



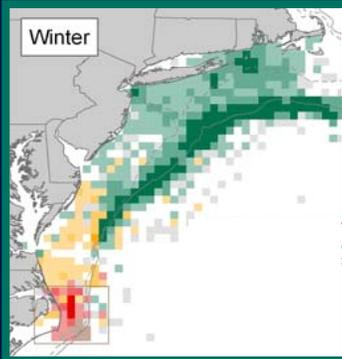
Updates on the
behavior, interaction rates,
bycatch & mortality
of sea turtles in Mid-Atlantic waters

NEFSC Sea Turtle Program and our collaborators

Outline



Behavior



Interaction Rates

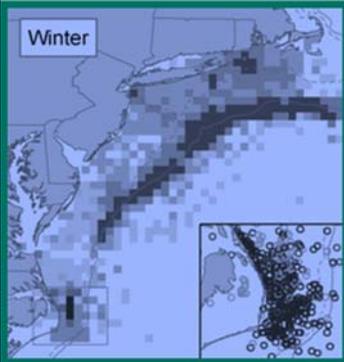


Estimated Bycatch and Mortality

Outline



Behavior



Interaction Rates



Estimated Bycatch and Mortality

Dive Behavior

- Observed loggerheads
 - diving to sea floor
 - diving to deep, cold water (~50m, ~10°C).



- <http://www.seaturtle.org/tracking/>

This is a joint project between the NOAA NMFS, BOE, FWS, Navy, and the sea scallop industry through their research set aside program. Coonamessett Farm Foundation with the assistance of Viking Village Fisheries and the F/V Kathy Ann and the sea scallop industry through their research set aside program.

Forage Behavior & Buoyancy

- Eat in water column and on bottom
- Positively buoyant at surface and negatively buoyant on bottom.



This is a cooperative project lead by **Coonamessett Farm Foundation** with the assistance of Viking Village Fisheries and the F/V Kathy Ann and the sea scallop industry through their research set aside program.

Forage Behavior & Buoyancy

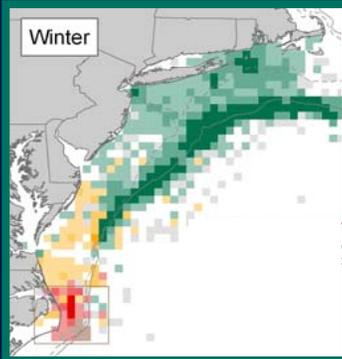


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Outline



Behavior



Interaction Rates



Estimated Bycatch and Mortality

Bycatch Analysis

Warden ML. In review. Loggerhead sea turtle interactions with U.S. Mid-Atlantic bottom trawl and scallop trawl gear, 2005–2008.

