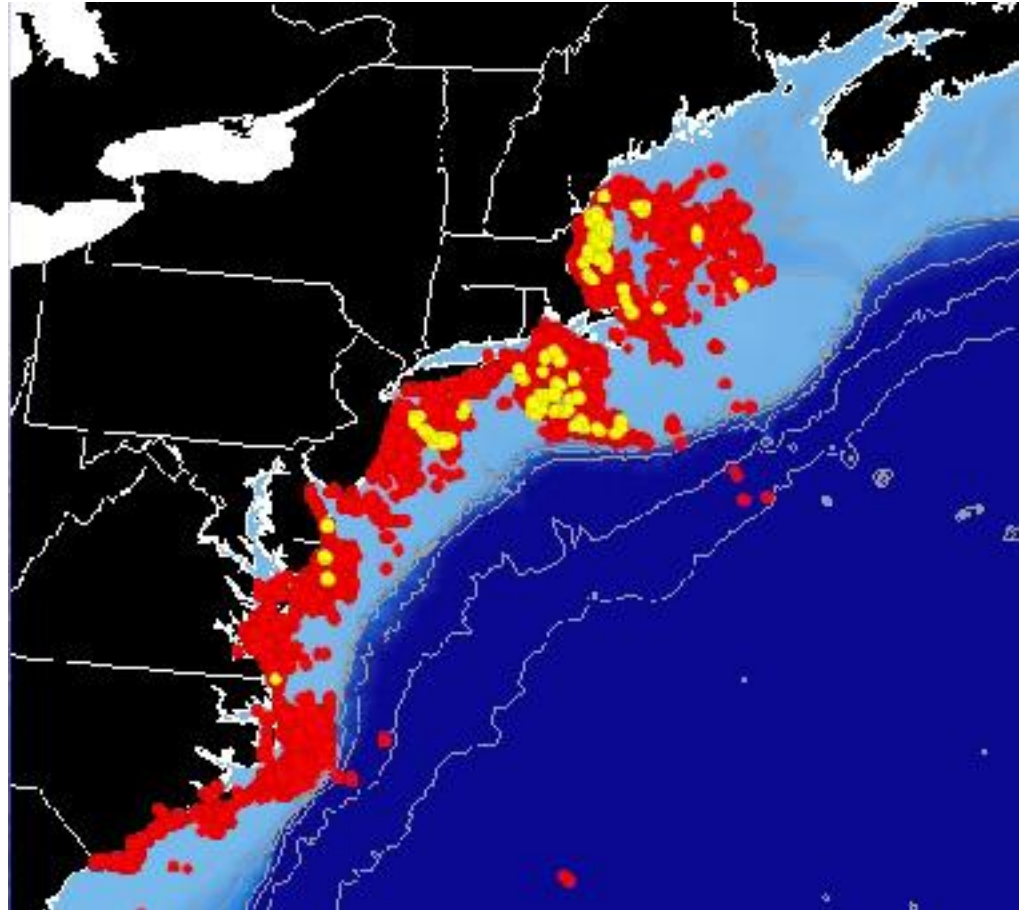
Background

- Harbor Porpoise Take Reduction Plan (HPTRP)
 - In effect since Dec. 1998
 - Gear modified during certain times of the year and in certain areas
- Initial decrease in takes at implementation of pinger usage, but takes have increased in recent years.
- At time of study pingers were not required south of Cape Cod South Management Area (south of 40°40' N latitude)



1999-2006 Observed Hauls and Observed Harbor Porpoise Takes

- Observed Hauls in Red
- Observed harbor Porpoise Takes in Yellow.

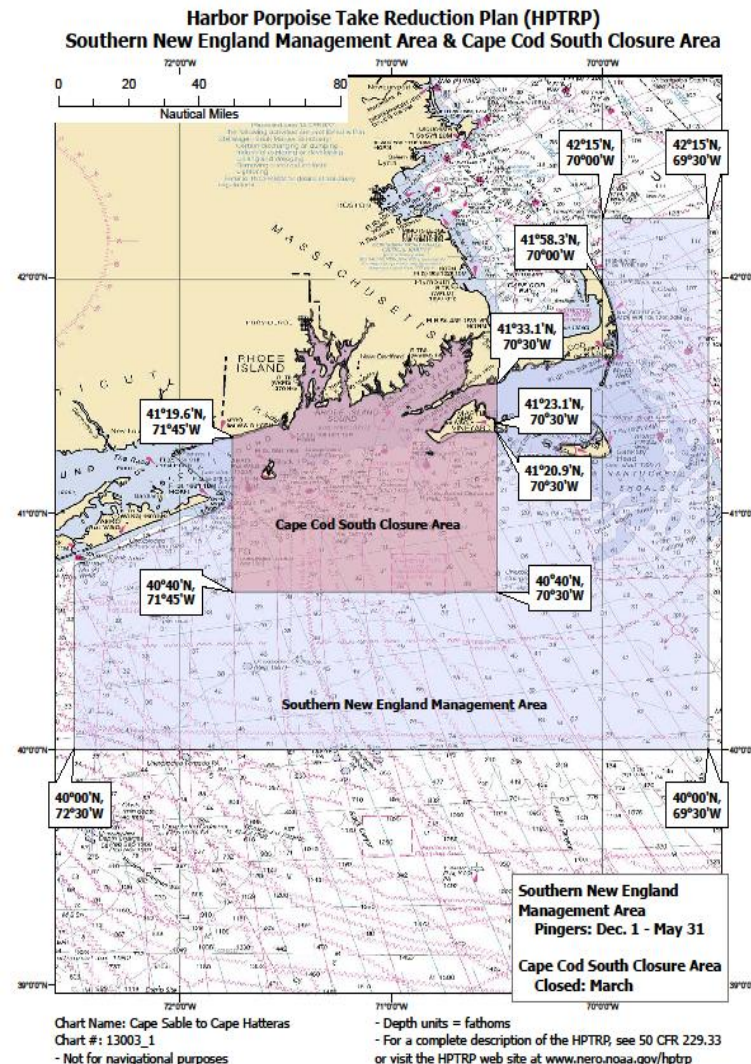


Courtesy Christopher Orphanides, NEFSC

Harbor Porpoise Take Reduction Plan

- Southern New England Management Area and
- Cape Cod South Closure Area

http://www.nero.noaa.gov/prot_res/porptrp/doc/SouthernNewEngland&CapeCodSouthAreas.pdf



Background

- Analysis of observer data by scientists at the NEFSC, Protected Species Branch (PSB) showed greater harbor porpoise bycatch in gear hung on the 1/3 (0.33) vs. gear hung on the 1/2 (0.50) in the area south of the South of Cape Management Area.

