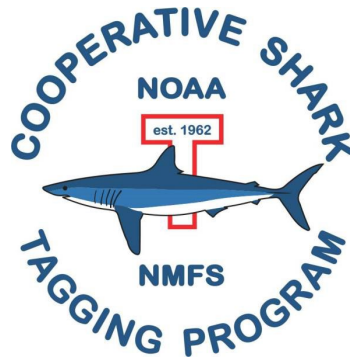




NOAA
FISHERIES



Cooperative Shark Tagging Program

Camilla T. McCandless

Lead, Apex Predators Program
Population Biology Branch



Richard S. McBride

Chief, Population Biology Branch
Northeast Fisheries Science Center



February 3, 2021

Apex Predators Program

Life History Research

- Age and growth
- Reproduction
- Feeding ecology
- Distribution and migrations
- Abundance

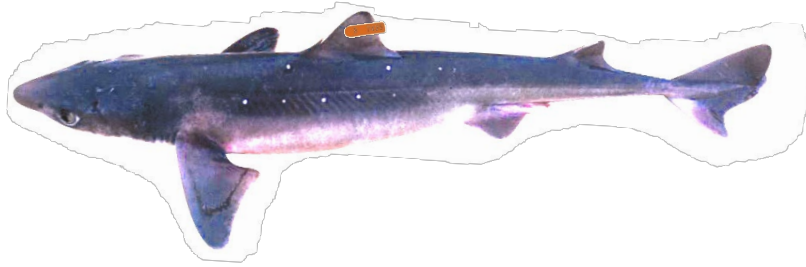
Research Platforms

- Sport fishing tournaments
- Other fishery-dependent sampling
- Fishery-independent surveys
- Cooperative Shark Tagging Program

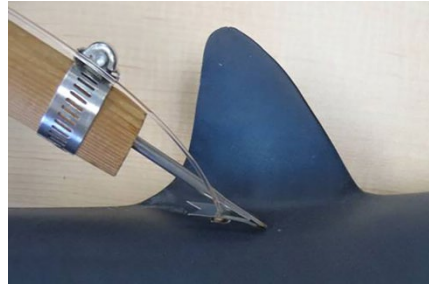
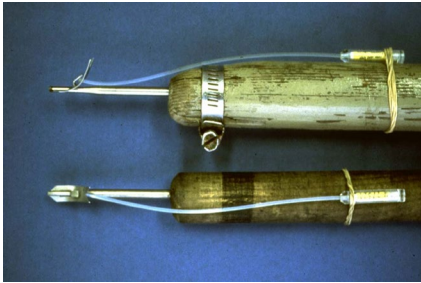


Primary tag types used

- Rototag

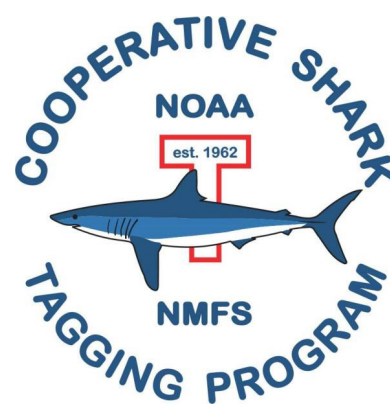


- M-tag



Information from Conventional Tag and Recapture Data

- Distribution, movements, and migrations patterns
- Stock structure
- Longevity
- Validate age and growth



