A Review of the Occurrence, Distribution, and Movements of Whale Sharks in the Northern Gulf of Mexico

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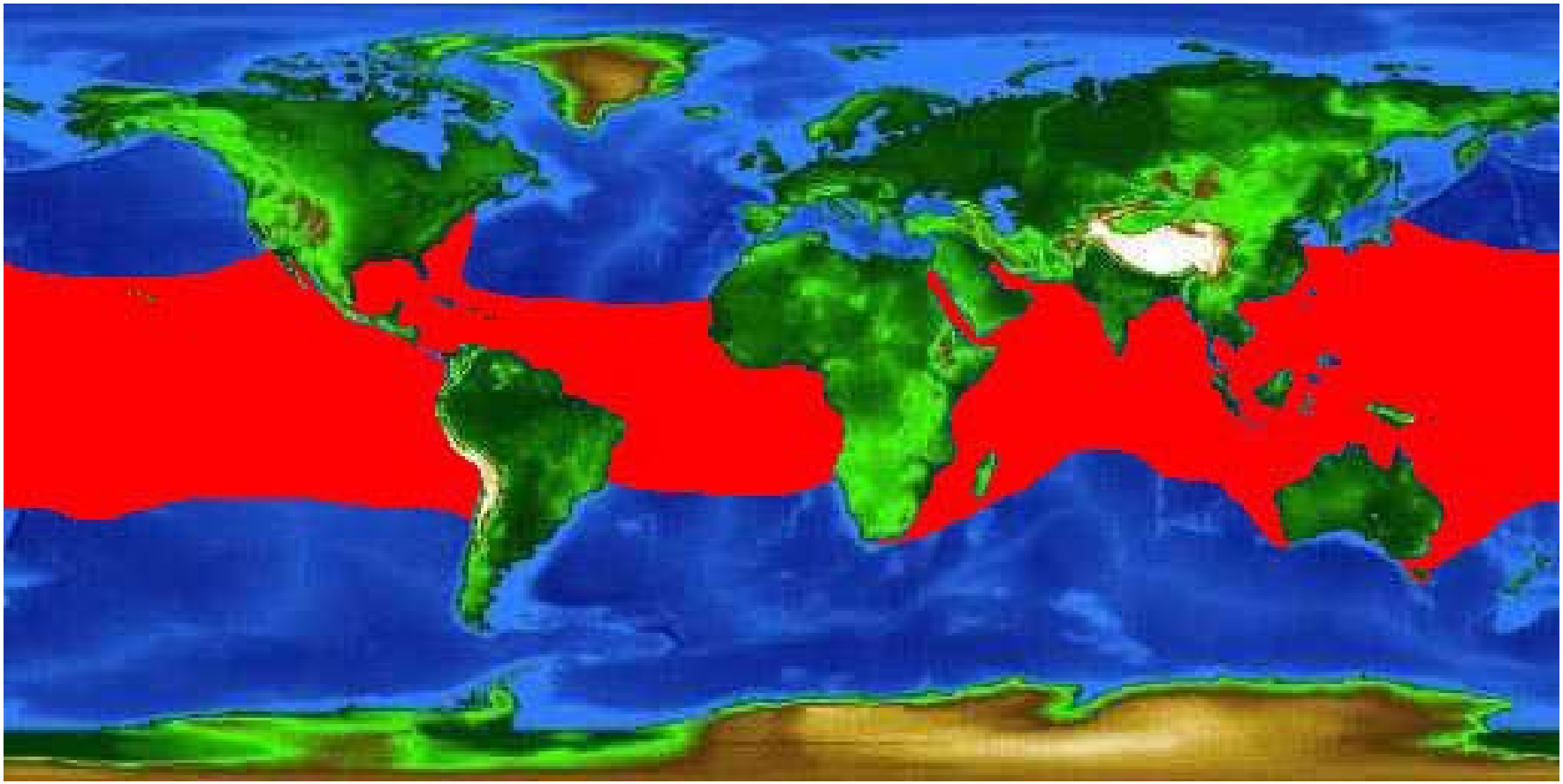
Whale Shark (*Rhincodon typus*)

- Largest fish in the ocean
  - Reach up to 15 m and 18 metric tons
- One of the two known filter feeding sharks in Gulf of Mexico
  - Basking Shark

Photo by B. Groark

Whale Shark Distribution



- All tropical and temperate seas
  - Except Mediterranean Sea

Western North Atlantic

- First reported in the western North Atlantic Ocean in 1902
- First documented in the Gulf of Mexico in 1933
- Reports on the occurrence of whale sharks in the Gulf of Mexico are primarily anecdotal or largely based on isolated observations
  - Gudger 1939, 1941; Baughman 1947, 1950, 1955; Gunter and Knapp 1951; Breur 1954; Springer 1957; Clark and von Schmidt 1965; Hoffman et al. 1981

