

# In Water Threats to Sea Turtles

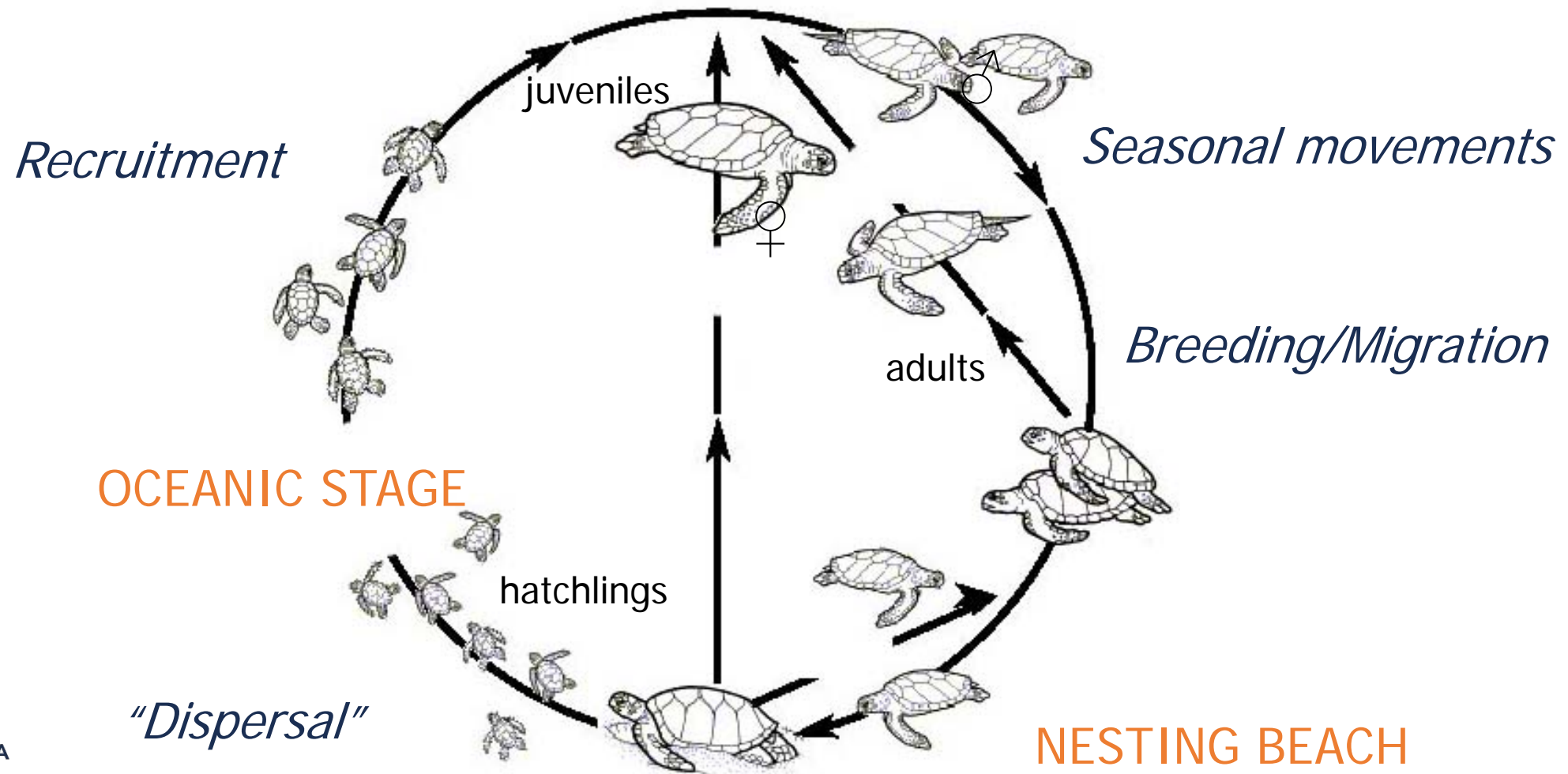
Susan Barco



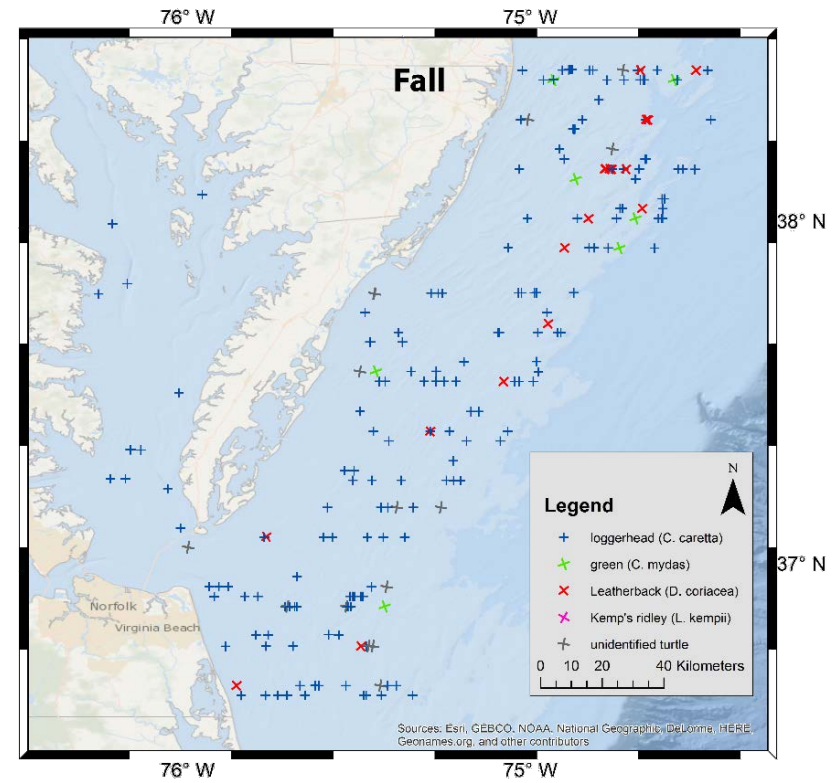
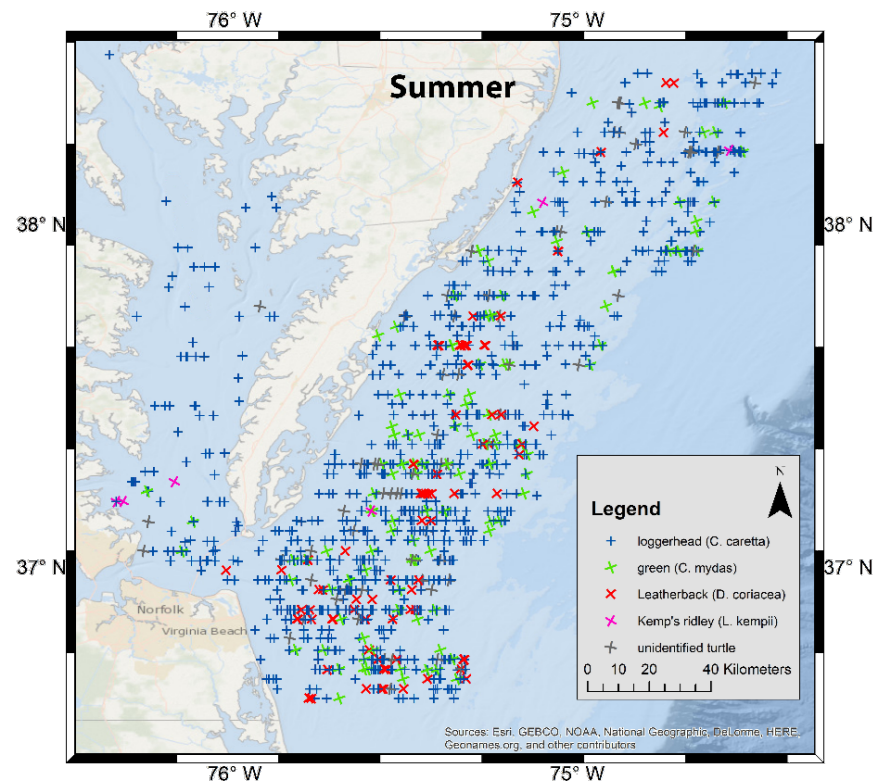