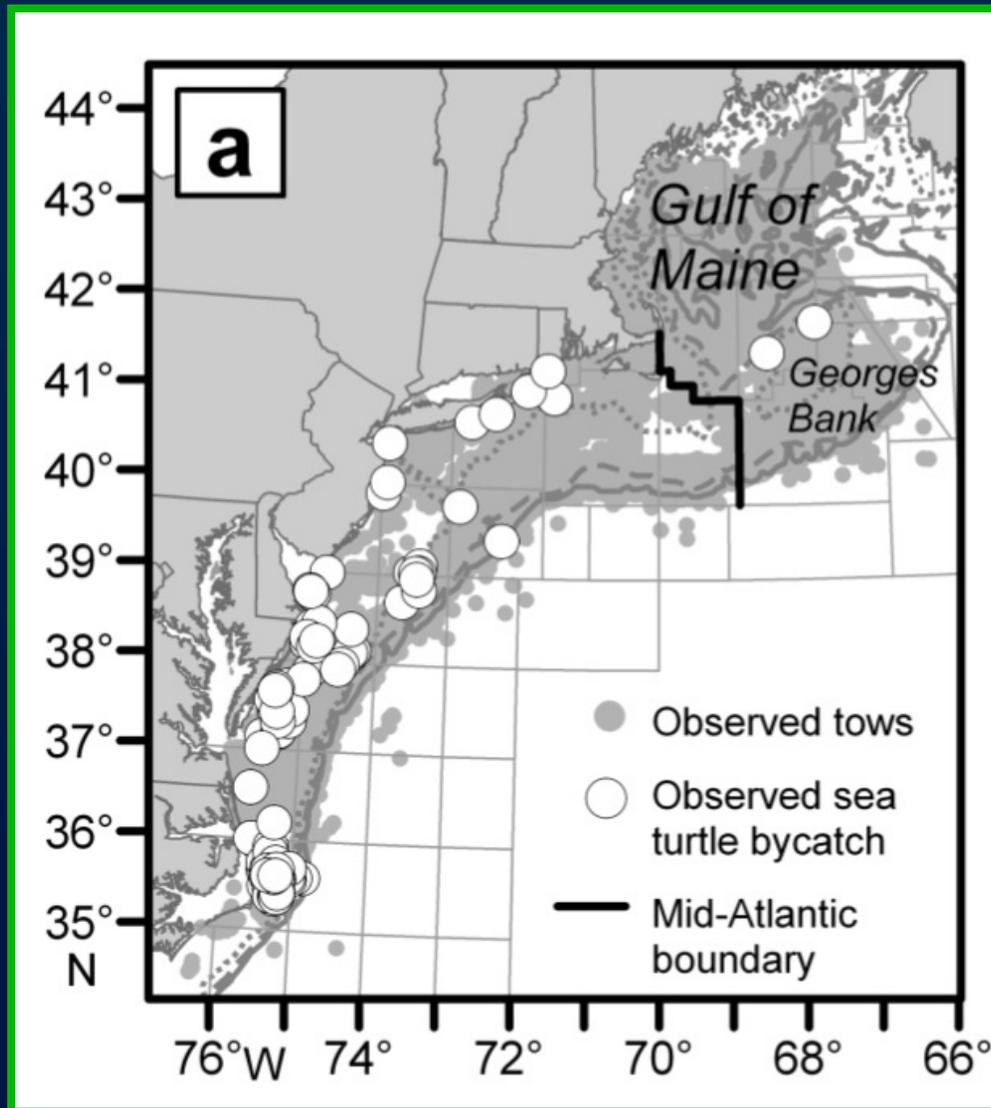
Murray KT. 2008. Estimated average annual bycatch of loggerhead sea turtles (*Caretta caretta*) in US Mid-Atlantic bottom otter trawl gear, 1996-2004 (Second Edition). US Dept Commer, Northeast Fish Sci Cent Ref Doc. 08-20; 32 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <http://www.nefsc.noaa.gov/nefsc/publications/>

NEFOP

- Northeast Fishery Observer Program
- Observers document
 - vessel and gear characteristics
 - weather and habitat conditions
 - time spent fishing
 - fishing location
 - catch composition