Cooperative Shark Tagging Program

NOAA FISHERIES

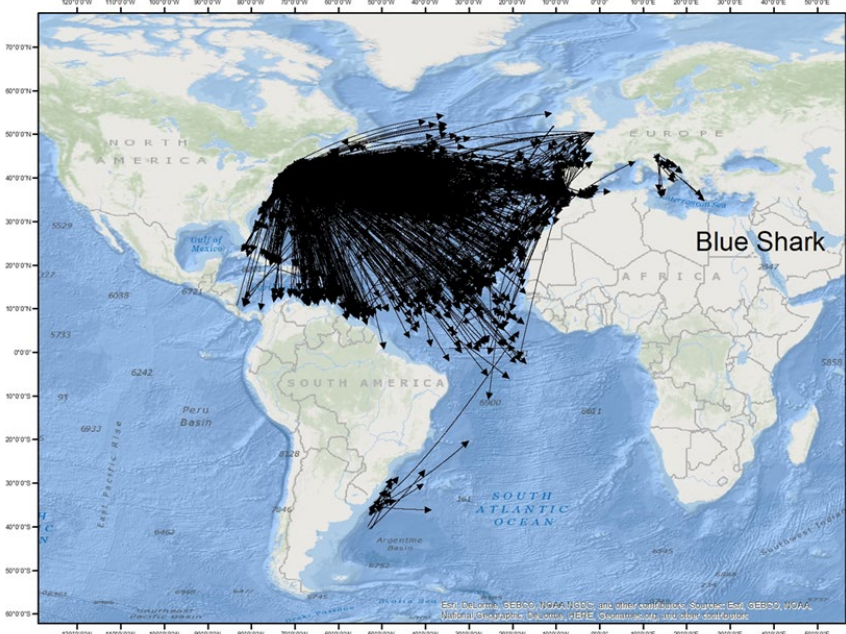
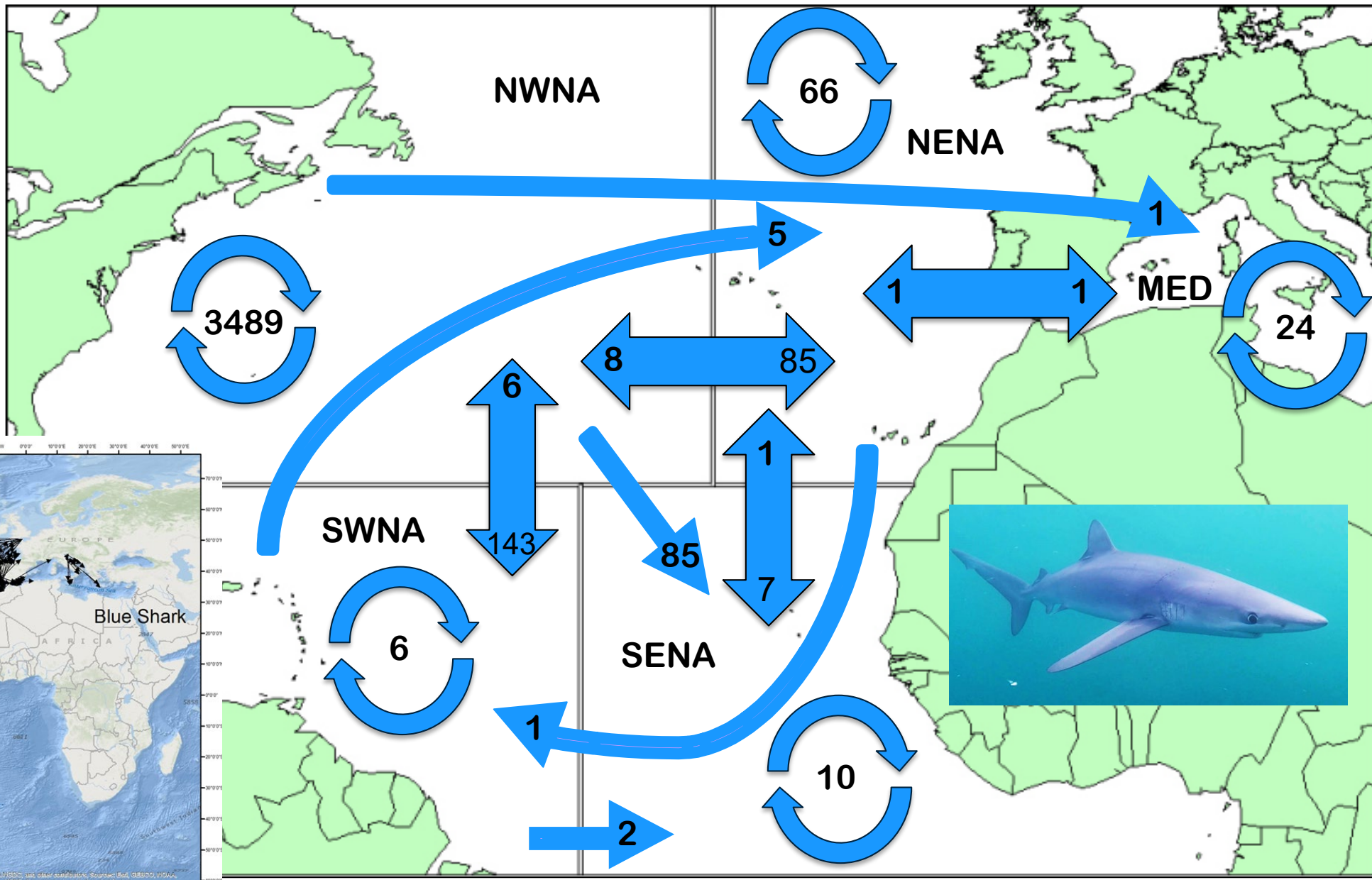
Started in **1962** More THAN **300,000** TAGGED

More THAN **18,000** RECAPTURED

The infographic features a green and blue color scheme. It includes silhouettes of sharks and a photograph of a shark's dorsal fin with a tag. The text is presented in large, bold, sans-serif fonts.