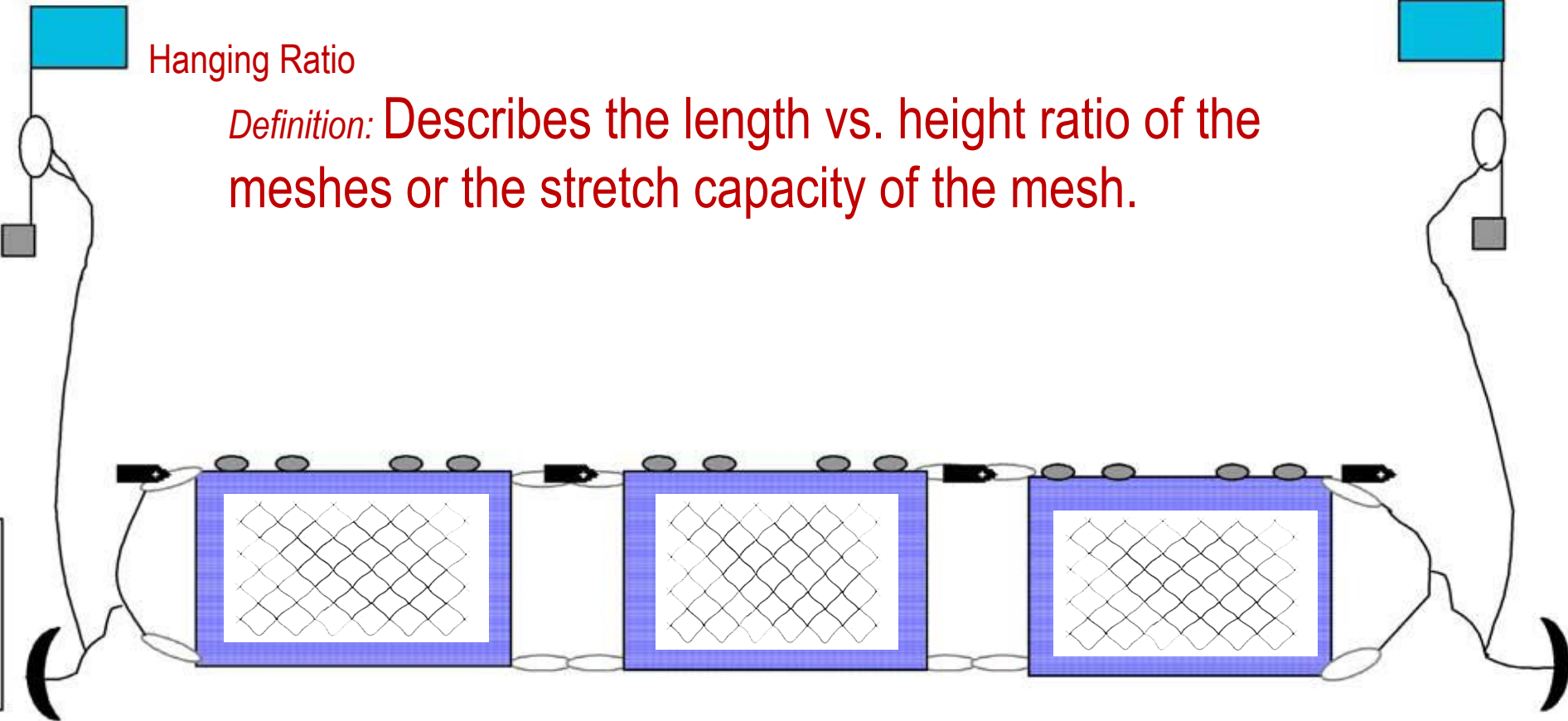
Goal

- To examine the effects of two hanging ratios on Harbor Porpoise bycatch and targeted catch

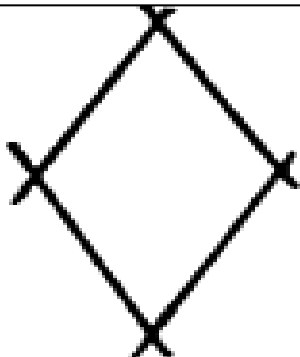


Hanging Ratio

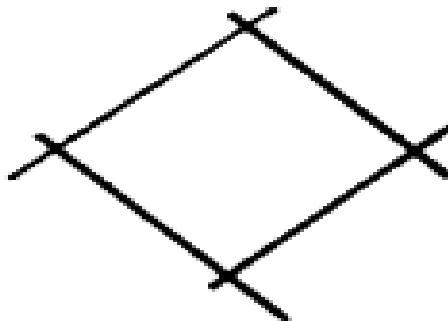
Definition: Describes the length vs. height ratio of the meshes or the stretch capacity of the mesh.



0



$1/3$



$1/2$



1

Methods (con't)

- **Fishing Practices**
 - Set and hauled in a manner consistent with normal fishing practices in designated study area
 - Targeted soak time was <96 hours
 - Standard haul information was collected for each haul
 - Effort was to be consistent between treatments



Fish Sampling Protocols

- Based on modified Fisheries Observer Program protocols
- Kept catch weights
 - Actual if possible, otherwise tote or tally counts
 - Discarded weights
 - Everything accounted for
 - Actual weights for all targeted species
- Length frequencies-only for kept and commercially important discarded fish



Marine Mammal Sampling Protocols

- Based on modified NEFOP Protocols
- Species ID, lat/long, time, net location on string, hanging ratio, body temp, wounds, body condition, gear entanglement code. 2010 field season also recorded distance of take from end bridle
- Pictures taken for all mammals caught in gear
- All mammals were tagged
- If dead fresh, retained for necropsy



Gear Reconfiguration

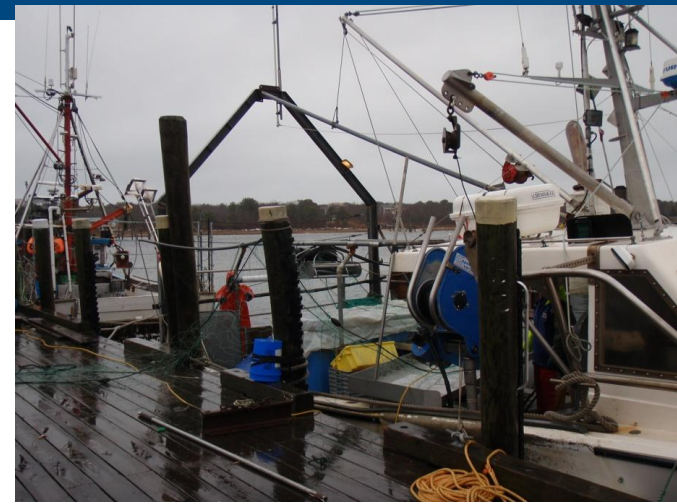
- **2009:**

Phase I [2009]

- Hauls 1-19: randomized array; 7 nets of each hanging ratio randomly placed on each string. 18 February-6 March, 2009
- Hauls 20-79: Each string consisted of only one hanging ratio. 8 March-28 April, 2009

Phase II [2010]