Observed Hauls

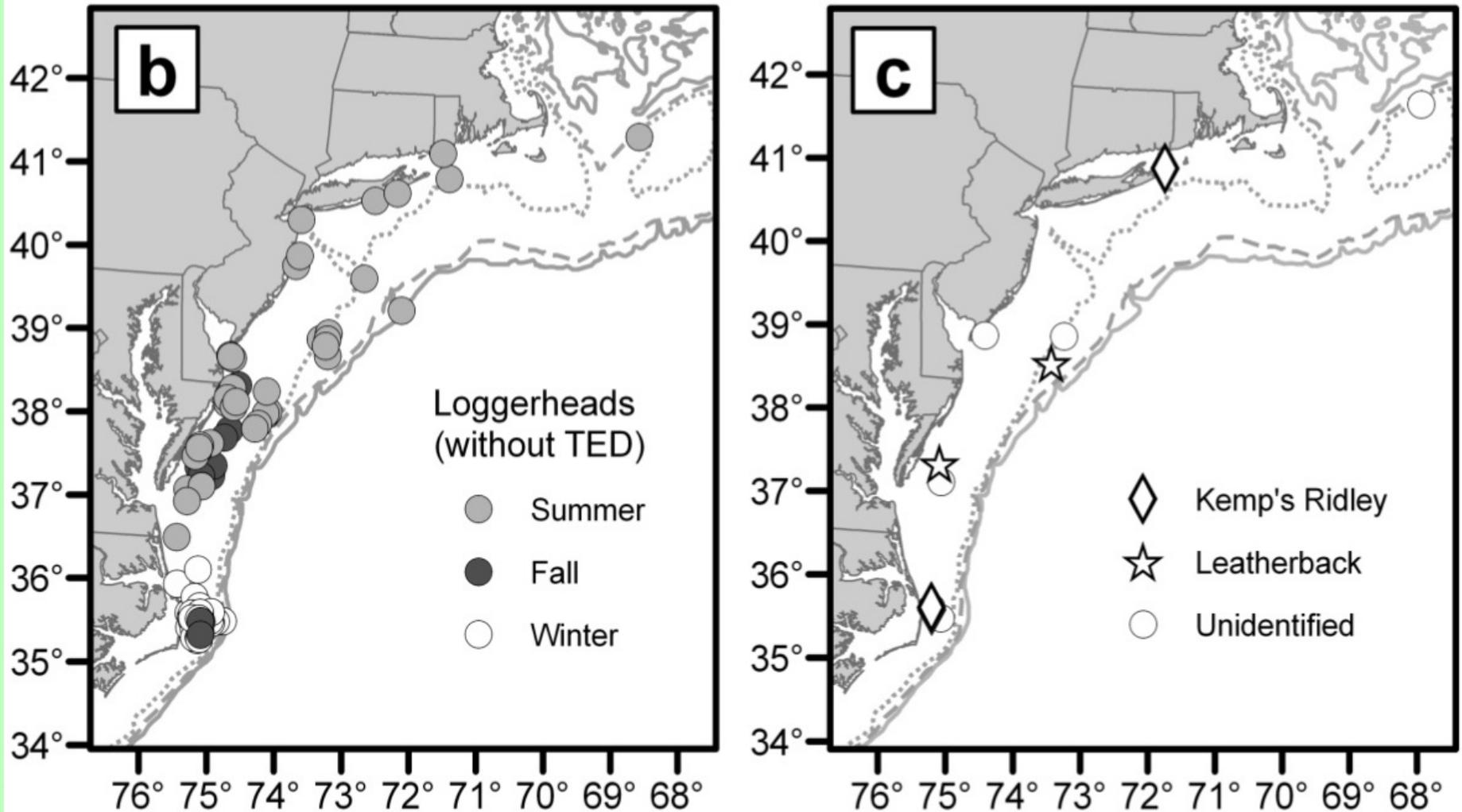


NEFOP observed
~24,000 tows in
bottom trawl
fish & scallop gear
in Mid-Atlantic
June 1994-Dec 2008.

Only 1 observed
turtle caught in a
“typical” TED, thus
rate analysis
restricted to no TEDs.

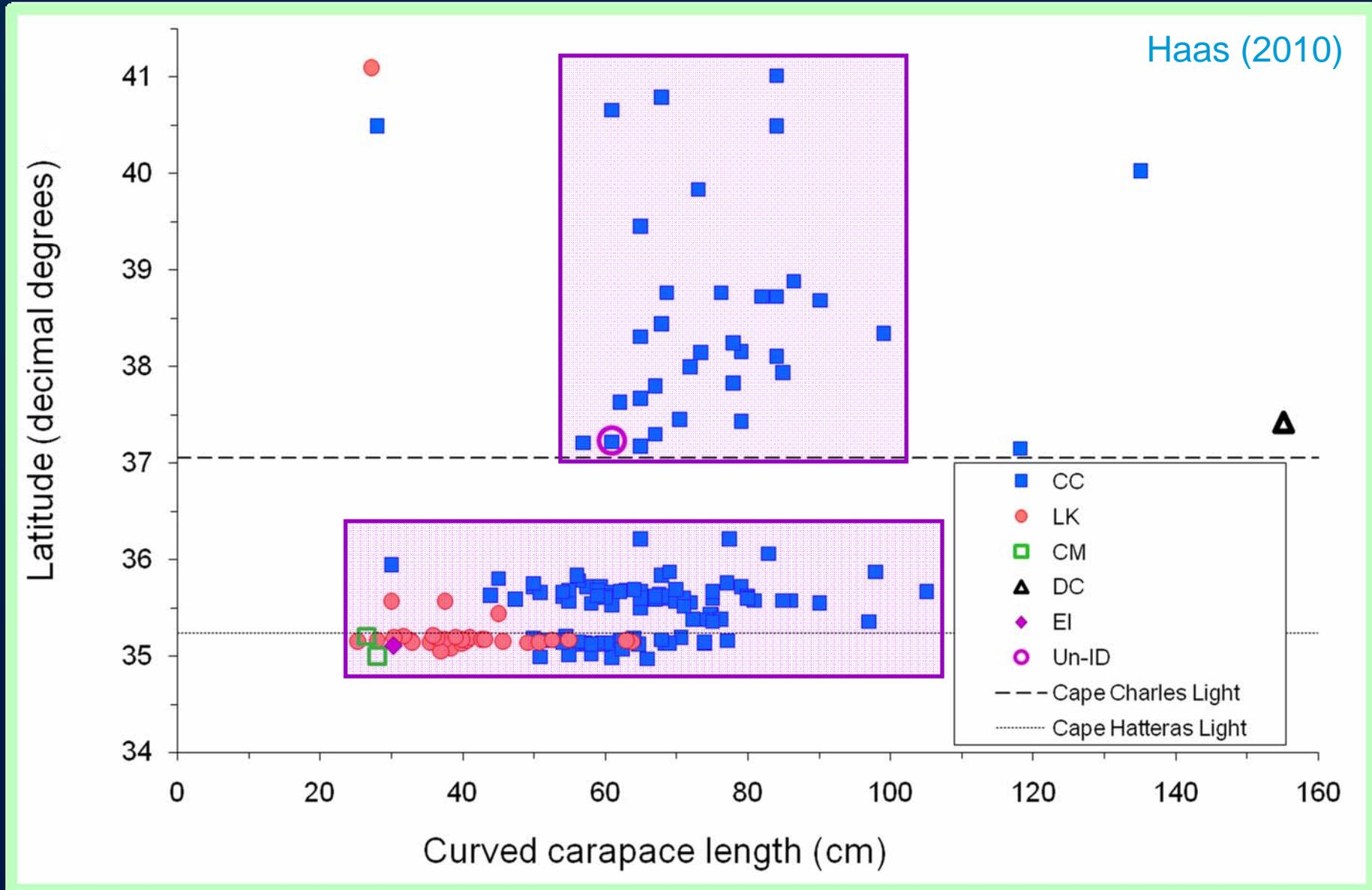
Draft results from Warden in review.