Blue shark transboundary movements

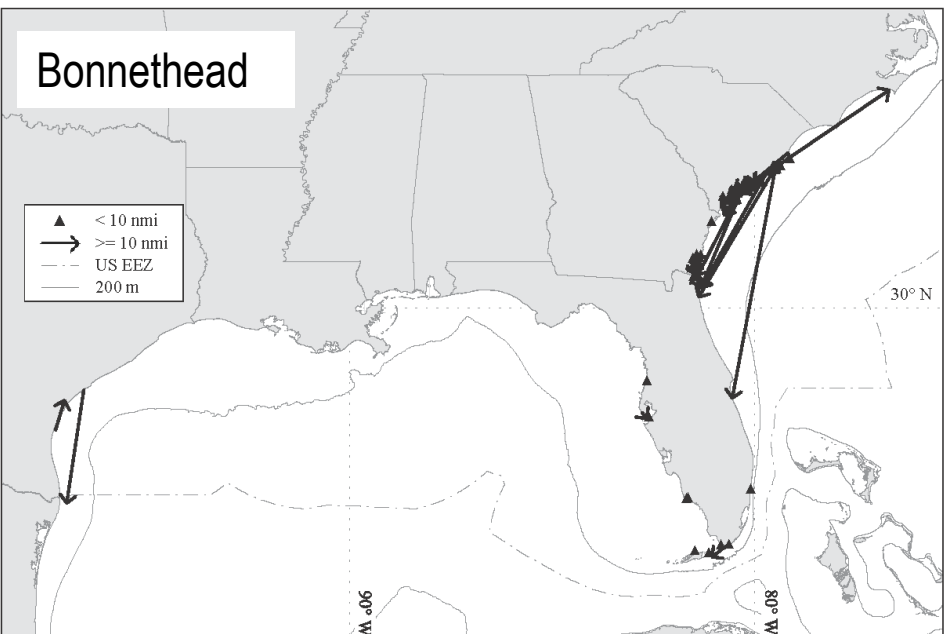
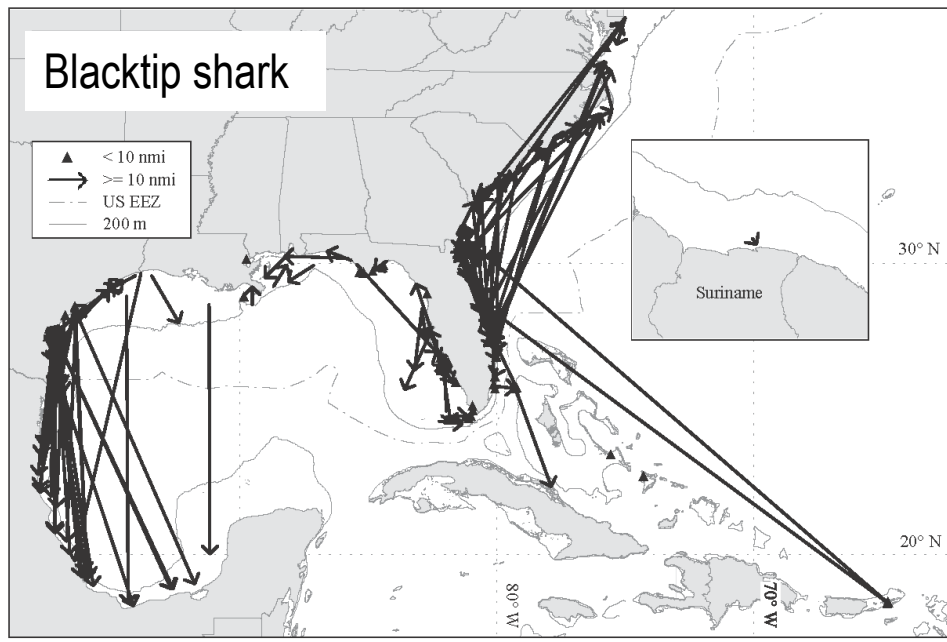
- >125,000 tagged
- >10,000 recaptured
- Single stock in North Atlantic



Kohler & Turner (2008)

Stock structure

- Blacktip shark
 - >13,500 tagged
 - >450 recaptured
 - **separate stocks**
- Bonnethead
 - >5,500 tagged
 - >250 recaptured
 - **separate stocks**