- No reconfiguration needed; configuration the same as Phase II of 2009 season

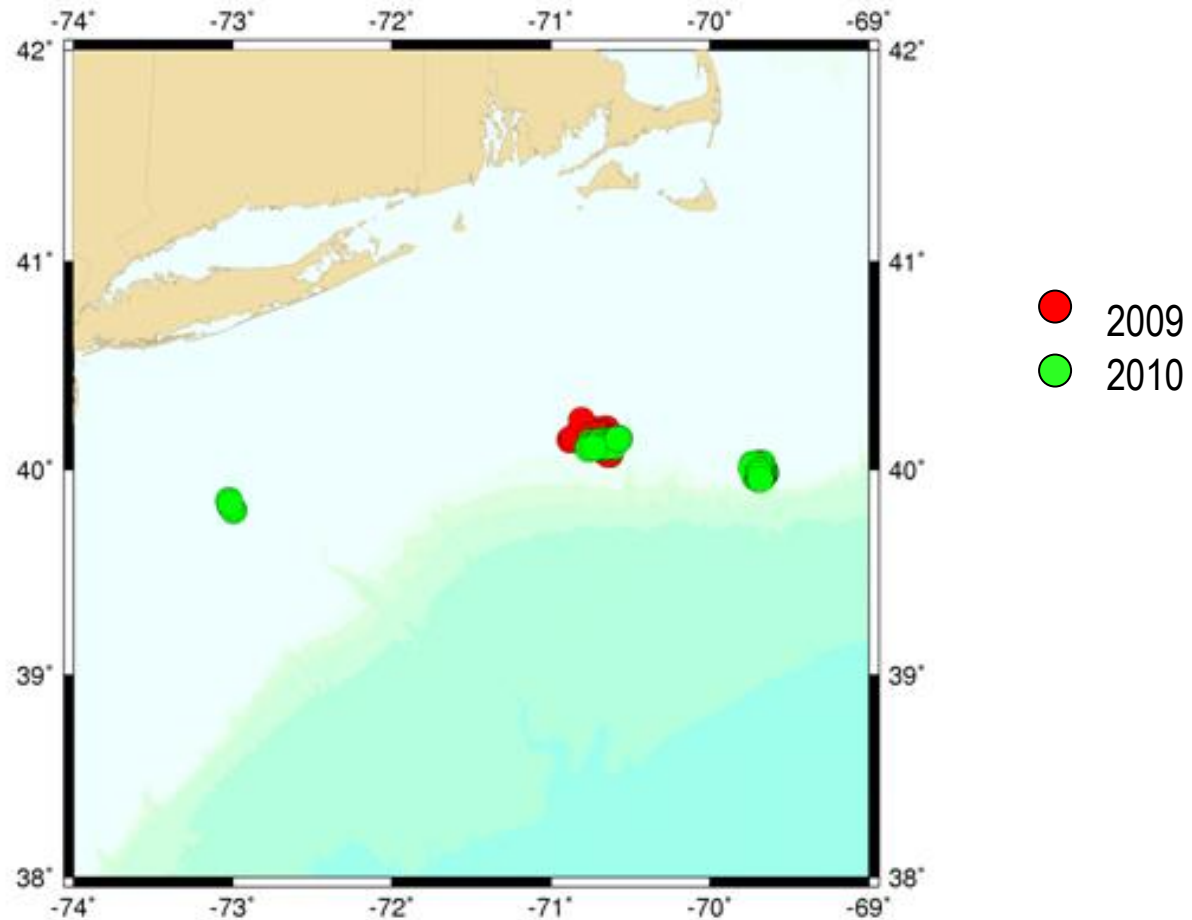


Results

- 79 hauls completed between 18 February and 28 April, 2009 and 80 hauls completed between 28 February to 28 April, 2010 (Total 159 hauls)
- Field Season 2009: 19 hauls completed in Phase I; 60 Hauls Phase II
- Field Season 2010: All 80 hauls same configuration of Phase II of 2009 field season
- Average soak time=127 hours
- Depth ranges 40-84 fm



Gillnet Sets 2009 and 2010

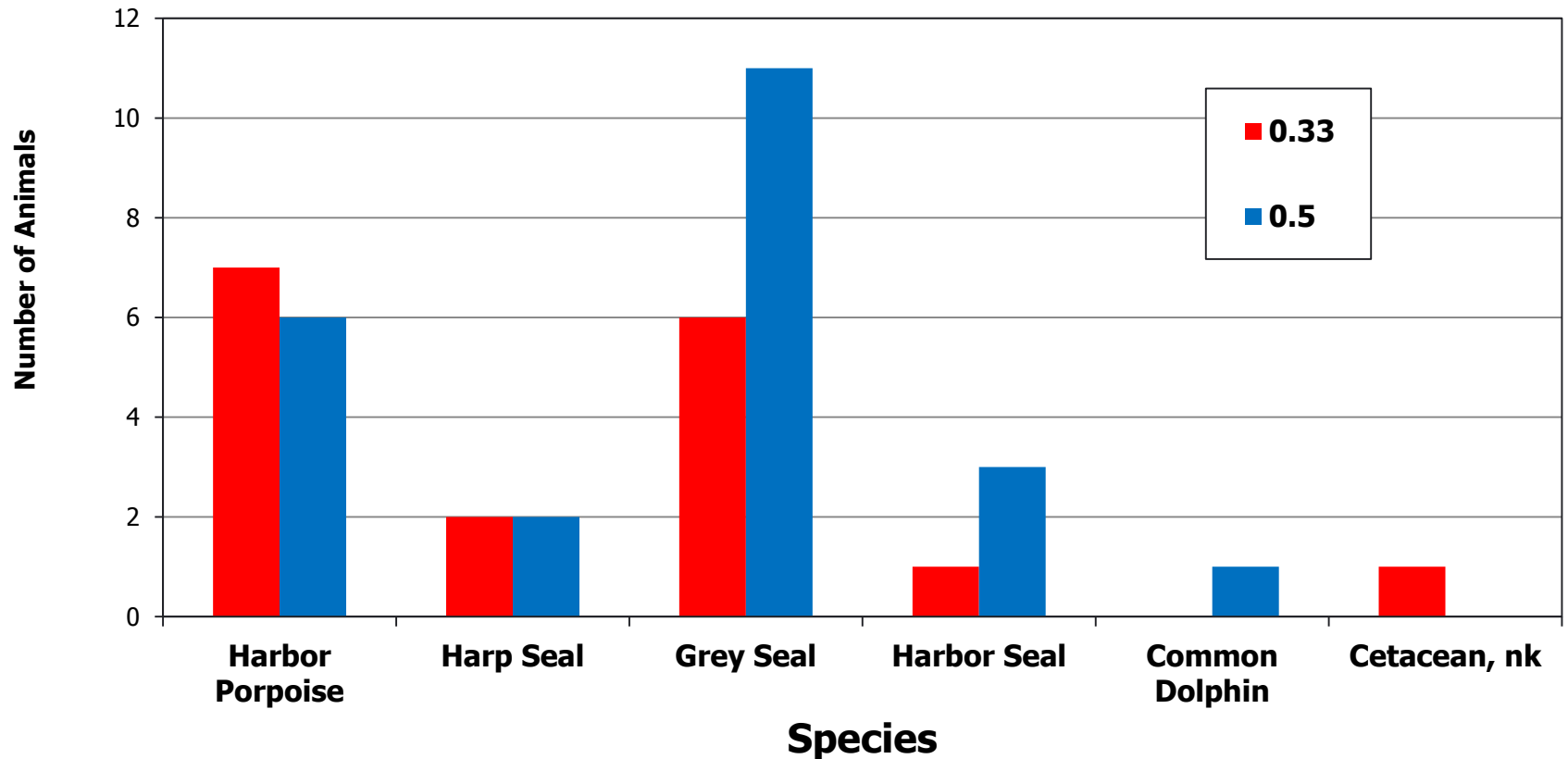


Results (con't)

- **Marine Mammals (Phase II)**
 - **Total caught Phase II: 13 harbor porpoise, 4 harp seals, 17 grey seals, 4 harbor seals and 1 common dolphin.**
 - **Hanging ratio 0.33: 17 animals; hanging ratio 0.50: 23 animals. Differences not significantly different from zero.**

Species	0.33	0.50
Harbor Porpoise	7	6
Harp Seal	2	2
Grey Seal	6	11
Harbor Seal	1	3
Common Dolphin	0	1
Cetacean, nk	1	0
TOTAL	17	23

Bycatch of Marine Mammals by Hanging Ratio, 2009-2010



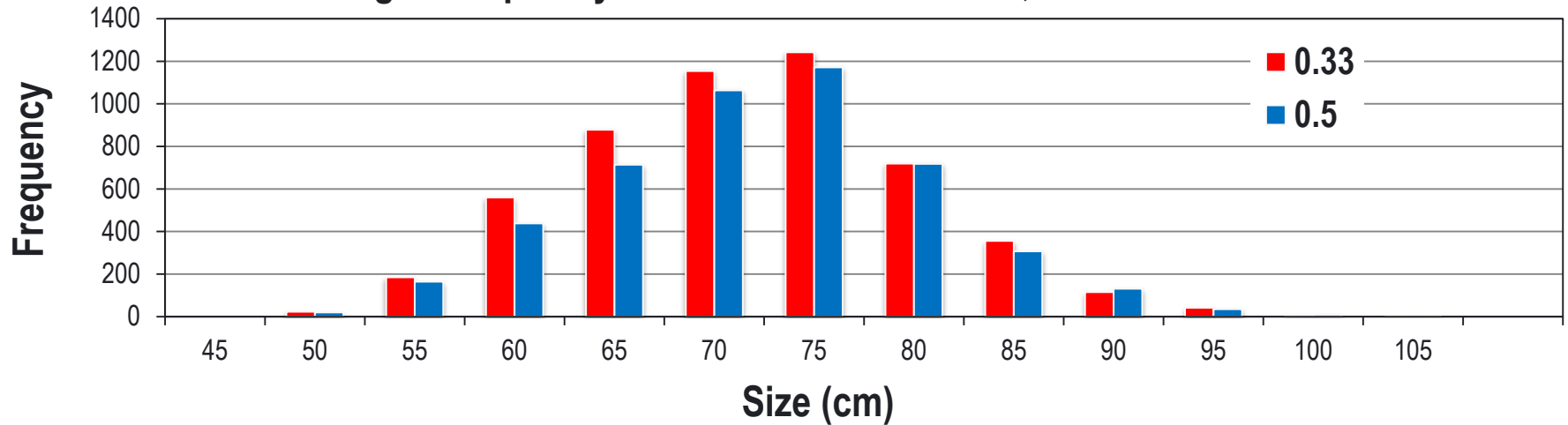
Results (con't)