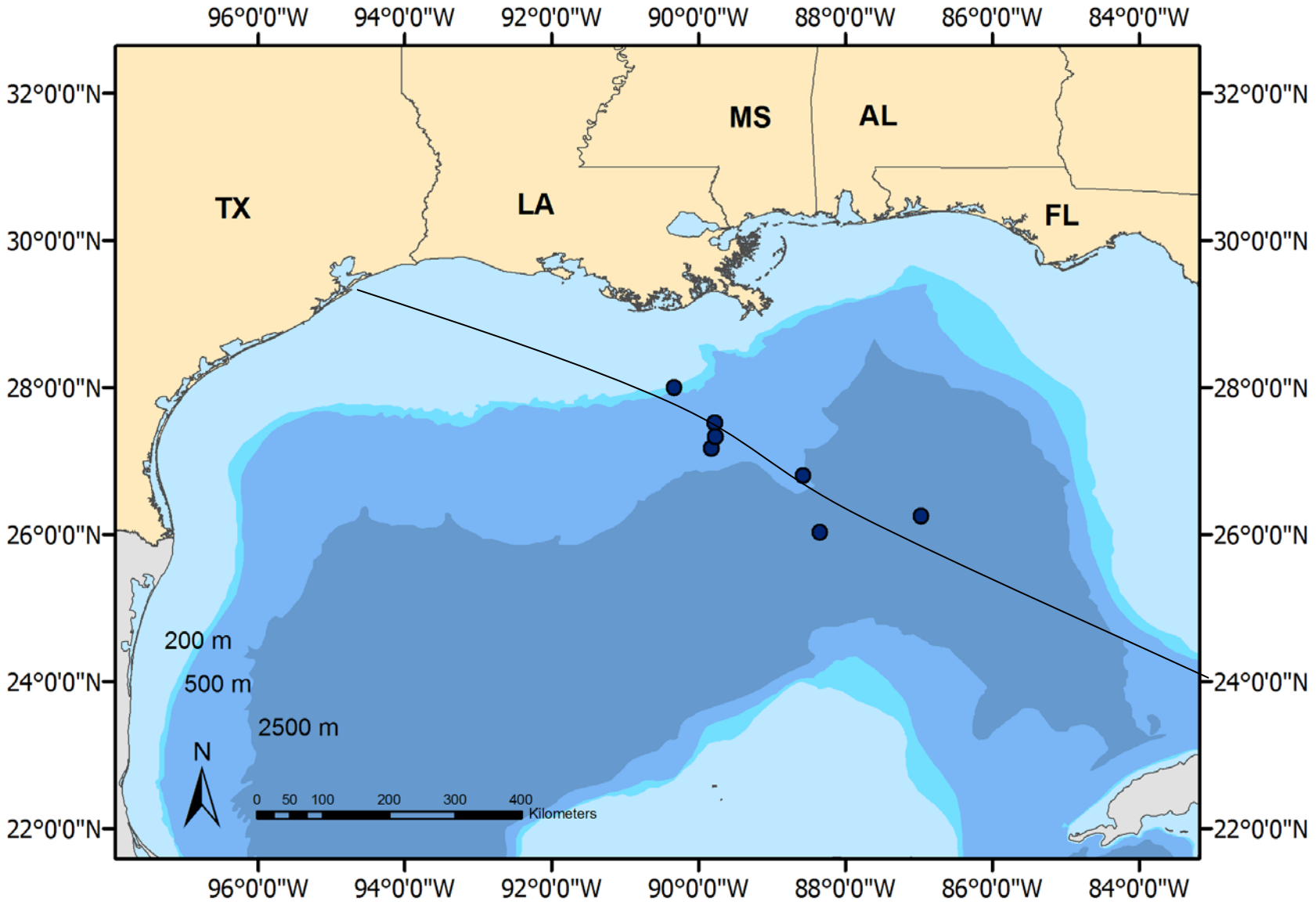
Occurrence in Northern Gulf of Mexico

- Early Accounts (1930s)
  - Reports from commercial mariners traveling from the Straits of Florida to Texas port cities
- NOAA Marine Mammal Surveys (1990s)
  - Aerial survey from Tampa, FL to Brownsville, TX over slope waters
- Gulf Coast Research Laboratory Whale Shark Research Program (2000s)
  - Reports of whale sharks sightings by fishers, offshore workers, pilots, etc.

Early Whale Shark Sightings

- Dr. Eugene Gudger
- First report of whale sharks from Gulf of Mexico
  - 8 sightings totaling 68 sharks
  - 1933 – 1939
- Reports from commercial mariners through the U.S. Hydrographic Office
  - Straits of Florida to Texas port cities

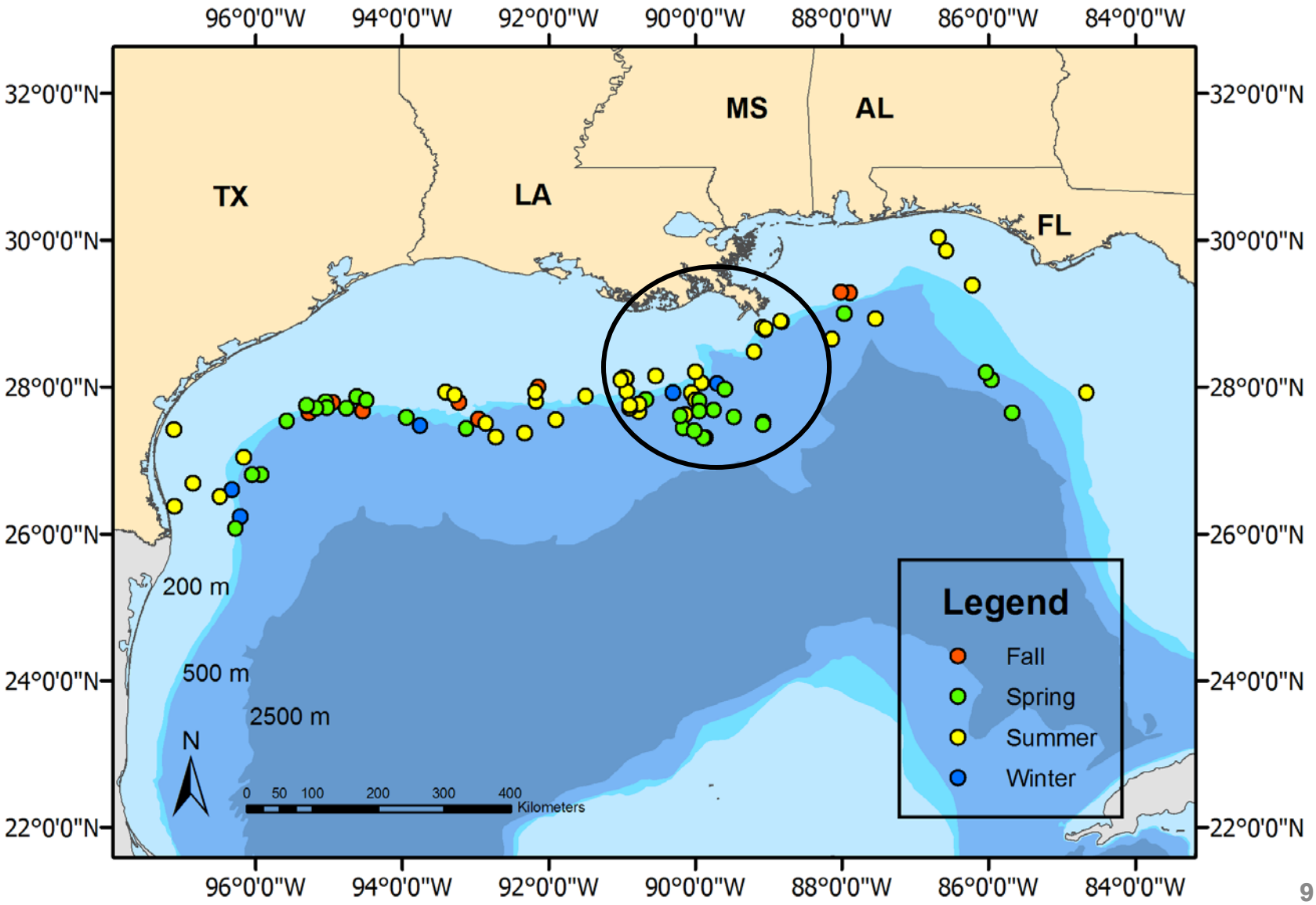
Early Sightings in Gulf of Mexico (1933 – 1939)