Observed Turtles

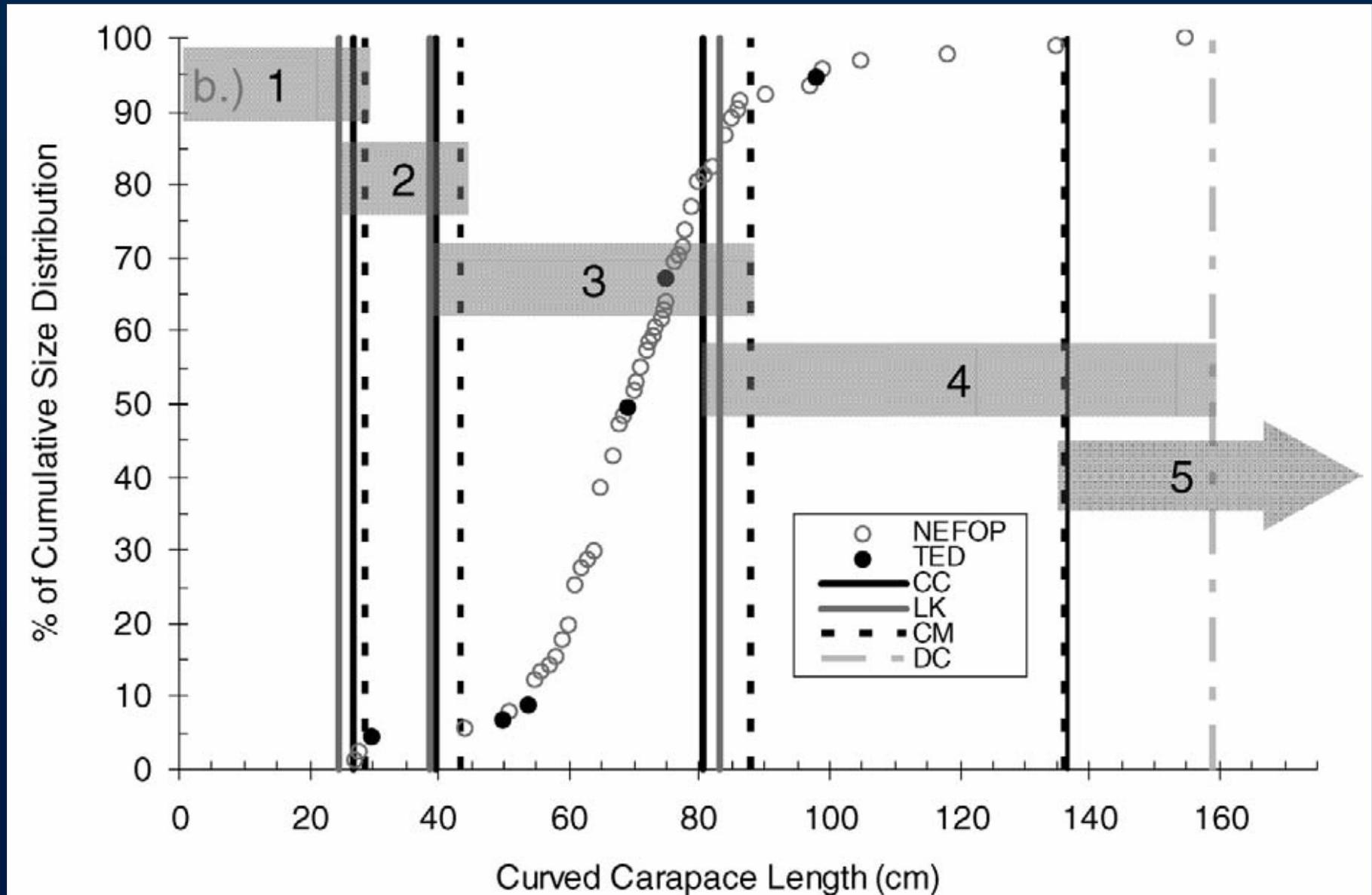


Draft results from Warden in review.