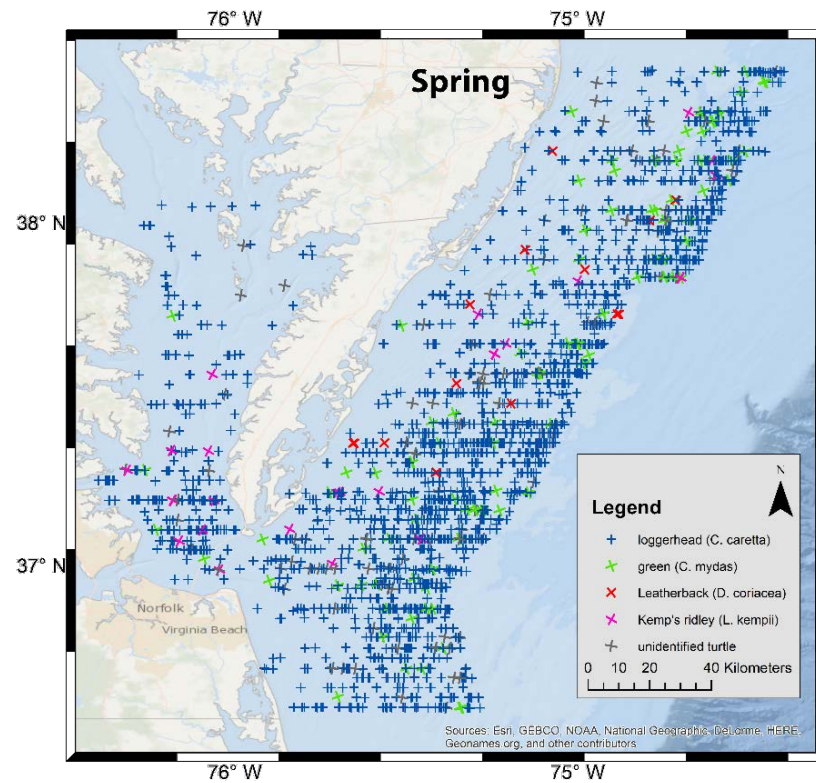
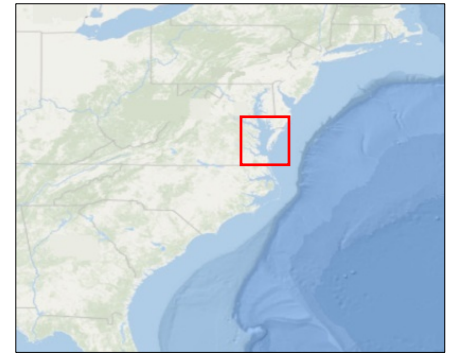
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# Hard-shelled sea turtle life cycle