Finfish

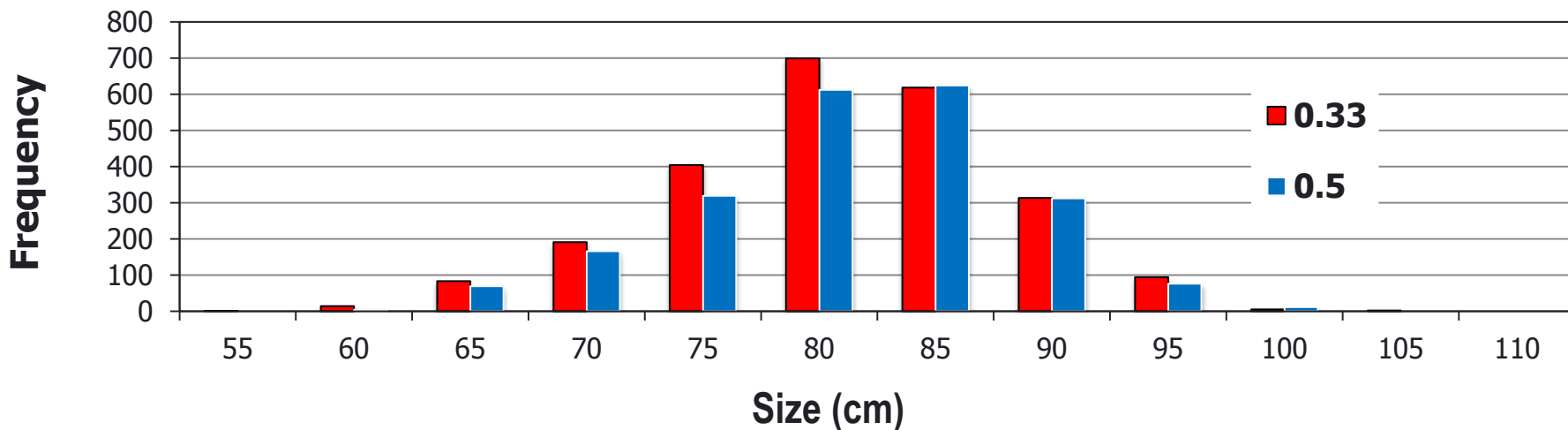
Status (Kept or Discarded)	Species	0.50 (lbs)	0.33 (lbs)
K	Monkfish	75,940	81,568
K	Winter Skate	47,750	68,736
D	Winter Skate	1,023	1,647
D	Skate, nk	1,095	1,468
D	Monkfish	10,729	9,927
D	Summer Flounder	2,313	3,179
D	Barndoor Skate	13,529	22,051
D	little skate	303	601

Results (con't)

Length Frequency Distribution of Monkfish, 2009-2010

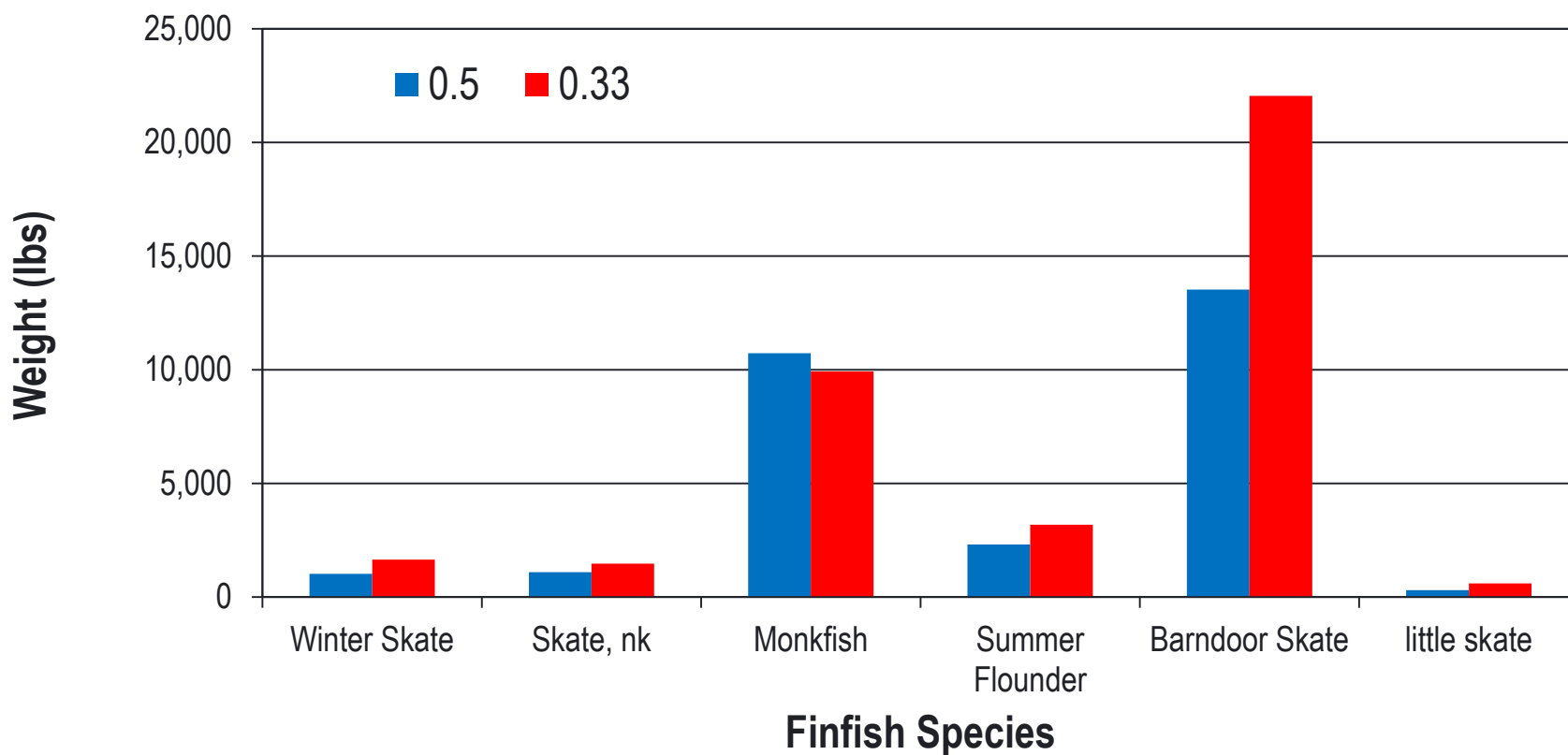


Length Frequency Distribution of Winter Skate, 2009 -2010



Discarded Finfish Species By Hanging Ratio

2009-2010



Conclusions

- Number of targeted fish greater in gear hung on the 0.33.
- Number of incidental takes greater in gear hung on the 0.50, except number of harbor porpoise were greater in gear hung on the 0.33 differences NOT significantly different from zero



Take Home Messages

This study suggests that hanging ratio does NOT appear to decrease harbor porpoise / marine mammal bycatch. We hope that the results of this work provides information which can be used to make informed decisions.