Turtle Size



Turtle Size Distribution

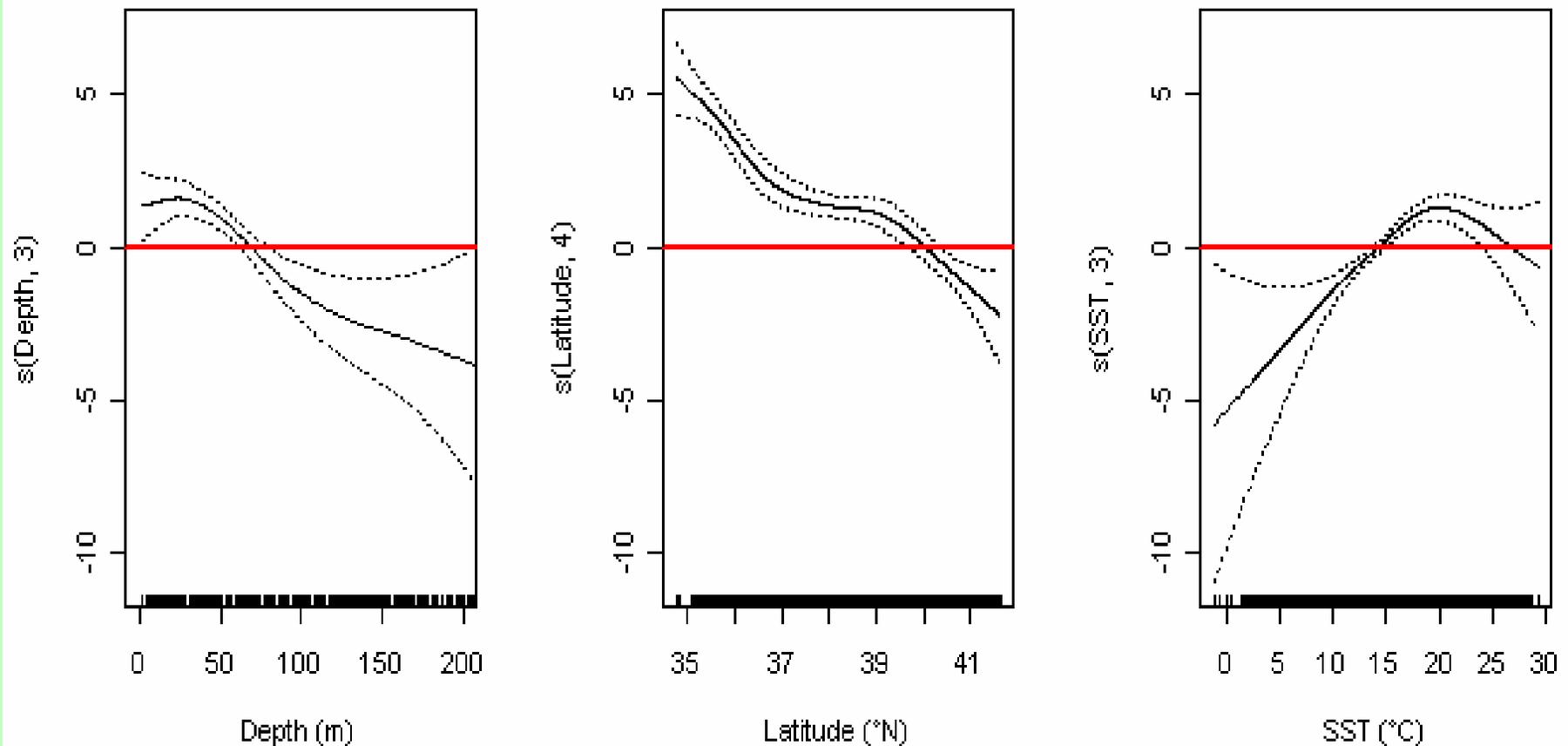


Observed Loggerheads

Variable	Category	N	% N	% days fished
Depth (m)	≤50	100	89%	33
	>50	12	11%	67
SST (°C)	≤15	30	27%	61
	>15	85	73%	39
Mesh size (cm)	≤7	15	13%	39
	7–15	93	83%	39
	≥15	4	4%	21
Target species	croaker	51	46%	2
	summer flounder	31	28%	28
	scallop	13	12%	6
	long-finned squid	6	5%	26
	short-finned squid	1	<1%	8
	large-mesh multispecies	0	0	7
	monkfish	0	0	6
	other	10	9%	17

Draft results from Warden in review.