## COASTAL FORAGING HABITATS



# Temperate habitat/ seasonal presence (VA/MD)





# Temporal & spatial surface time (Cc VA & MD)

- Surface time highest in ocean in summer (>30% spring & summer)
- Variation in surface time high among individuals
- Higher surface time than previous studies

[Mansfield (2006) or Byles (1988)]

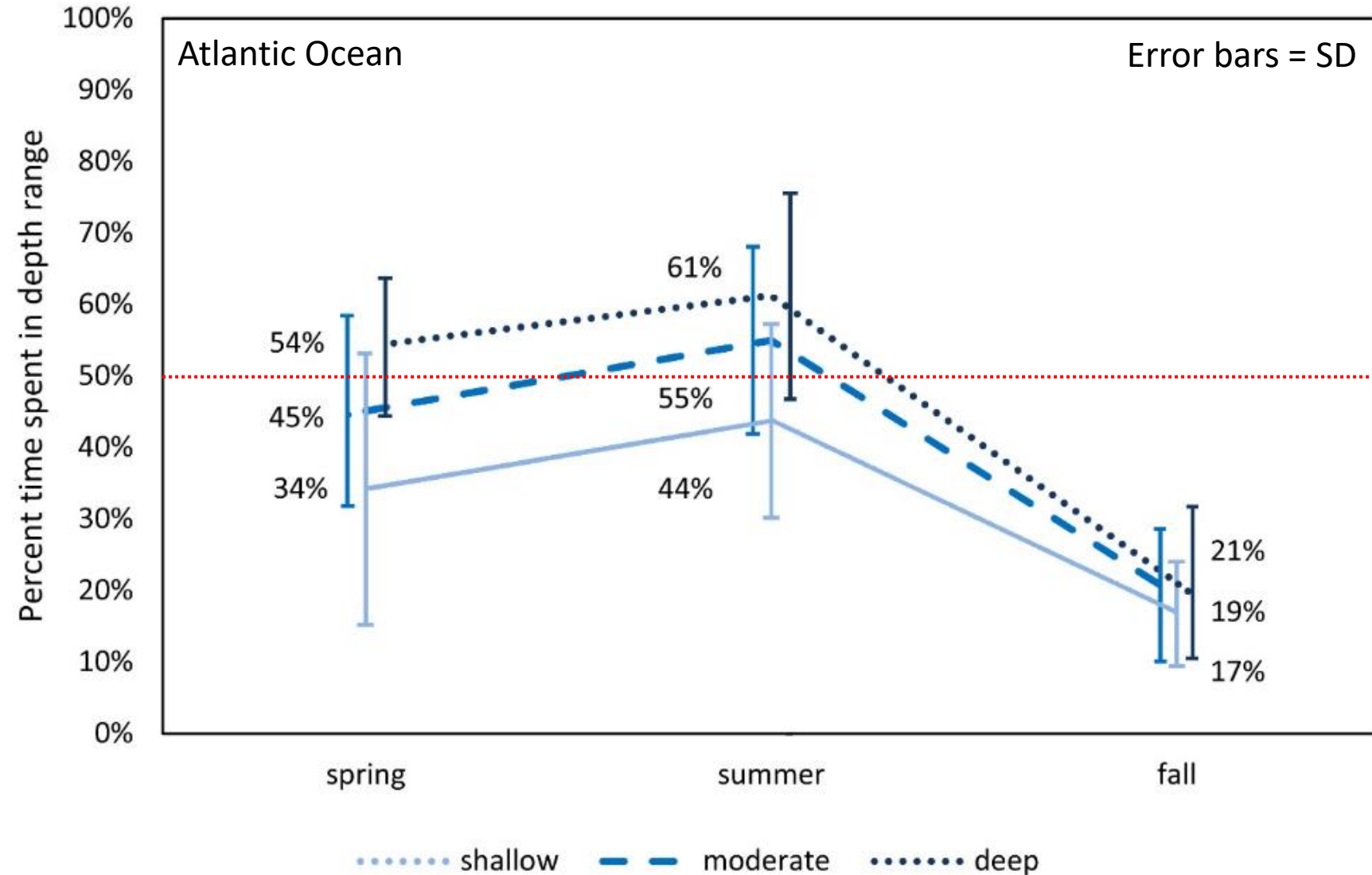
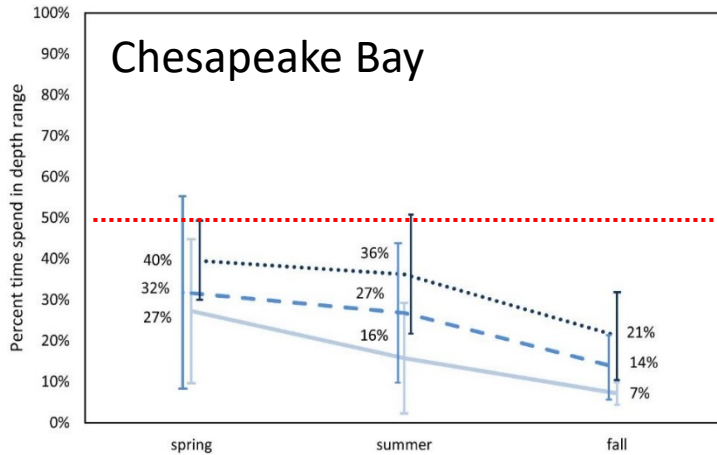
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NMFS permit 16134