NMFS Aerial Survey Results

- Aerial surveys were conducted in the northern Gulf of Mexico between 1989 – 1998
- 119 whale sharks were observed during 81 sighting events
- Most abundant during summer
- Highest abundance occurred in a region southwest of the Mississippi River Delta
  - Attributed to the large amounts of nutrients discharged by the Mississippi River into the northern Gulf of Mexico

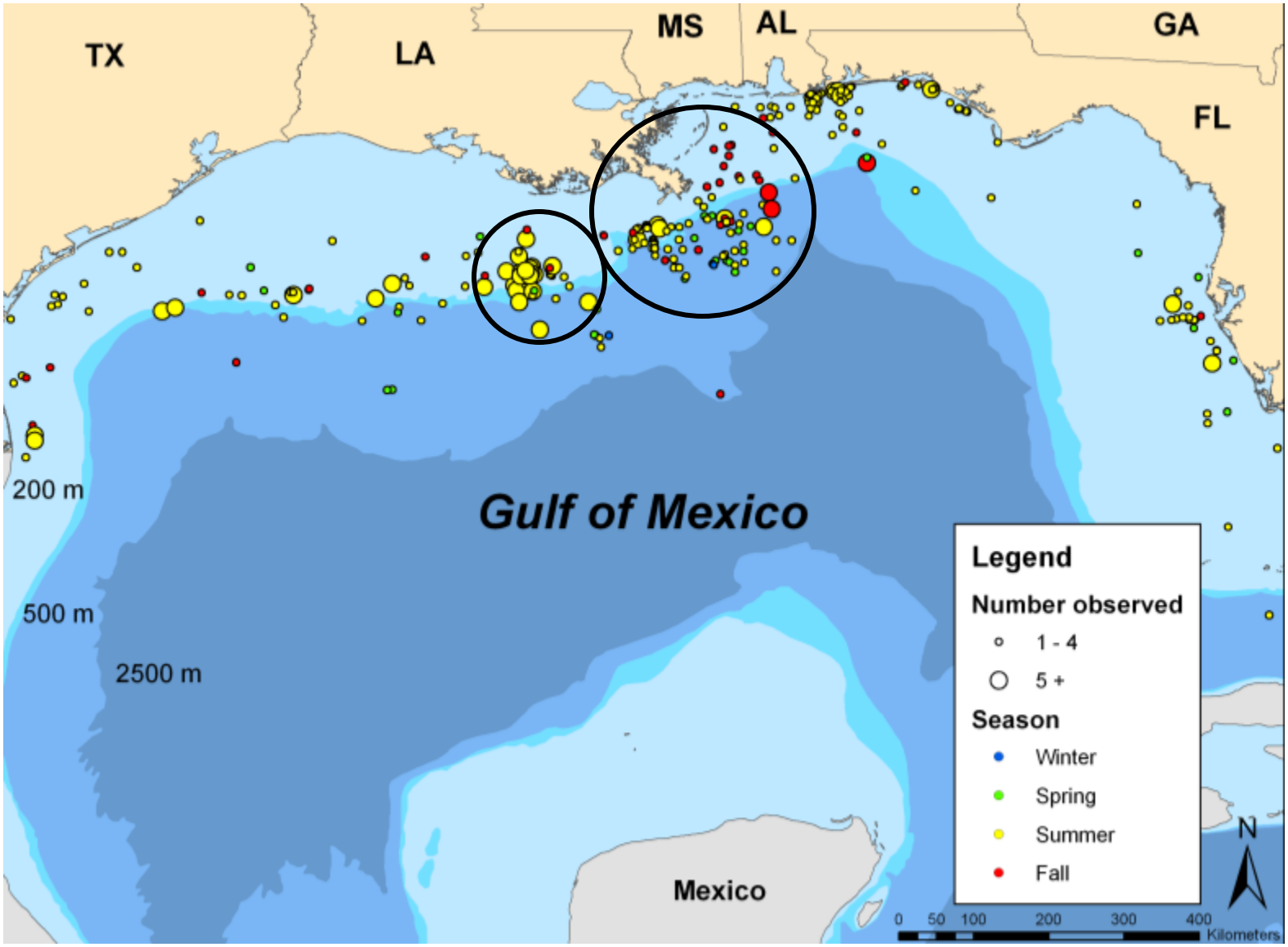
NMFS Sightings Locations



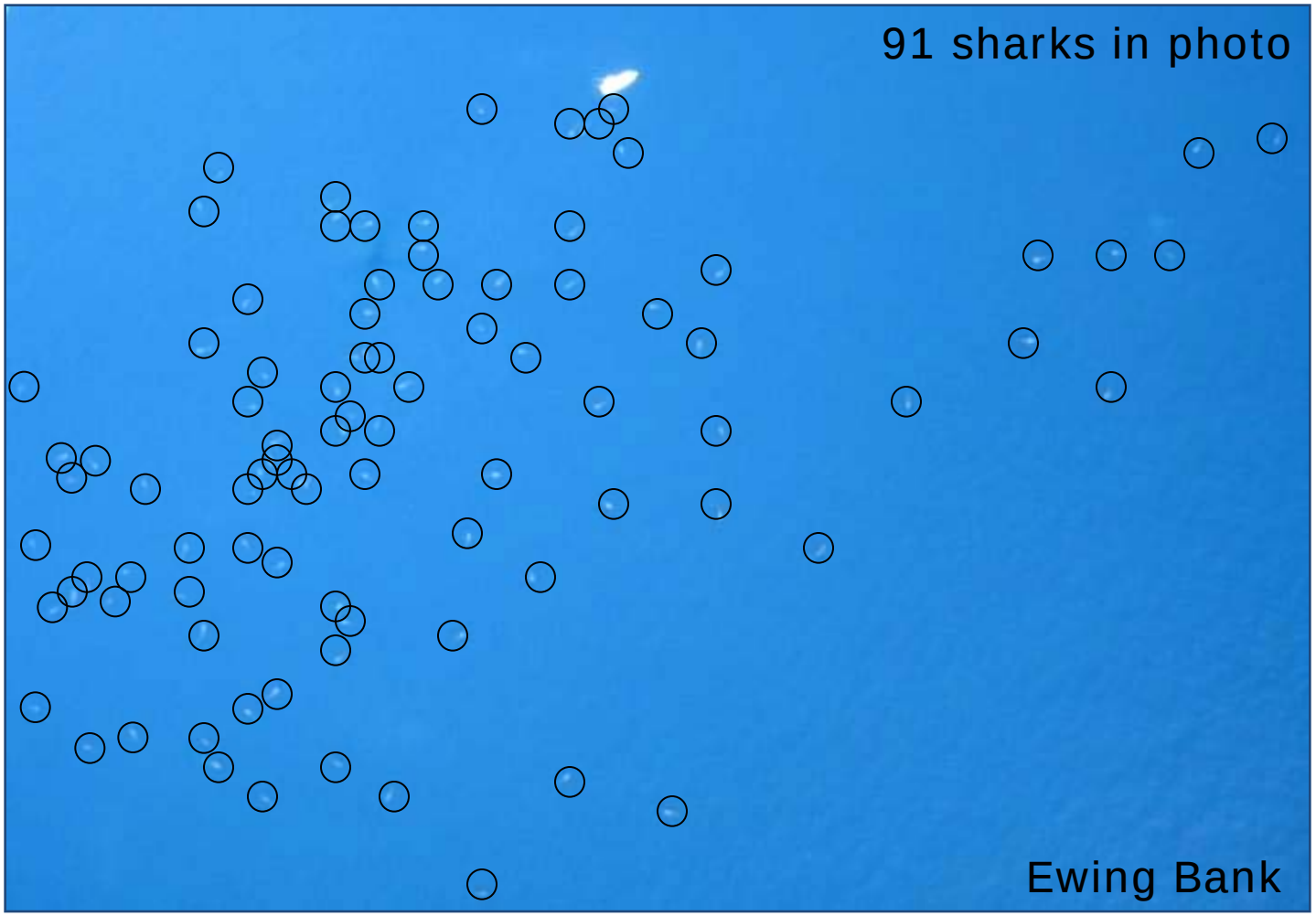
Northern Gulf of Mexico Whale Shark Sightings Database