Future Research Suggestions

- Increase bridle/spacing between nets
- Other types of pingers with scanning frequencies
- Reconfigure with tie down at every float



Acknowledgements

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- **Eric Matzen for his technical assistance and support**
- **Technicians: Rob Bland, Jenna Christiansenn, Matt Coble, CW Clarke, Randy Collins, Craig Gogan, Nikole Jalbert, Janine L'Heureux, Trevor Horwell, Jen Langares, Allison MacConnell, Chris Marsden, Meghan Miner, Max Morgan, Cara Sands, Lauren Wahl, and Lauren Zatorski**
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- **Matt Coble, Nikole Jalbert and Trevor Horwell-Data entry and audits**
- **Betty Lentell and Fred Wenzel for assistance with marine mammal samples**
- **NEFOP**
- **ALS Support Staff**



Gillnet Configurations and their Impact on Atlantic Sturgeon and Marine Mammal Bycatch in the New Jersey Monkfish Fishery



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James L. Armstrong

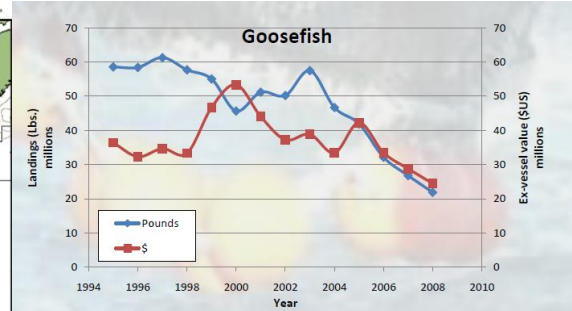
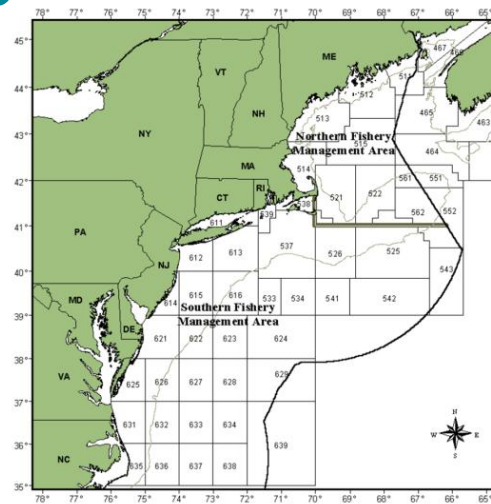
Lori M. Brown

Dewayne A. Fox

Henry Milliken

Monkfish Fishery

- 750 Limited Access Vessels
- \$25-50 Million Fishery
- Trawl fishery in NMA
- Gillnet fishery in SMA

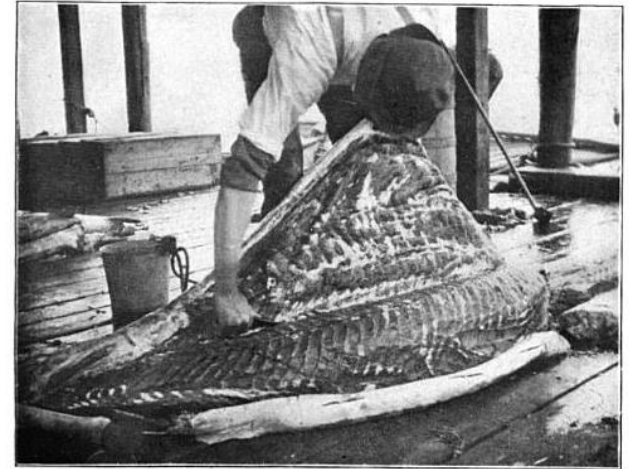


Atlantic Sturgeon Fishery

- Onetime abundant populations decimated by caviar fishery at turn of 20th century
- Gillnet fishery off NJ until 1995 moratorium
- Gillnet fishery for sturgeon “discovered” monkfish
- Just listed under ESA

Report U. S. F. C. 1899. (To face page 376.)

PLATE 20.



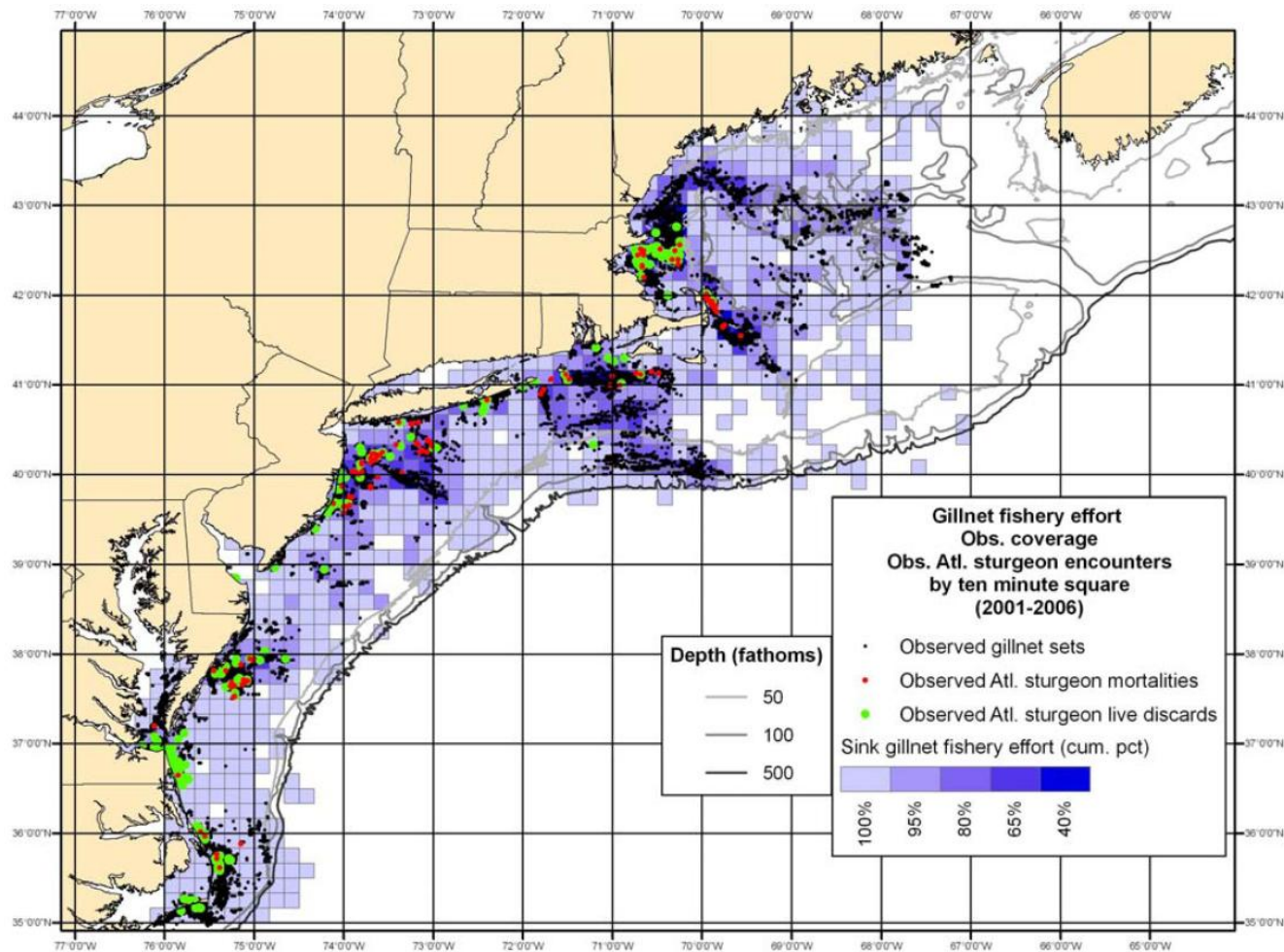
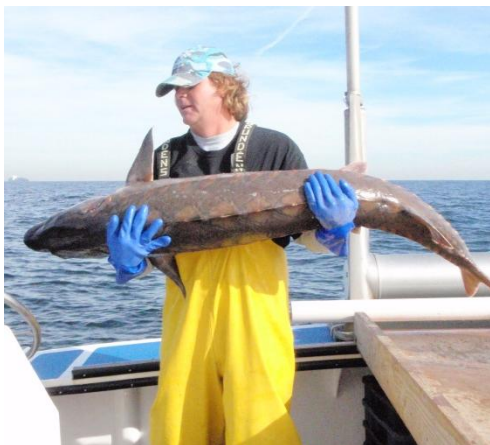
SKINNING A STURGEON.

from Cobb 1900



CUTTING OUT THE ROE OF A STURGEON.