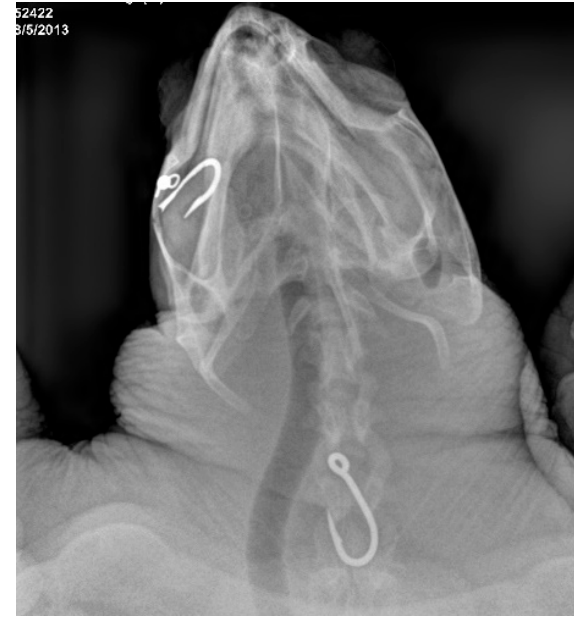


# Temporal & spatial surface time (Cc VA & MD)



# How are threats reported?

- Stranding response/rehab network (national)
  - Examinations voluntary & inconsistent
  - Mostly coastal/inshore mortality & injury
- Fishery observer programs
  - Commercial
  - mostly federal
- Anecdotal





# Natural (in-water) mortality

- Predation (esp. hatchling/pelagic phase-)
- Disease/malnutrition\*
- Biotoxin (harmful algal bloom)\*
- Cold stunning\*

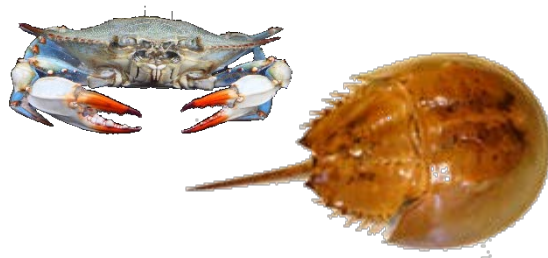
(exacerbated by climate change?)





# Threats from human activities (HI)

- Trauma (vessel strike, dredge take)
- Entanglement (gear, debris)
- Ingestion (gear, debris)
- Other (subtle, compound)
  - Displacement/disturbance
  - Noise
  - Contaminants
  - Resource competition





# Trauma (vessel)

- Sharp force
- Blunt force



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# Trauma (dredge)

- Catastrophic
- Entrained sediment



NORTHEAST REGION STRANDING NETWORK  
Organization: VAQS  
Field Number: Dredge Take #3  
Species: CC  
Date: 20 May 2009  
Location: Thimble Shoals  
Responder(s): Padre Island Dredge