- 2003 to present
- Over 400 sightings of whale sharks
- Summer – fall
- 130 accounts of aggregations
  - 2 – 200 sharks

Whale Shark Occurrence 2003 – present

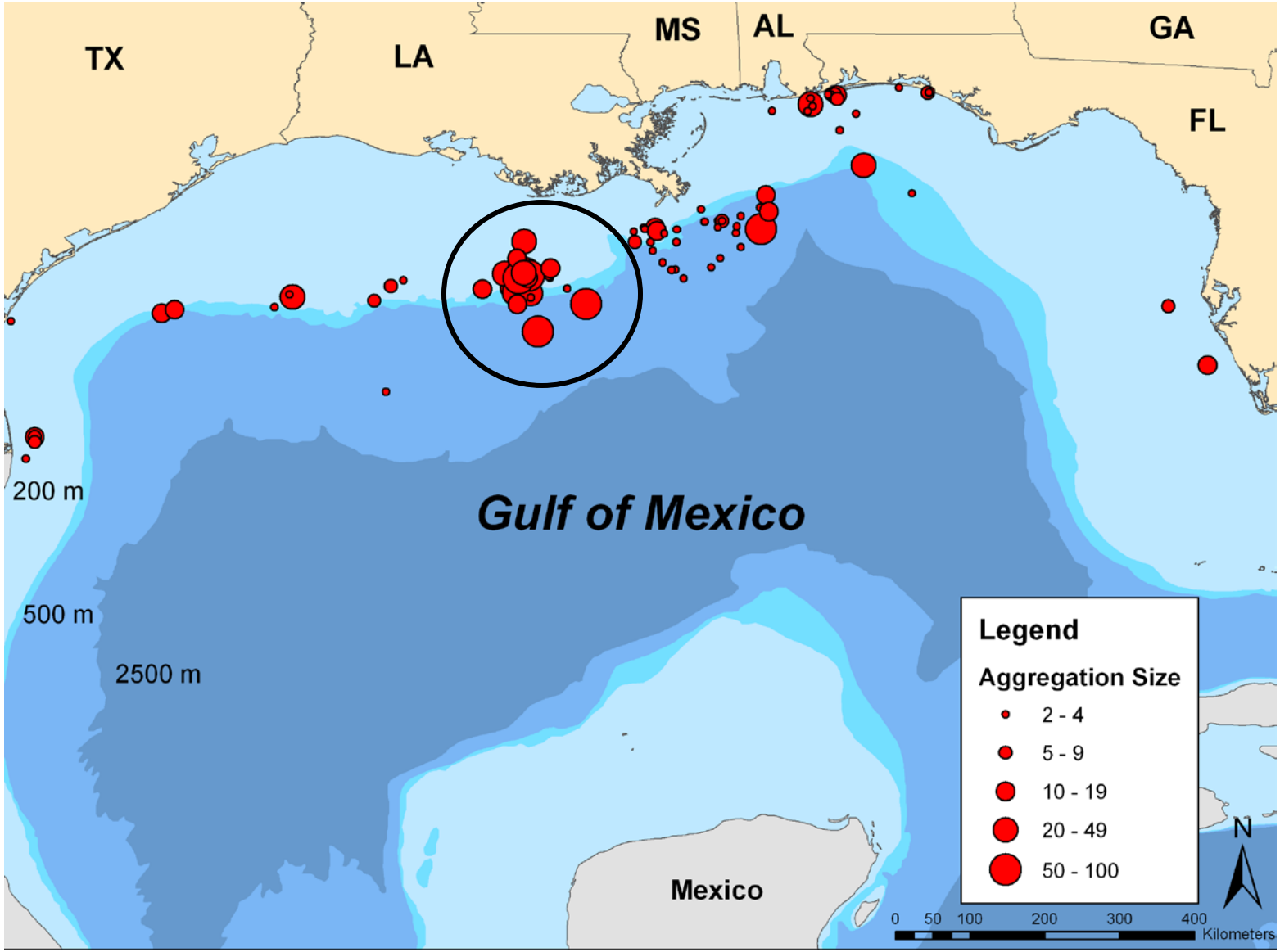


Whale Shark Aggregations



- Over 130 sightings of aggregations
  - 2 to 200 sharks

Aggregation Locations
2003 – 2010



Aggregation Encounters

- June 26, 2006
  - 16 sharks at Sackett Bank
- June 11, 2009
  - 25 – 30 shark at Ewing Bank
- June 22, 2010
  - >100 sharks at Ewing Bank
- Surface feeding on fish eggs
  - 1st documentation in Gulf of Mexico