Monkfish fishery - Sturgeon Interactions



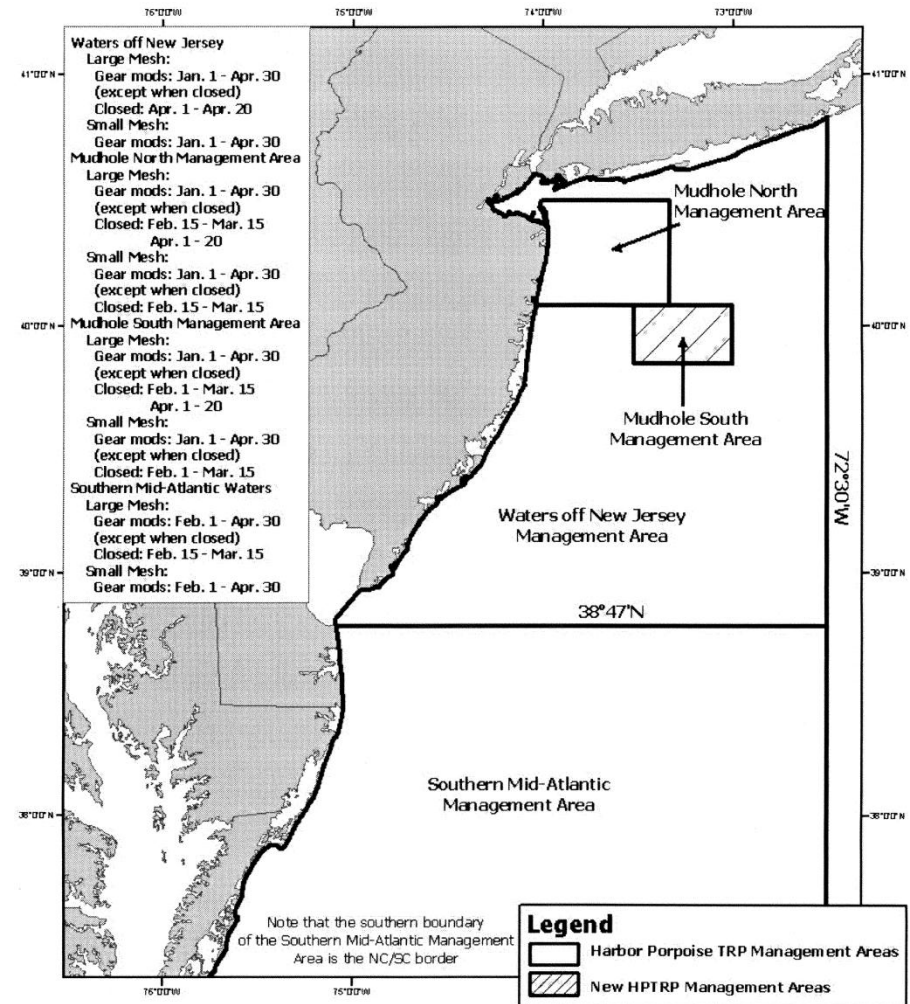
ASMFC 2007



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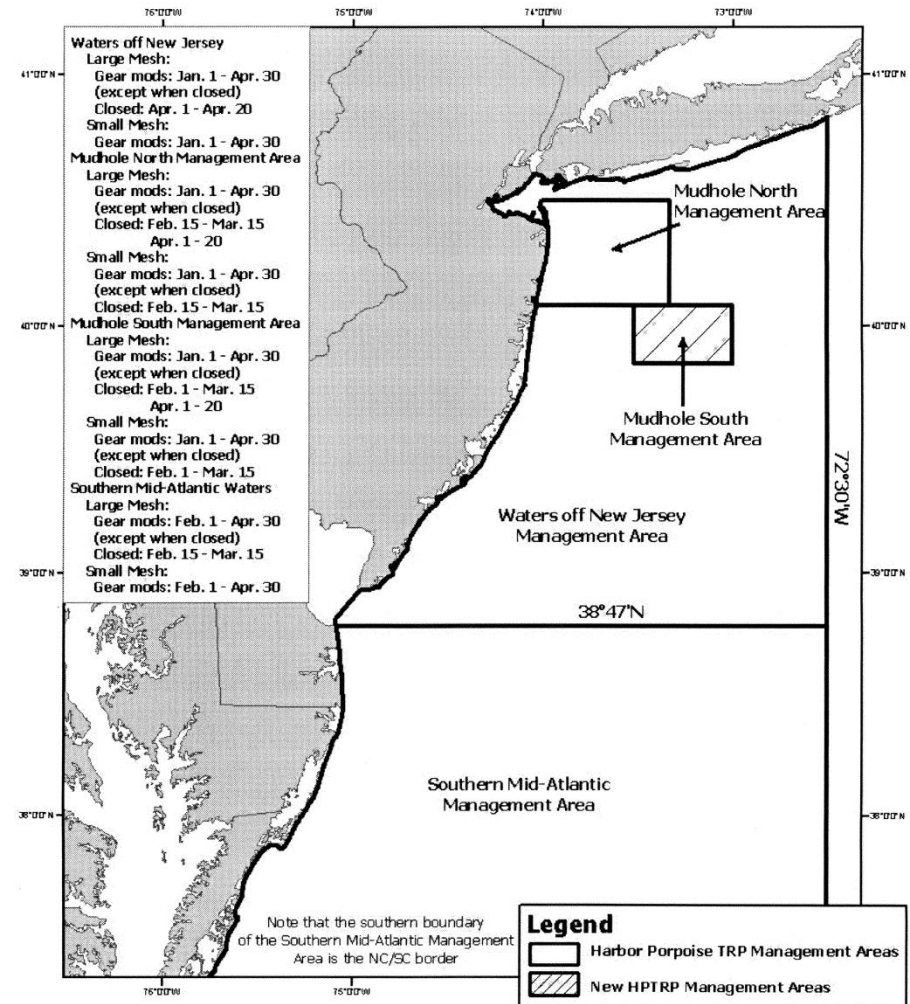
Gillnet Requirements off New Jersey

- HPTRP
 - Area Closure
 - Float line length
 - Twine size
 - Net cap
 - Net size
 - Net tagging
 - Tie Downs



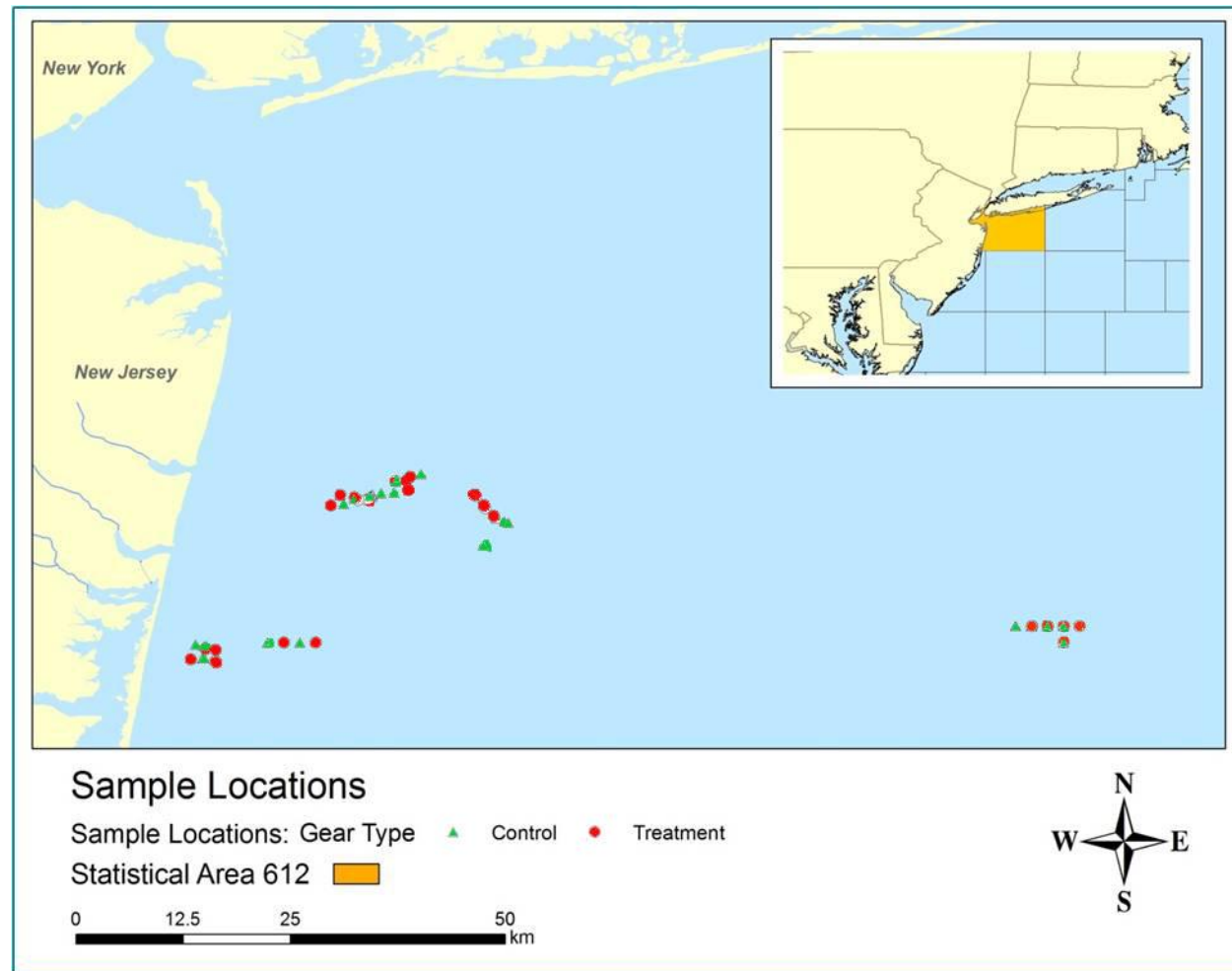
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Study Area