Dredge Take  
10/21/03  
CC  
REMSA

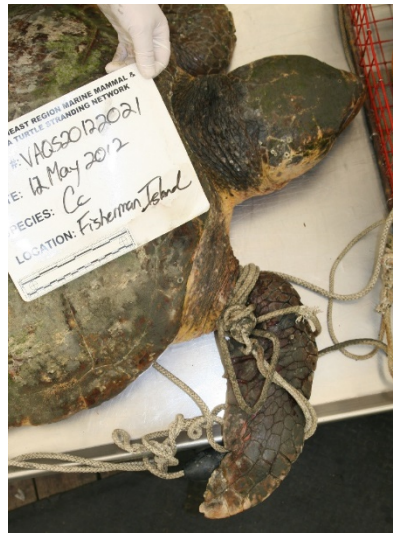


# Net entanglement



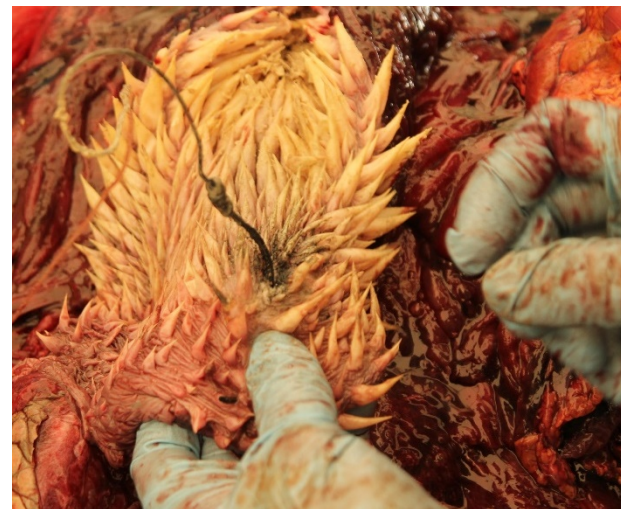


# Pot entanglement (whelk/crab pot buoy line)





# Twine (single strand) entanglement



...with hook ingestion

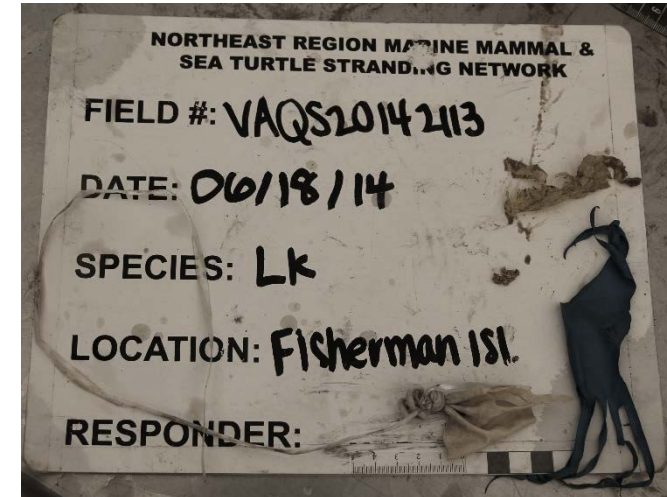