2010 Aggregation Encounter

- June 22, 2010
- Ewing Bank
- Dr. Sylvia Earle
- 100+ whale sharks
  - Deployed sat tags
  - Collected DNA samples
  - Obtained ID photographs
    - Added 44 sharks to the Ecocean Library
  - Collected plankton sample
    - Genetically ID eggs

Fish Eggs at Surface

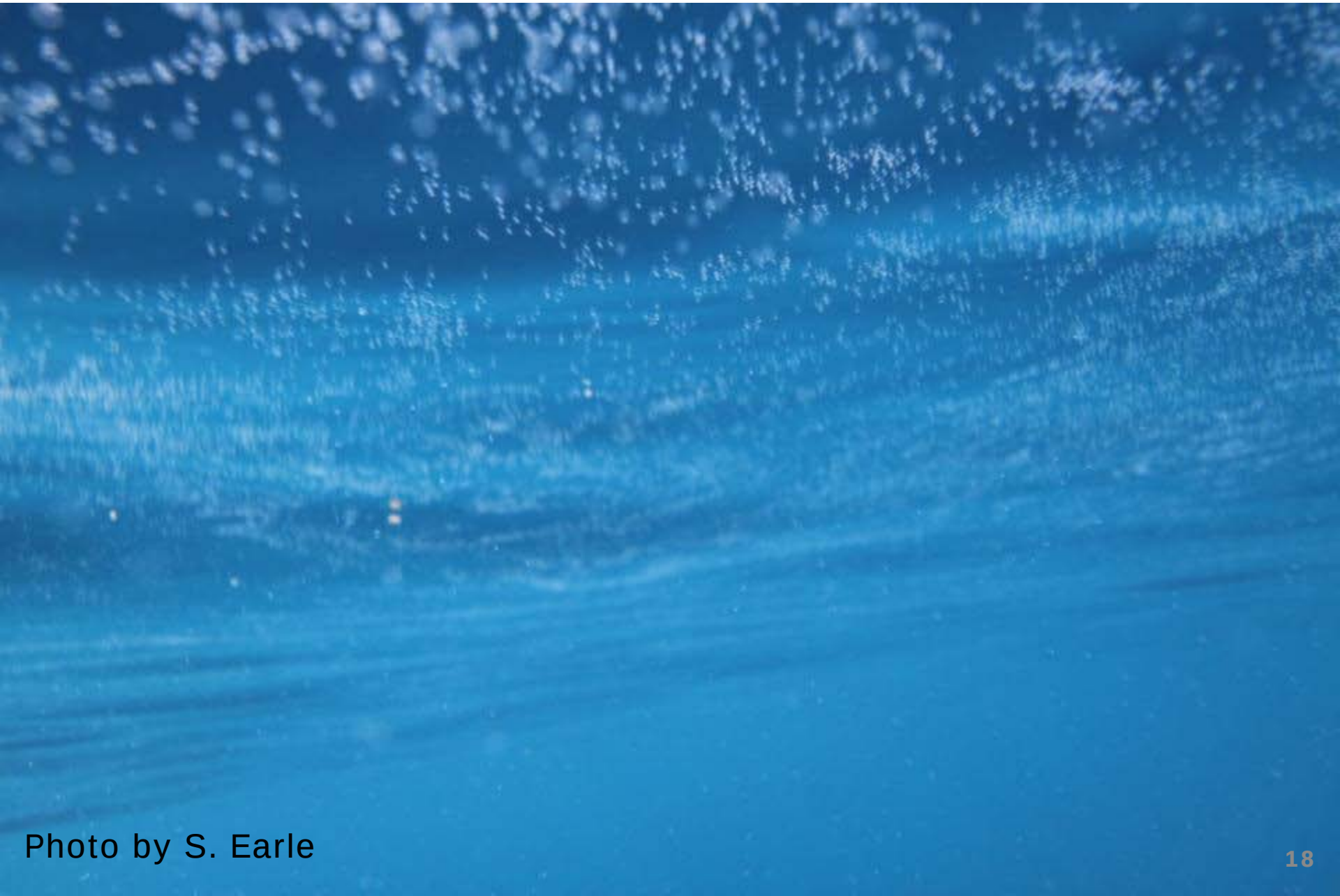
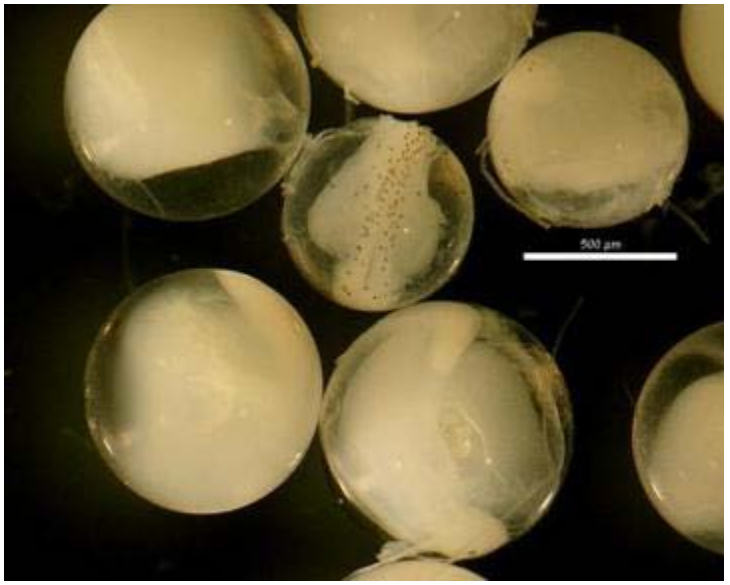


Photo by S. Earle

What's on the Menu?