- Nov –Dec 2010
- Two sites
 - Nearshore
 - Offshore
- Two monkfish gillnetters
- Observers



Objectives

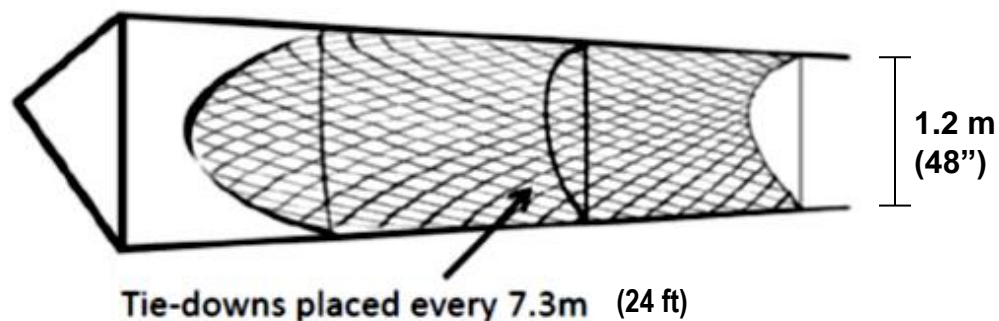
- Evaluate affect of tie downs on catches of:
 - Atlantic sturgeon
 - Harbor Porpoise / Marine Mammals
 - Monkfish



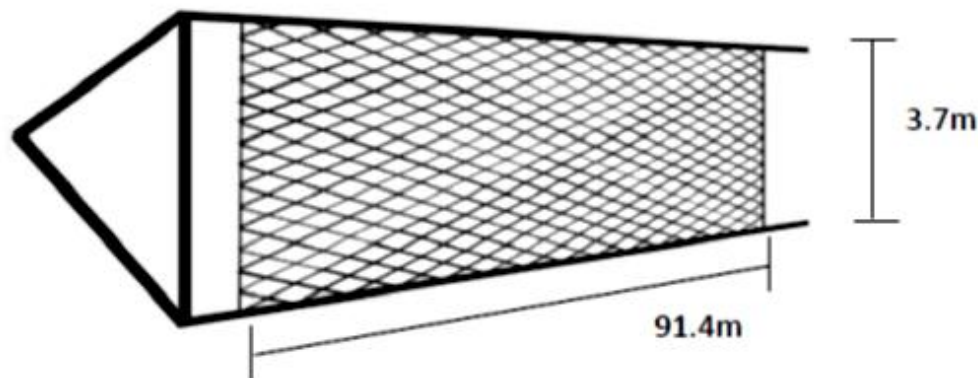
Methods

- Control –Tie Down
- Treatment – No Tie Down
- Two strings each per site
- Ten panels per string
- Panels 91.4 m
- Mesh 30.5 cm
- 12 meshes top - bottom

a. Control gillnet configuration with tie-downs



b. Experimental gillnet configuration with no tie-downs



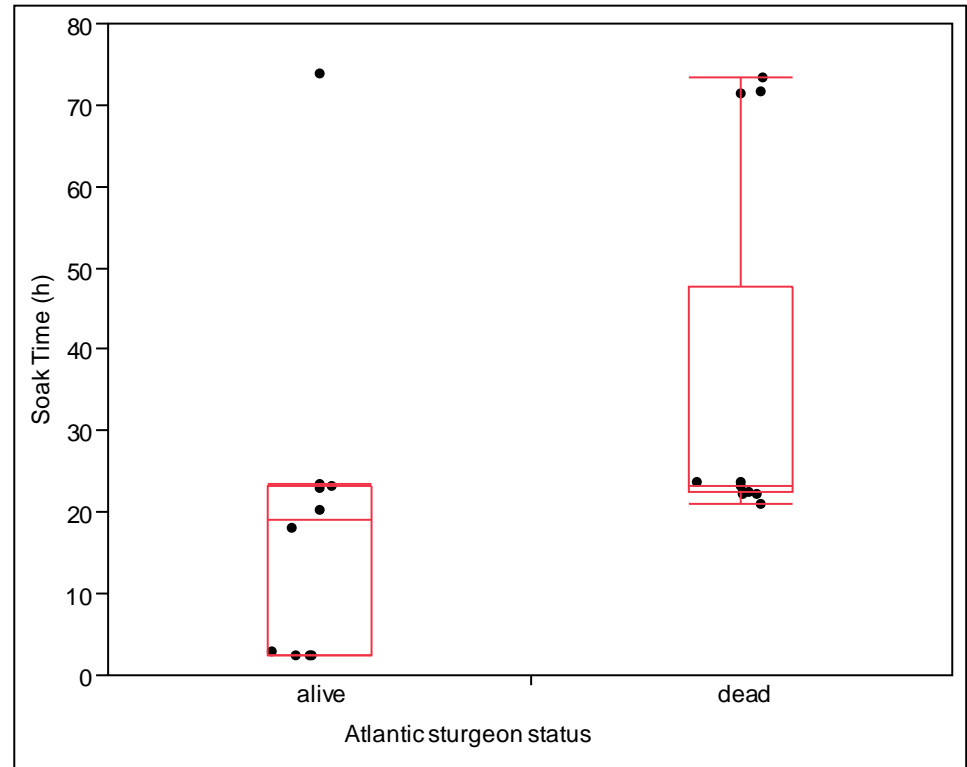
Methods



- Gillnetters randomly assigned paired replicates
- $N = 60$ (120 hauls)
- ANOVA CPUE
- $E = \text{net-day}$
- $\alpha = 0.05$
- Otherwise, fished as normal monkfish trips