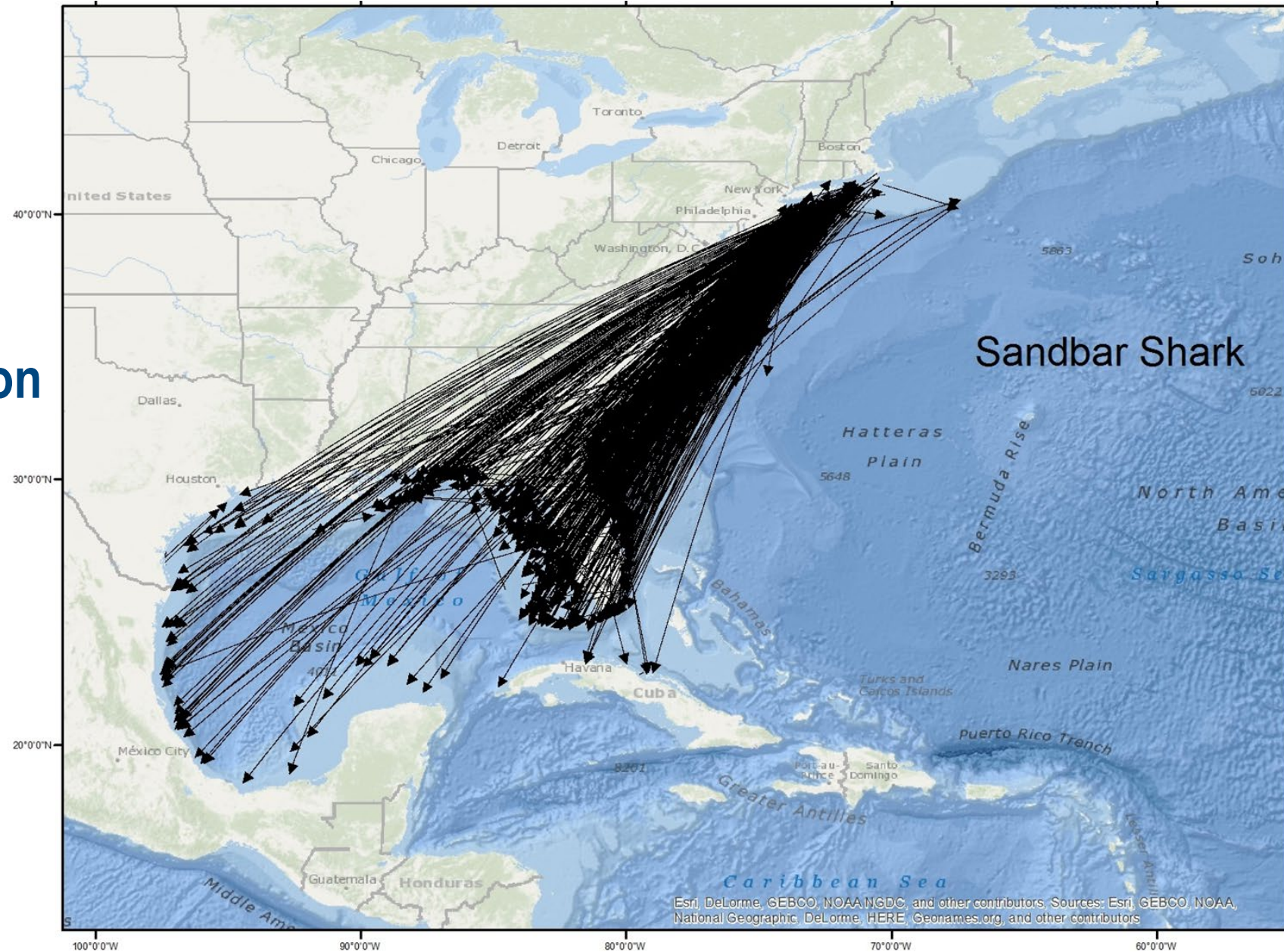


Stock structure

- Sandbar shark
 - >43,500 tagged
 - >2000 recaptured
 - **one stock**

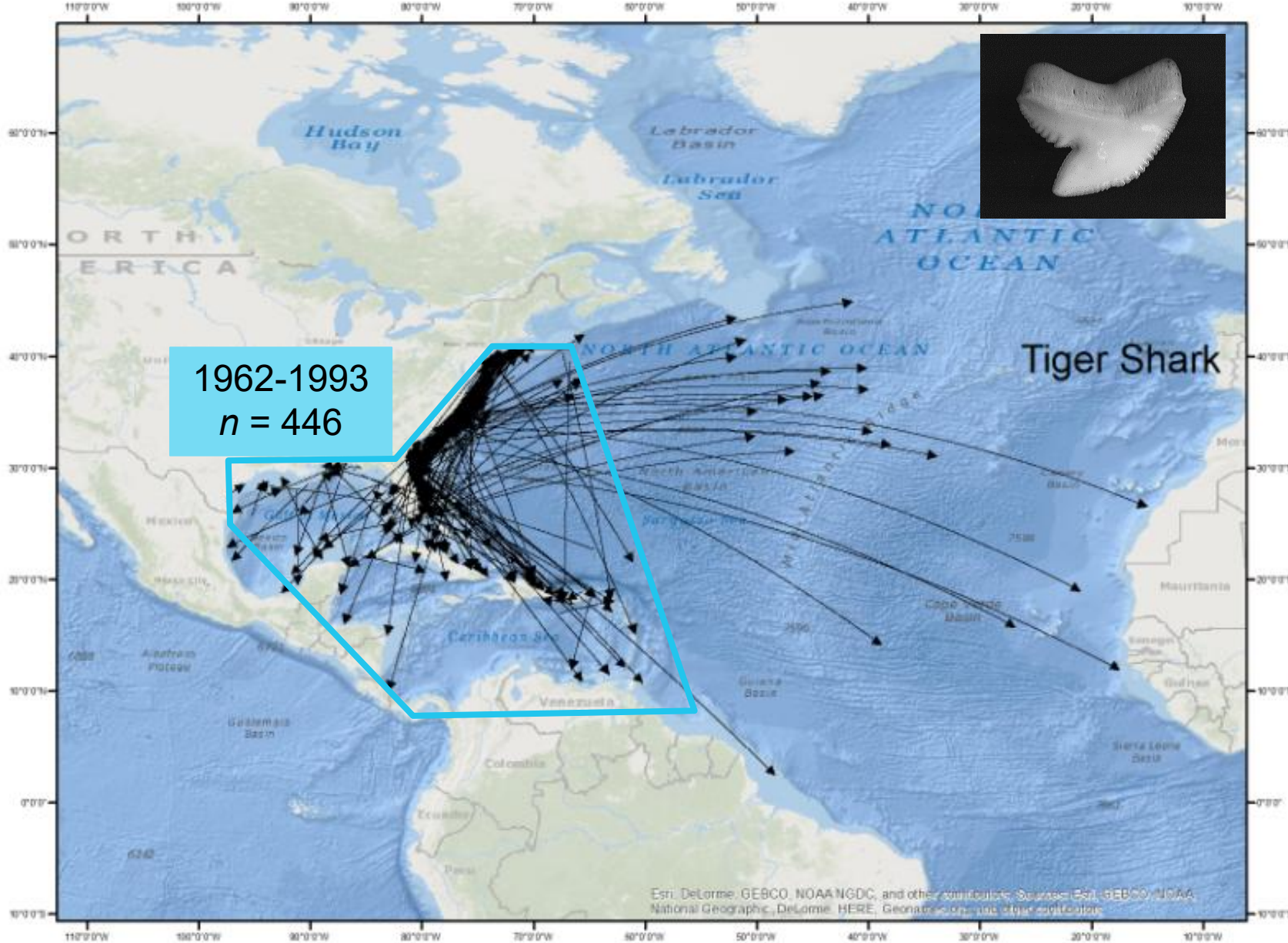
Longevity and age validation

- Sandbar shark
 - Longest tag at liberty = 27.8 years