- Little Tunny eggs (*Euthynnus alletteratus*)
  - ➢All 3 encounters in the northern GOM
  - ➢One encounter off Holbox, MX

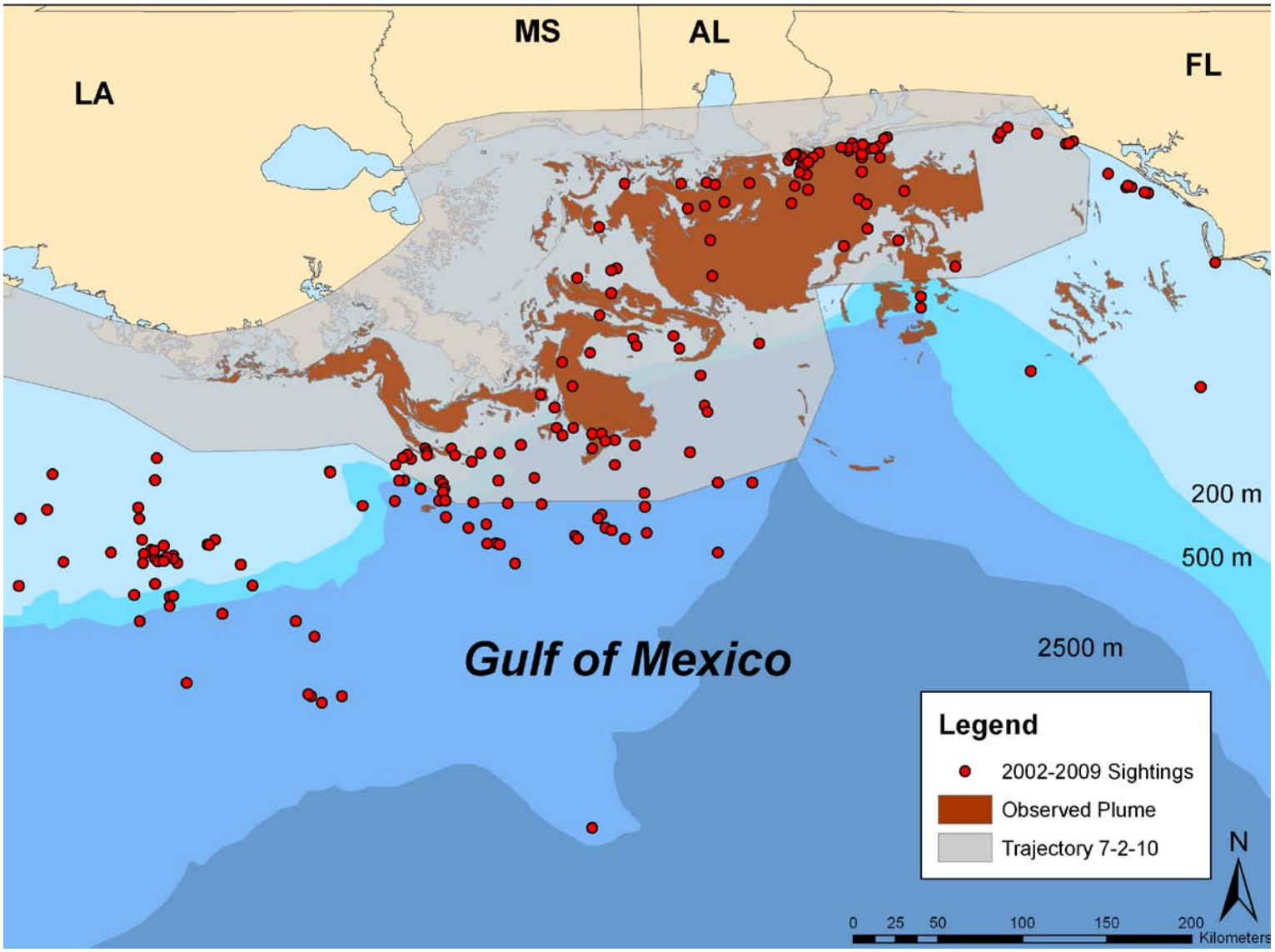


Feeding Aggregations

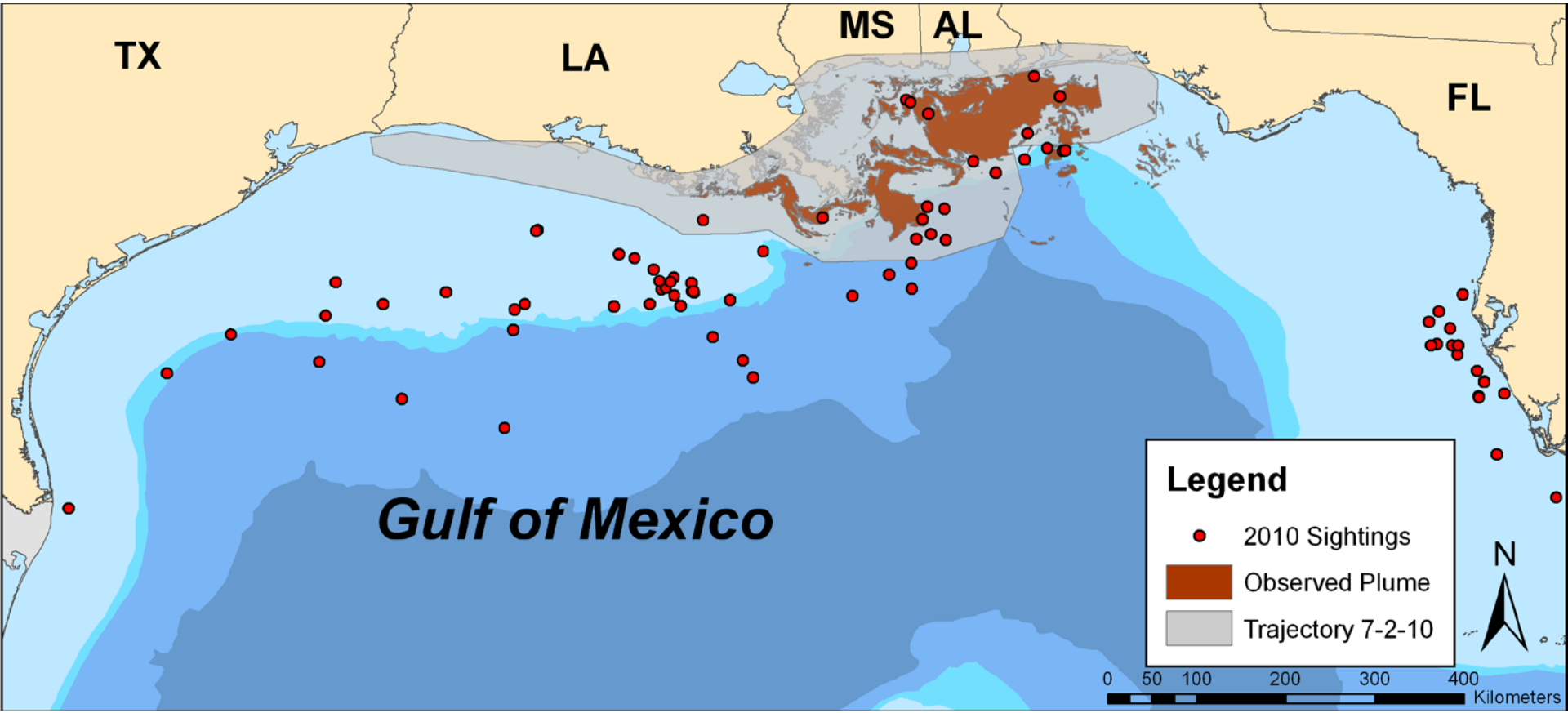
- How important are short-term localized productivity events?
  - Spawning events, convergence zones, plankton blooms, etc.
- How are whale sharks finding these areas?
  - Olfaction, auditory cues, predictable events, etc.
- Were they able to detect oil and avoid the northcentral Gulf region during the oil spill?