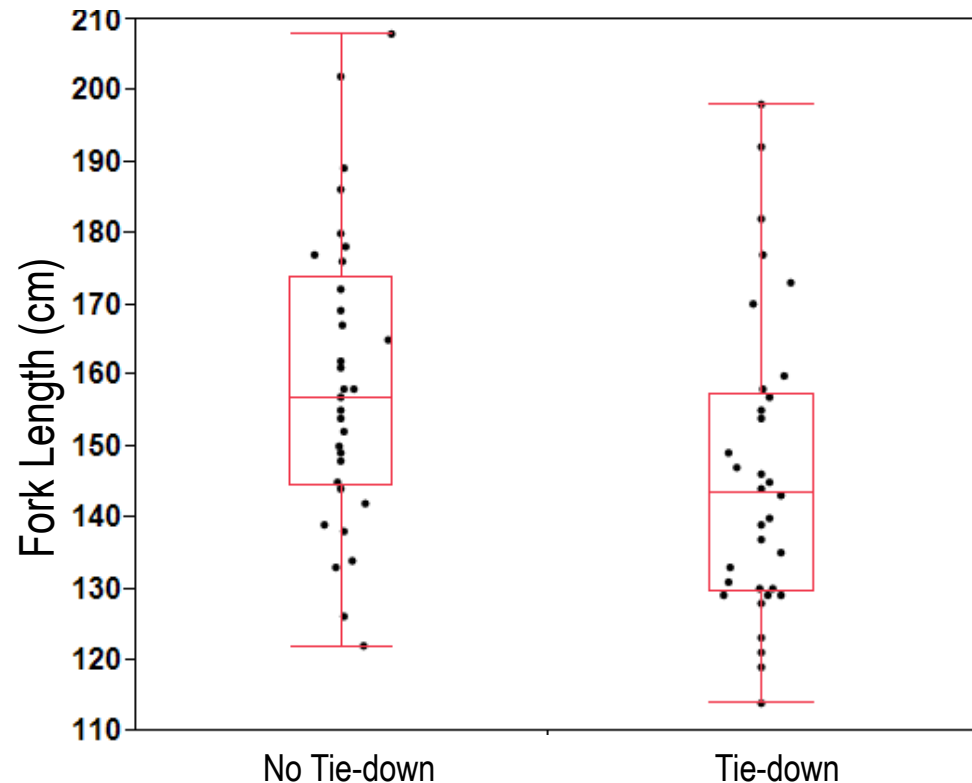
Results – Atlantic sturgeon

- **Atlantic Sturgeon Catch 23 fish in 120 hauls (18 Control - 5 Treatment)**
 - **Control CPUE 0.706**
 - **Treatment CPUE 0.198**
 - **$p = 0.3140$**
 - **Lots of zeros**
 - **(Atl.S 16/120 hauls)**
- **Mortality not predicted by soaktime ($p=0.1137$)**
- **FYI – 33/ 34 split in spring work (stand up / tie down)**



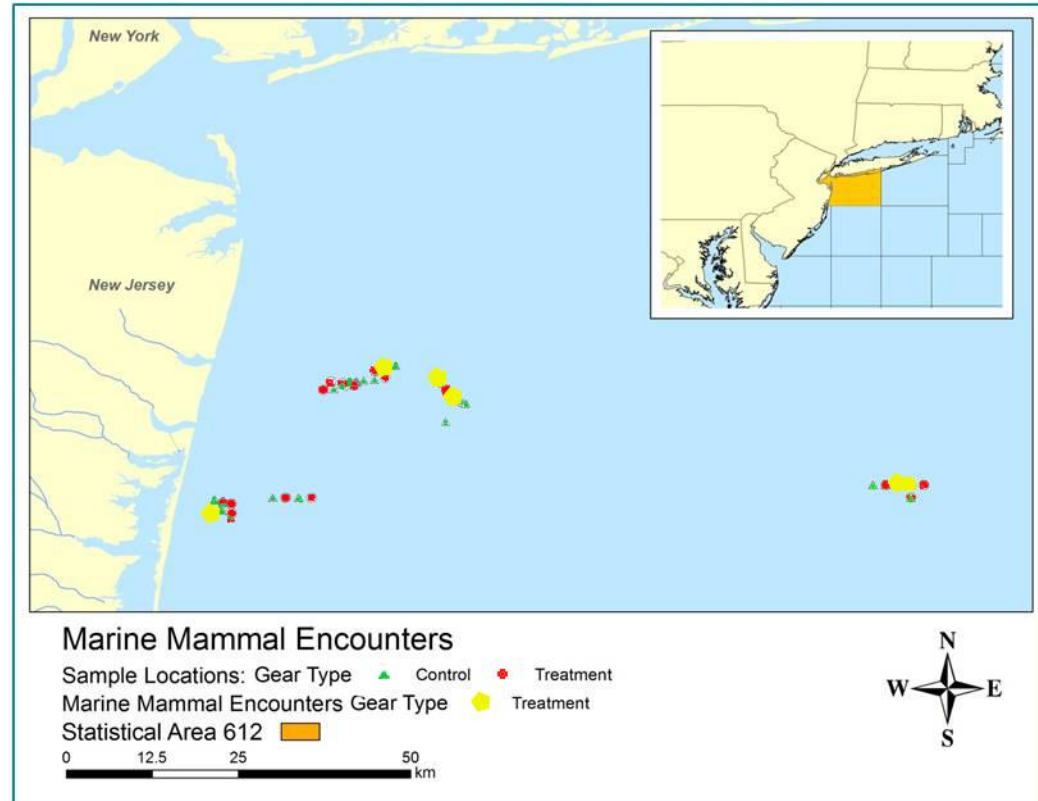
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 - Lots of zeros
 - (Atl.S 16/120 hauls)
- Mortality not predicted by soaktime ($p=0.1137$)
- FYI – 33/ 34 split in spring work (stand up / tie down)



Results – Harbor porpoise

- Harbor Porpoise encounter rate appears to be lower in pre-HPTRP era when tie-downs were used
- Current study - eight marine mammals captured in stand-up nets, none in tie-down nets



Results – Monkfish (and other target species)

- **Monkfish catch**

11,044 kg

- **Control = 7,306 kg**
- **Treatment = 3,738 kg**
- **$p < 0.0001$**

- **Winter skate catch**

11,831 kg

- **Control = 10,048 kg**
- **Treatment = 1,782 kg**
- **$p < 0.0001$**

		Control	Experimental
Monkfish	% Landing	66.2%	33.8%
	Average Length (cm)	69.6	67.7
	Total Weight (kg)	7306.3	3737.9
Winter Skate	% Landing	84.9%	15.1%
	Average Length (cm)	81.8	84.1
	Total Weight (kg)	10048.5	1782.3

Conclusions

- Atlantic sturgeon

Within the limits of this study, tie-downs do not appear to increase capture probability and hence, mortality.

- Harbor Porpoise

Based on NEFOP data, tie-downs do appear to decrease risk of entanglement.

Stand-up nets caught more marine mammals.

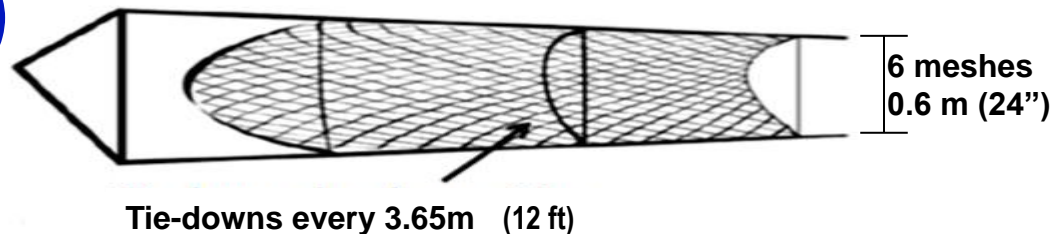
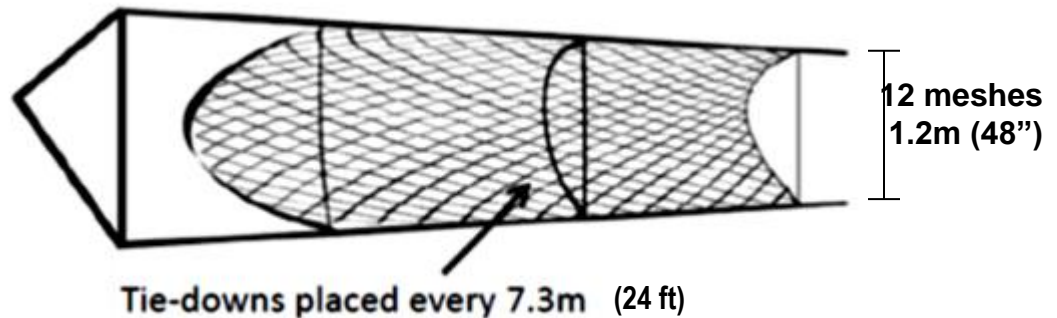
- Monkfish (and winter skate)

Tie-downs significantly increased the catch of the targeted species.



Future Directions (completed 2011)

- **Control –**
 - 12 mesh net tied down to 1.2 m (48")
 - Tie down every other float
- **Treatment –**
 - 6 mesh net tied down to 0.6 m (24")
 - Tie downs every other float



Acknowledgements

Capt.'s
Kevin Wark
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Matt Breece

ALS Observers



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