Tiger shark trans-Atlantic movements

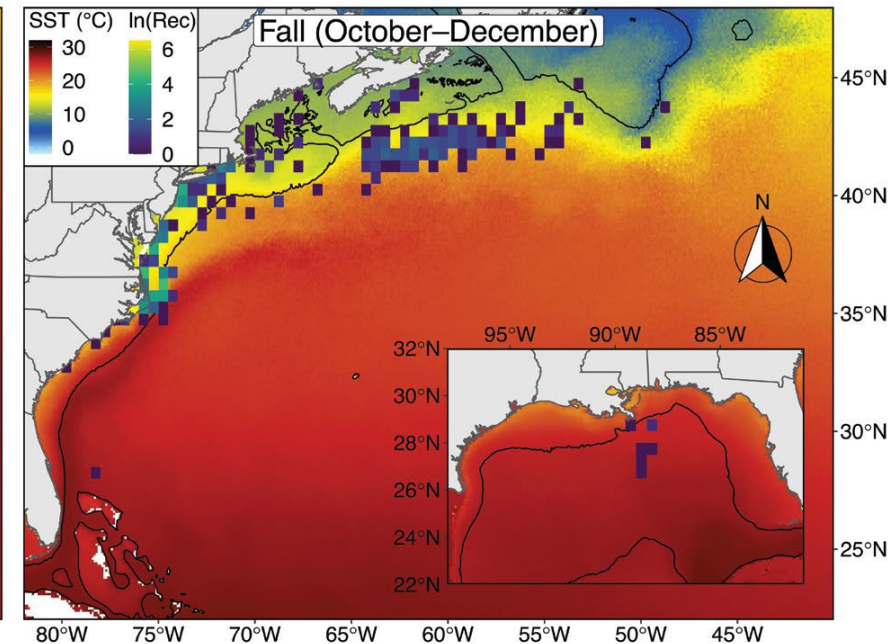
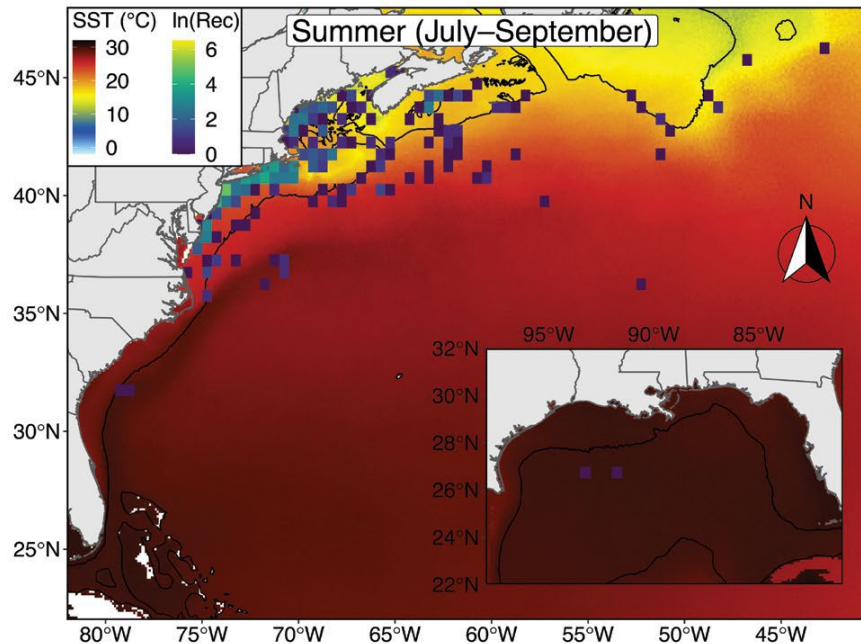
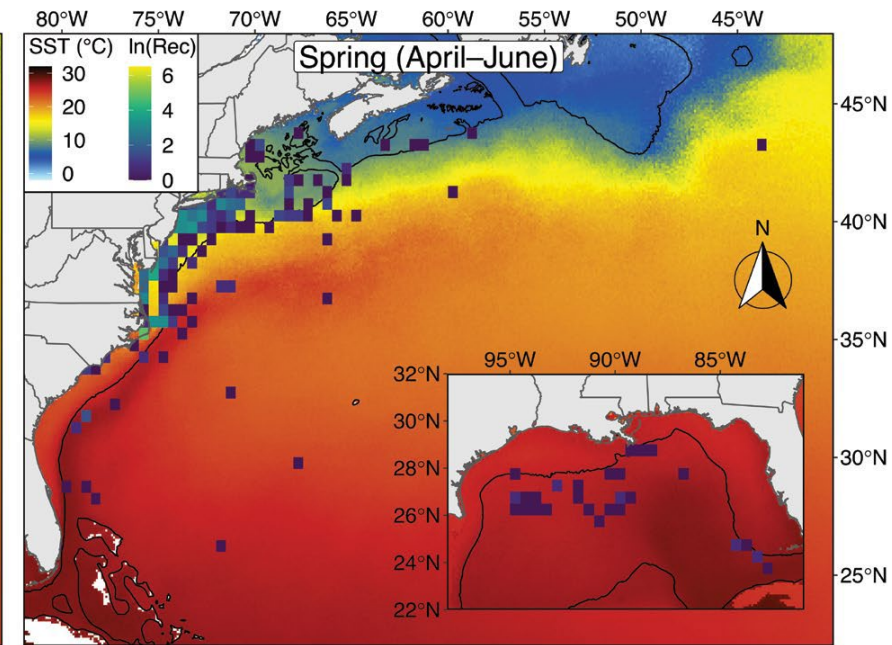
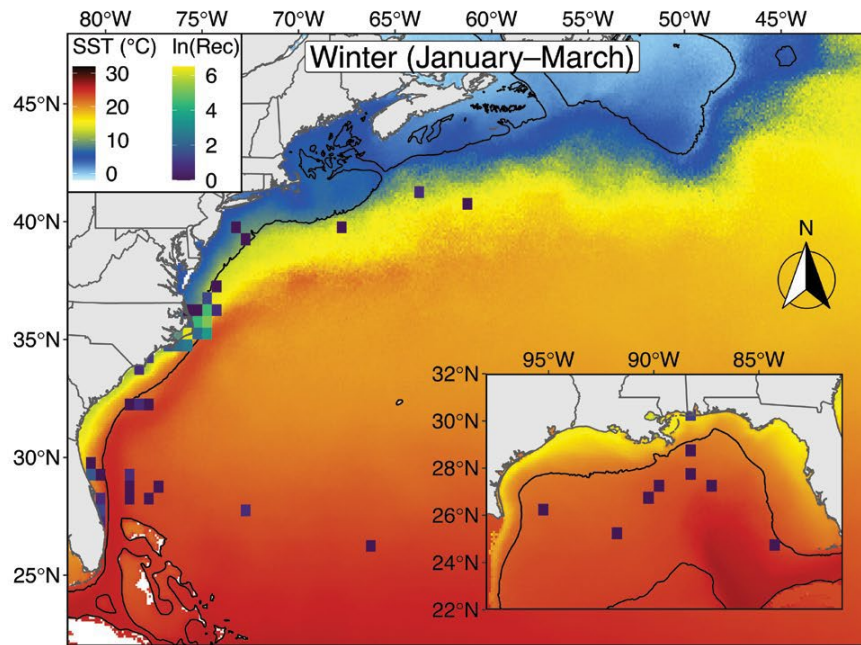
- >11,000 tagged
- >800 recaptured
- 1962-1994 nothing crossing Mid-Atlantic Ridge