# Twine (single strand) entanglement



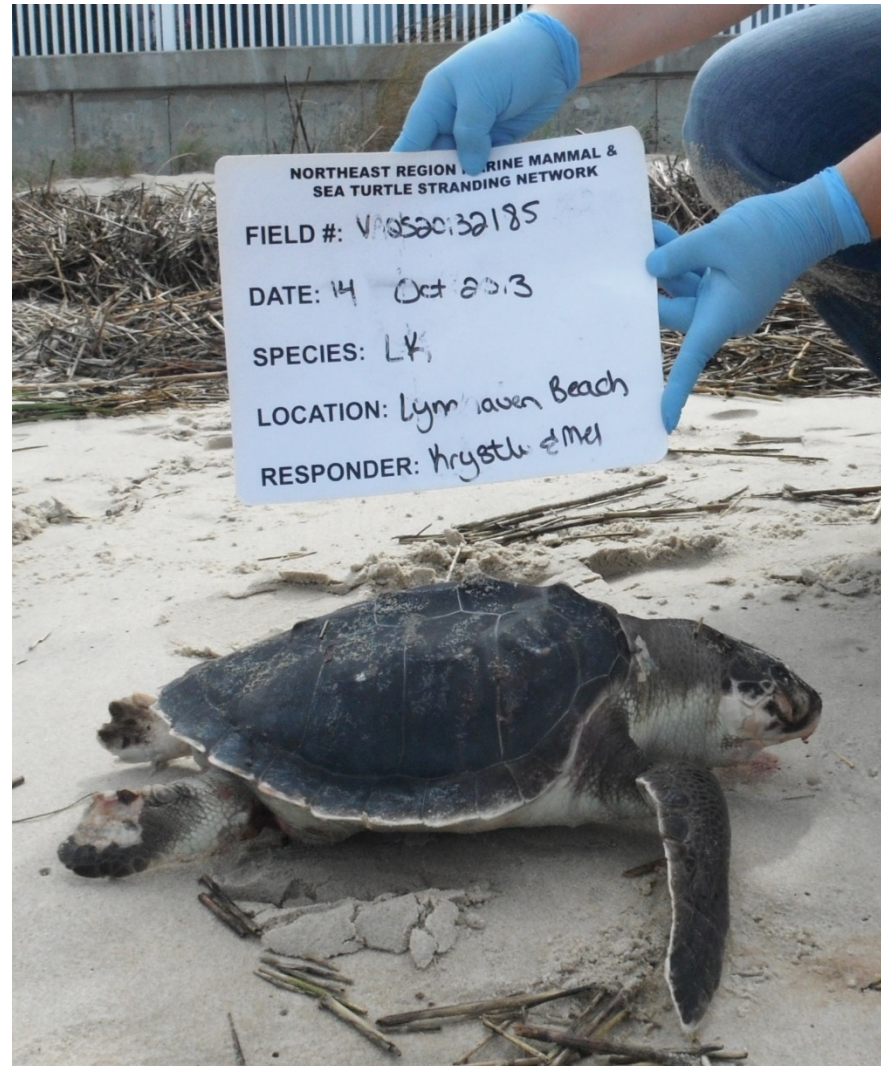


# Debris ingestion (probable COD)





# Debris ingestion (incidental-no physical injury)

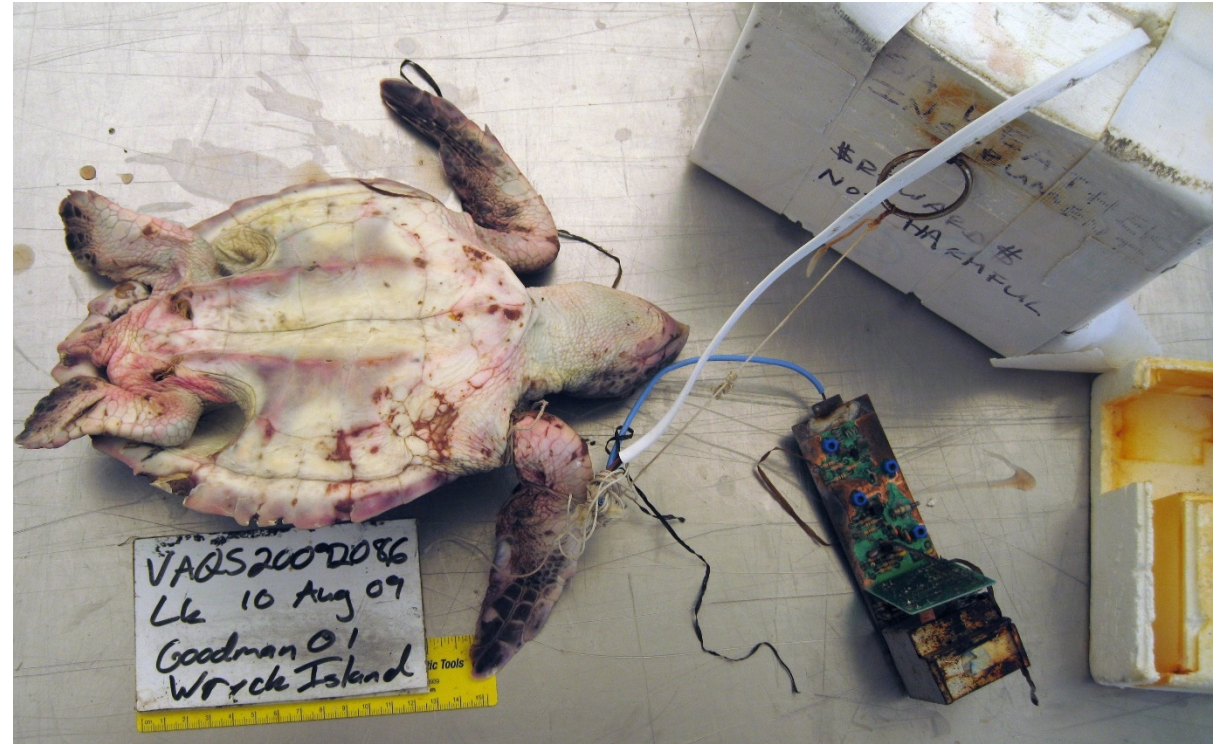




# Debris entanglement



...string, plastic strapping, woven tyvek bags, parachute...