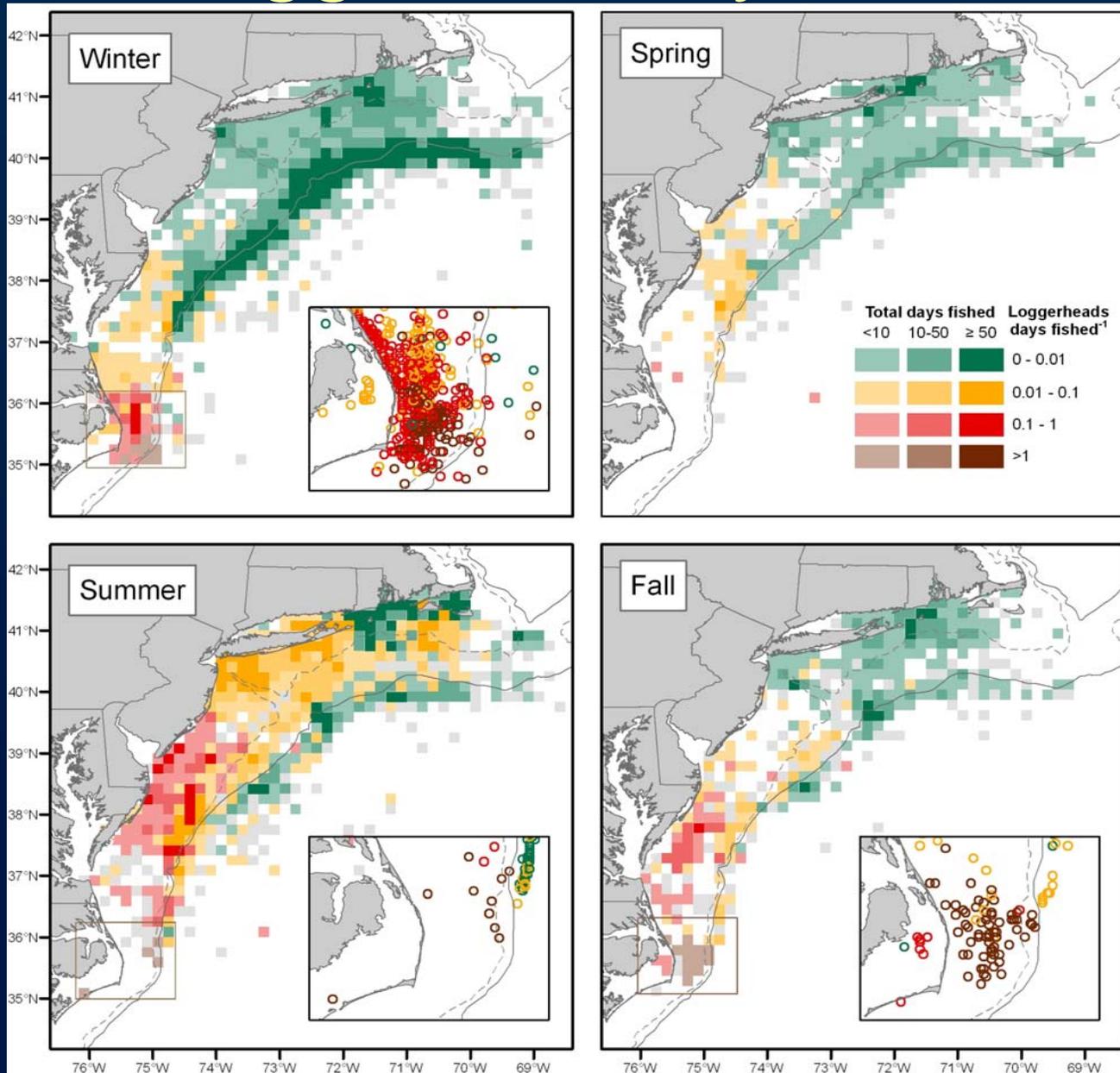
(noTED) Loggerhead Bycatch Rates



Draft results from Warden in review.

(Observable) Loggerhead Bycatch Rates

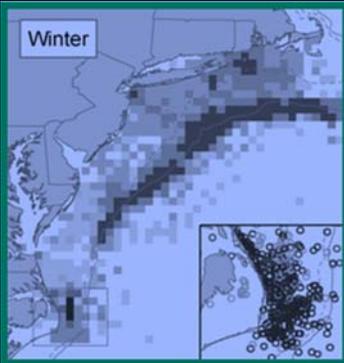
Draft results from Warden in review.