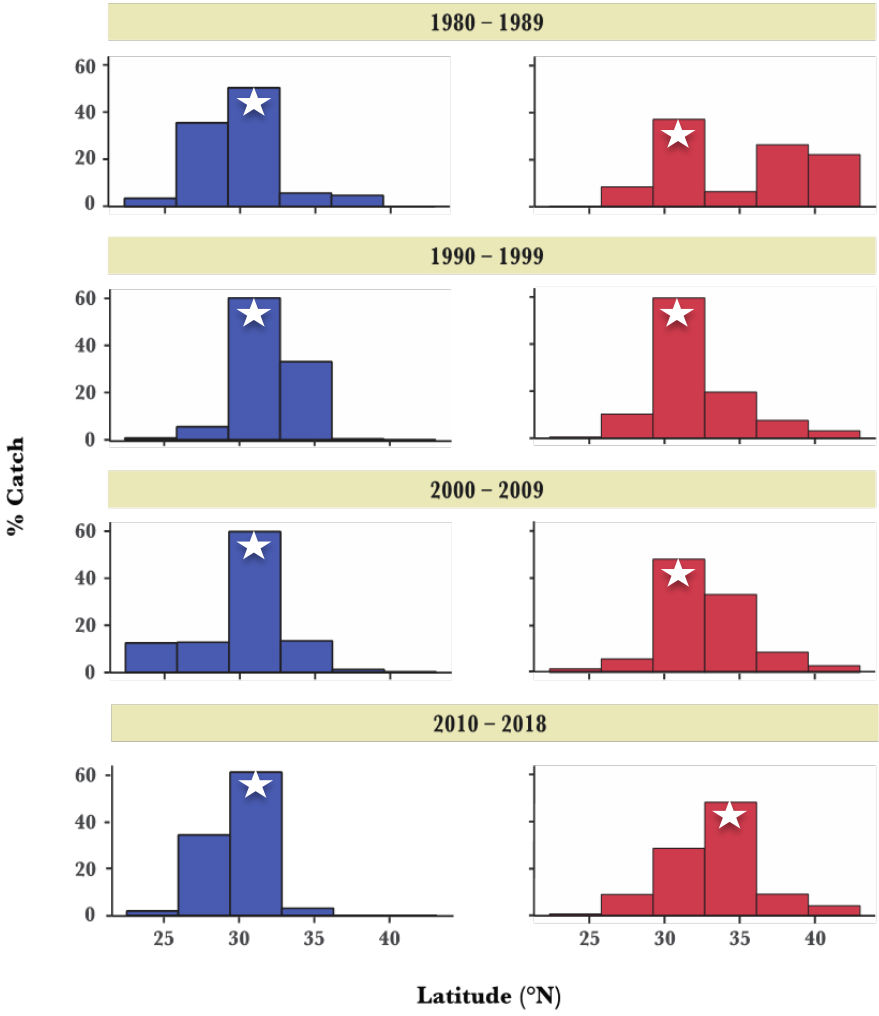
Common thresher

Seasonal distribution

- Kneebone et al. 2020
- Fishery dependent data
- SST
- Towards EFH update