Potential Impacts of the *Deepwater Horizon* Oil Spill

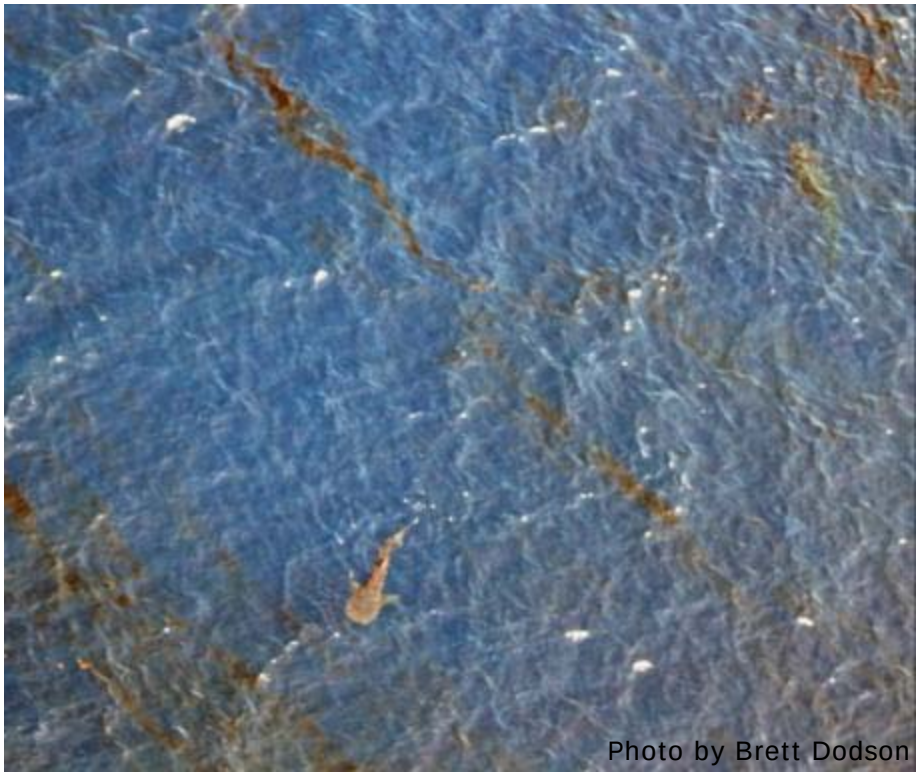
Whale Shark Sightings 2003 – 2009



2010 Sightings

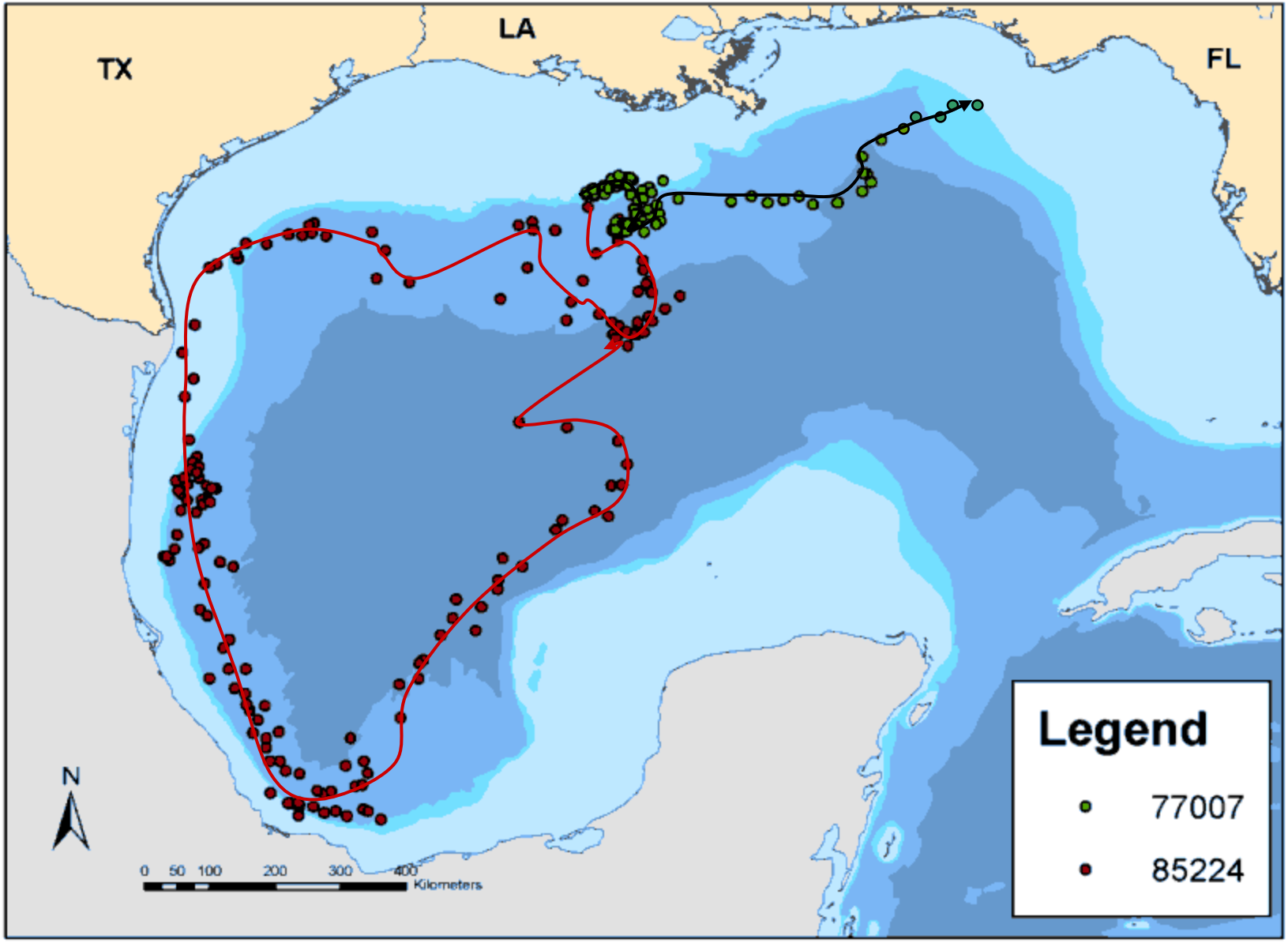


Sharks Observed near Oil

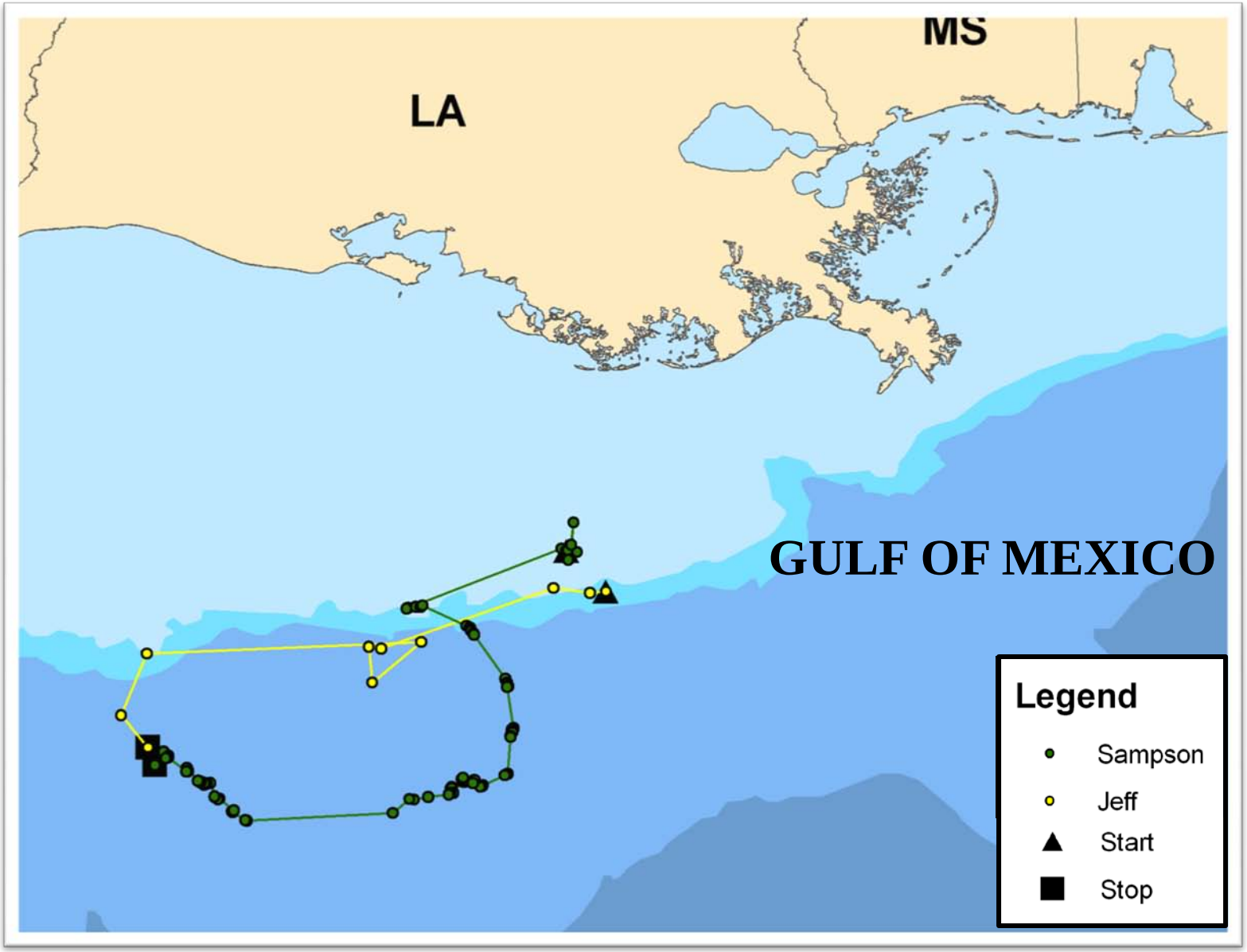


- 4.2 miles from *Deepwater Horizon* 6/27/10
- Three sightings totaling five sharks

2009 Movements



2010 Movements



2011 Research Plan

- Monitoring occurrence and distribution in region
  - Online sightings form
  - Aerial surveys
  - At sea research
- Investigating movement patterns
  - Satellite position tags (SPOT)
  - Pop-up satellite archival tags (PSAT)
  - Ecocean – photo-identification library

Acknowledgments

- Capt. Underwood and crew of “Norman B”
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