Outline



Behavior



Interaction Rates

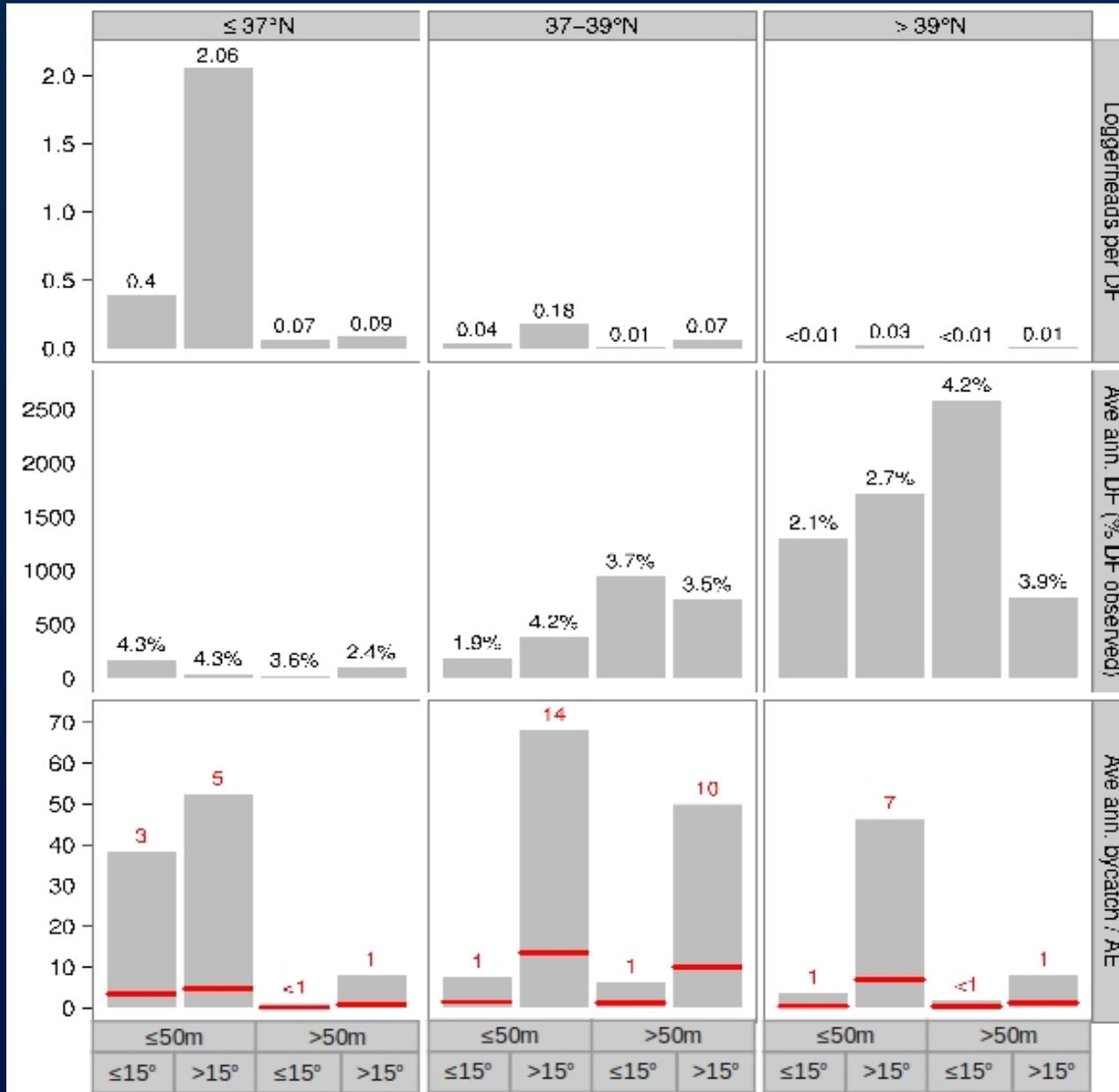


Estimated Bycatch and Mortality

$$\begin{aligned} &\text{Bycatch rate} \\ &\quad \times \\ &\text{Fishing effort} \\ &\quad = \\ &\text{Estimated Bycatch} \end{aligned}$$

(noTED, observable) Loggerhead Bycatch Rates

Draft results from Warden in review.