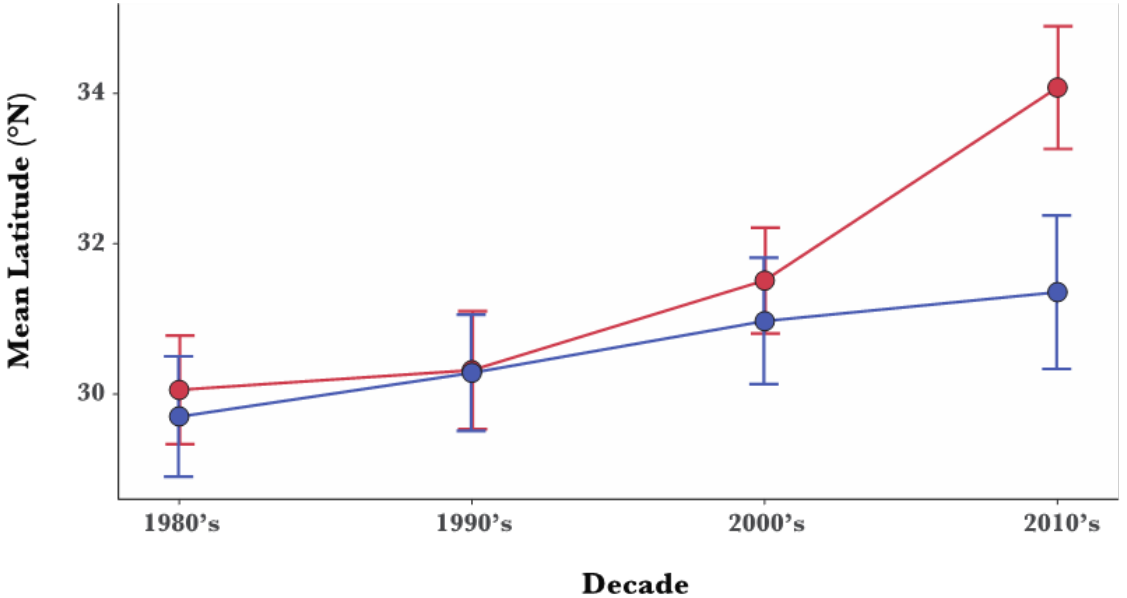


Tiger shark core area off Atlantic Coast using tag and recapture data

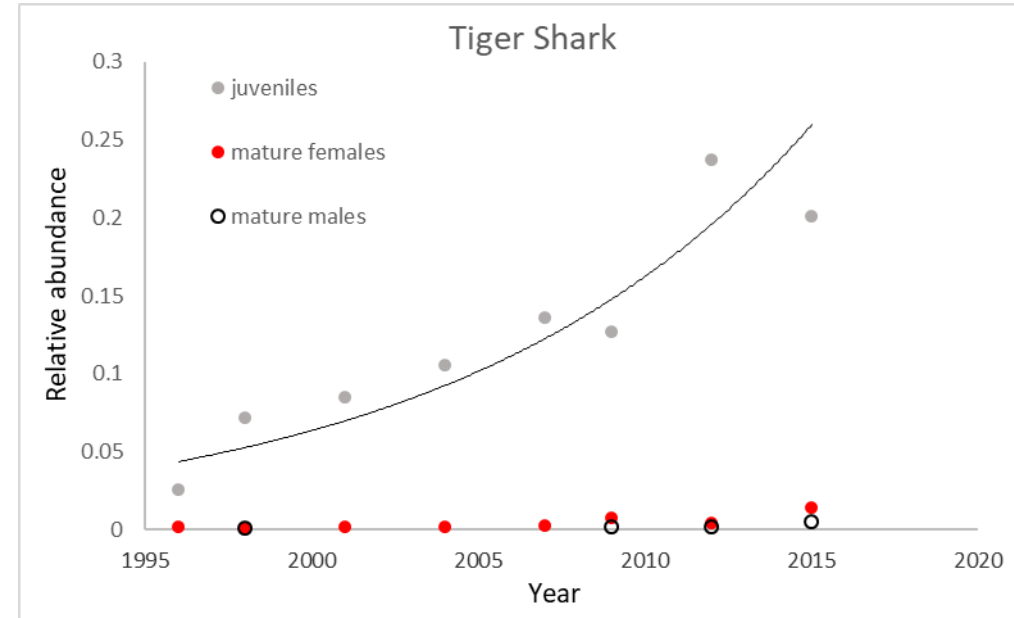
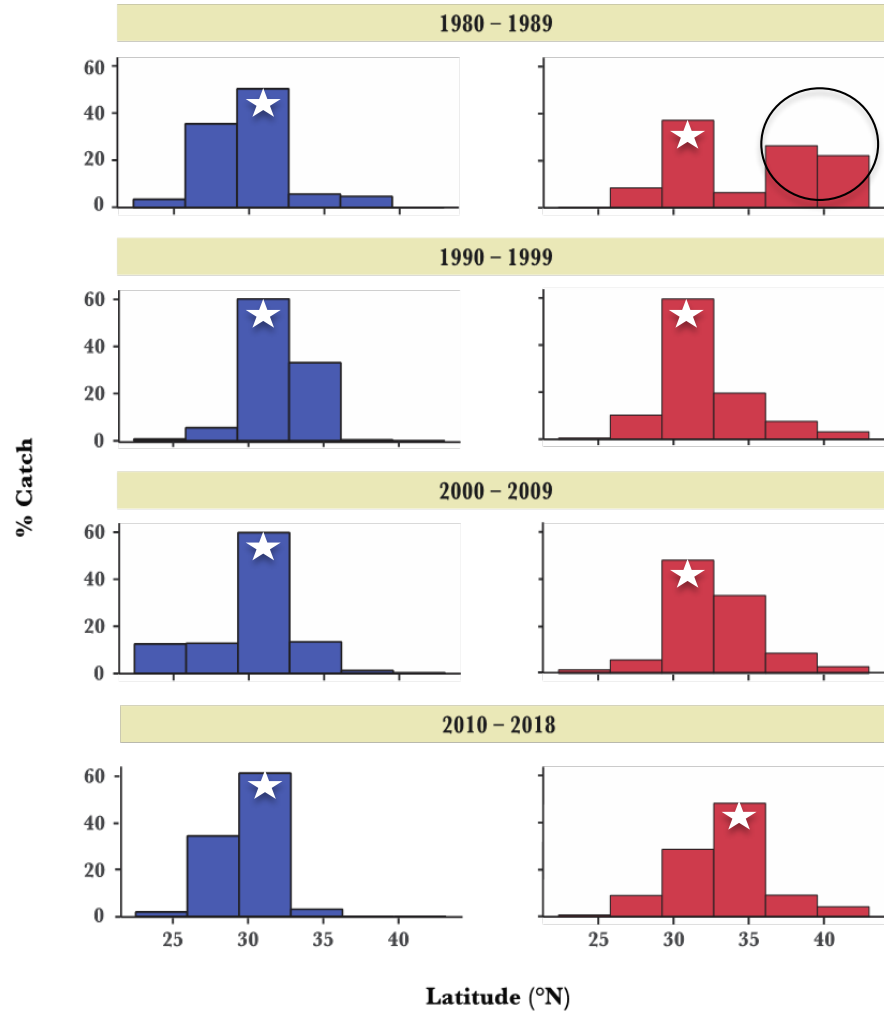