# Contaminant ingestion/adsorption



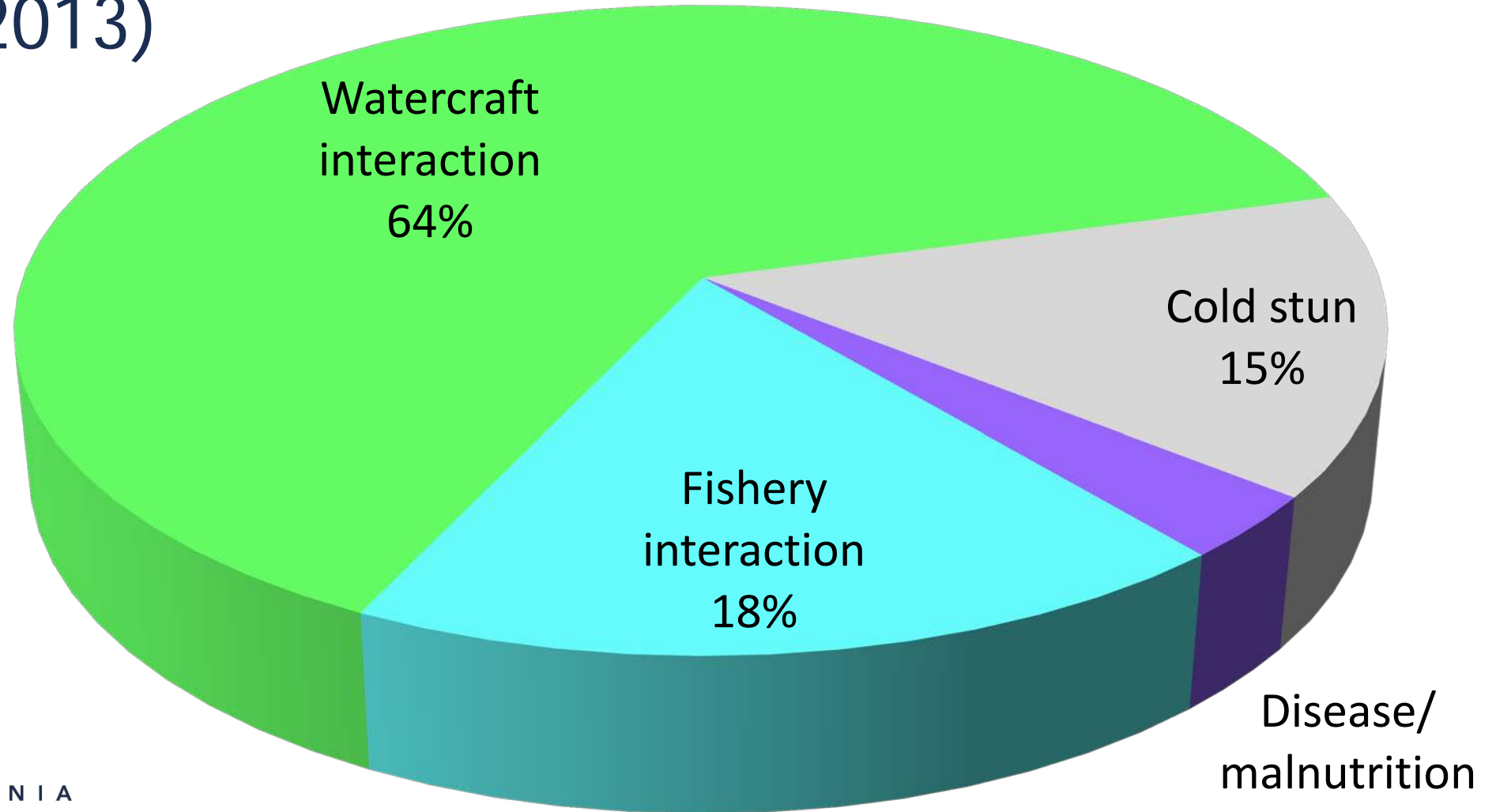
Scientific American-J. Abernethy NMFS permit 1551