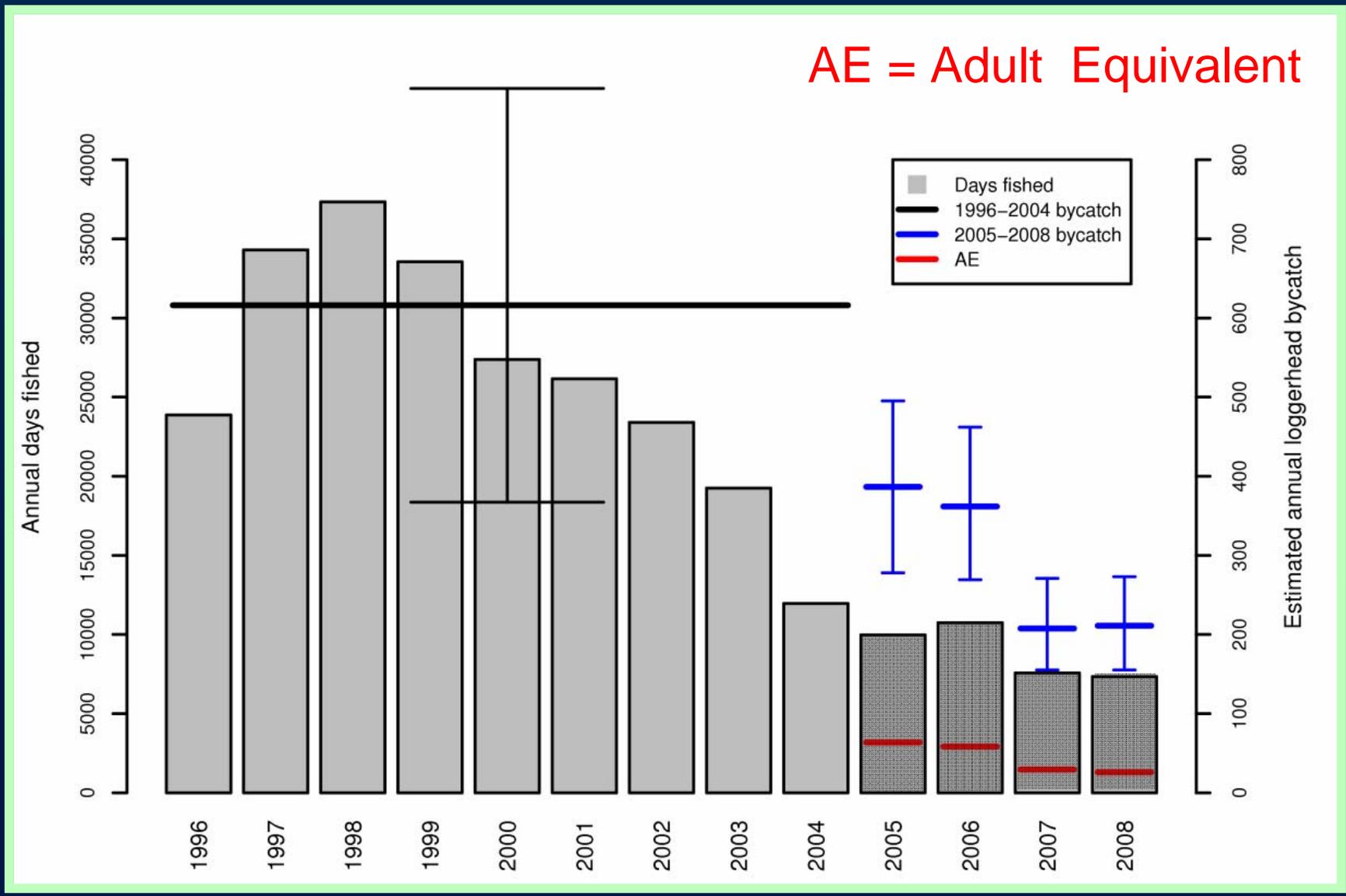


Rate

Effort

Bycatch
(~300/yr)

(Observable) Loggerhead Bycatch



Draft results from Warden in review. Dark Gray=fish + scallop effort

Estimated Mortality

$$\underline{\text{Bycatch}} * \underline{\text{mortality rate}} = \underline{\text{mortality}}$$

From Murray (2008)... of the documented loggerhead interactions....

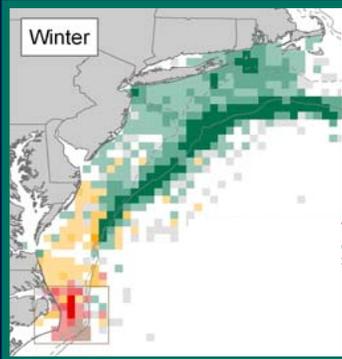
- 43% were dead, injured, resuscitated, or of unknown condition.
- 57% were alive and uninjured.

Summary Outline



Behavior

Water column and bottom



Interaction Rates

Highest in warm, shallow, southern waters



Estimated Bycatch and Mortality

~300 loggerhead / year

~40% injury & mortality

Questions?