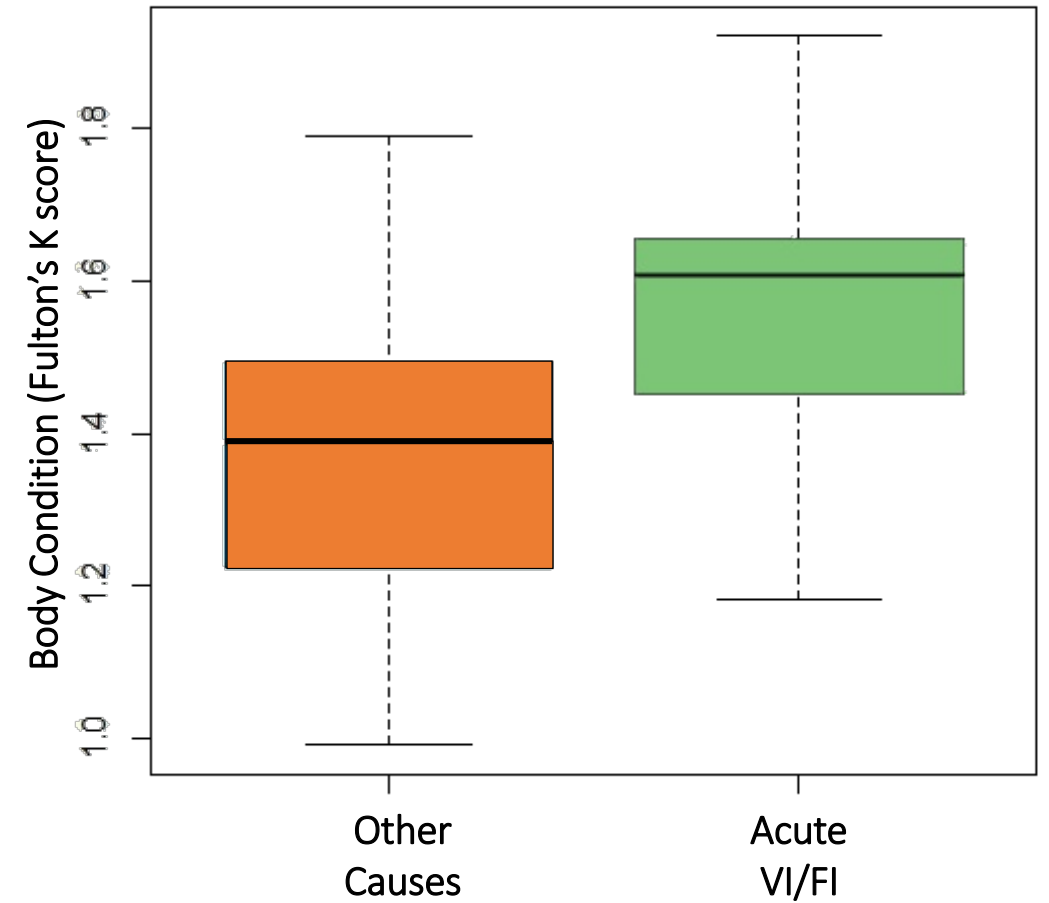
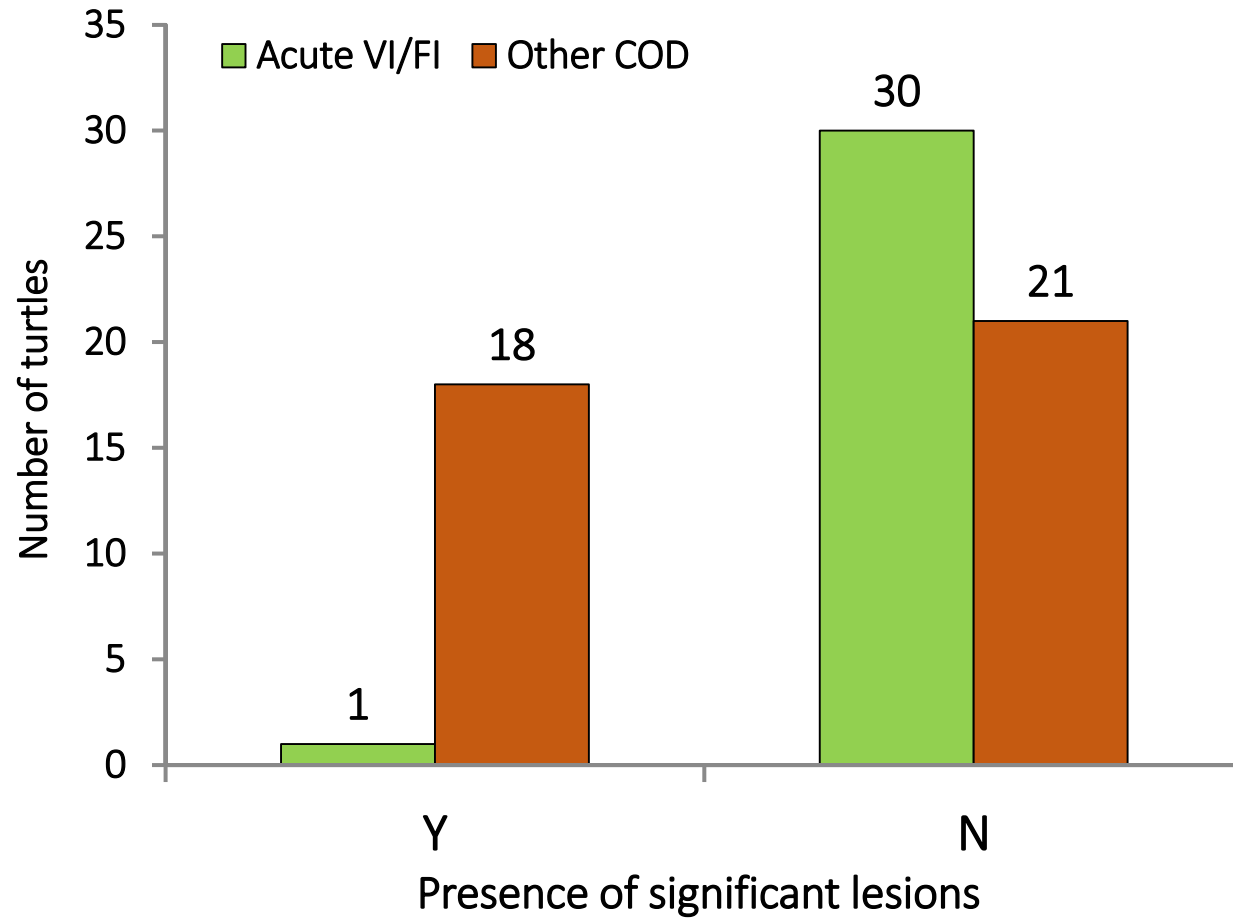
NOAA Fisheries



# COD for sea turtle strandings in VA (2009-2013)



# Are HI turtles compromised?



T-test T=226, P<0.0001



# Threats posed by wind energy construction & development

- Difficult to predict
- Direct (Kyle) & indirect
- Construction vs. operation
- Increased vessel traffic
- Increased fishing  
*(turbines = artificial reefs)*
- Changes in human & prey distribution (?)





# Needs

- Understand baseline sea turtle (& human) distribution & behavior in & around WEAs
  - aerial survey
  - sea turtle tagging
  - health assessment (?)
- Monitor distribution & behavior during construction & operation





Questions??