Season

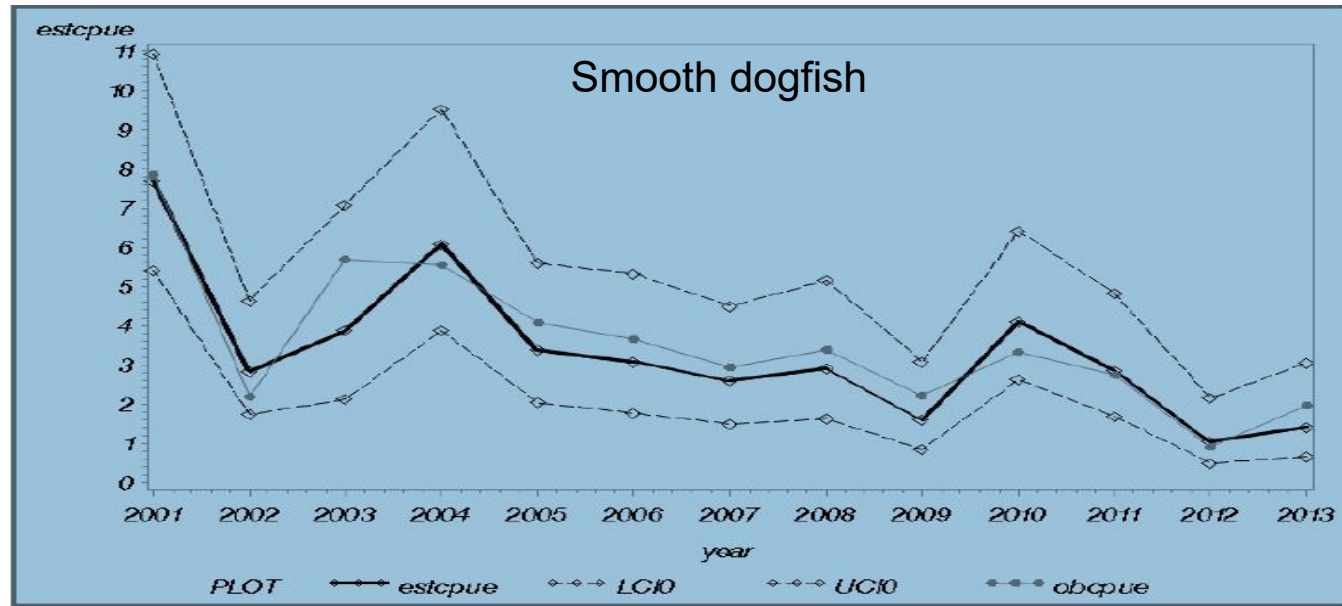
- Cold (November – April)
- Warm (May – October)



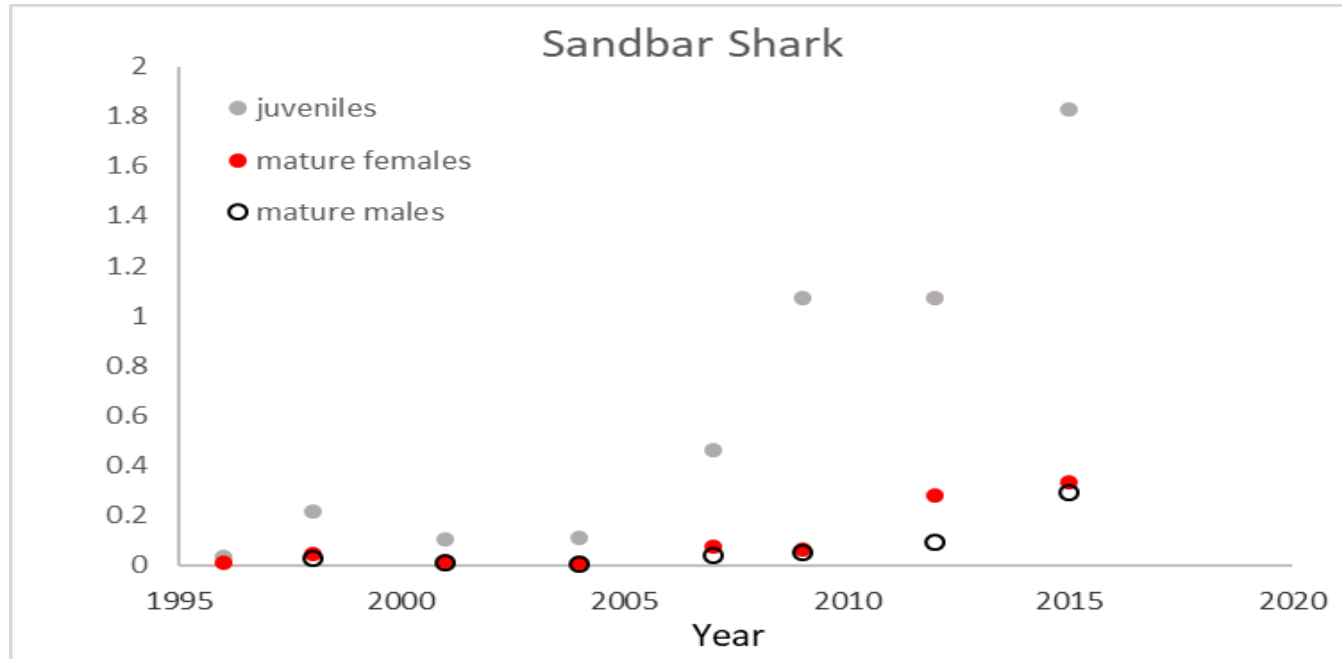
Abundance may also play a role



Fishery independent survey and tagging data in Delaware Bay

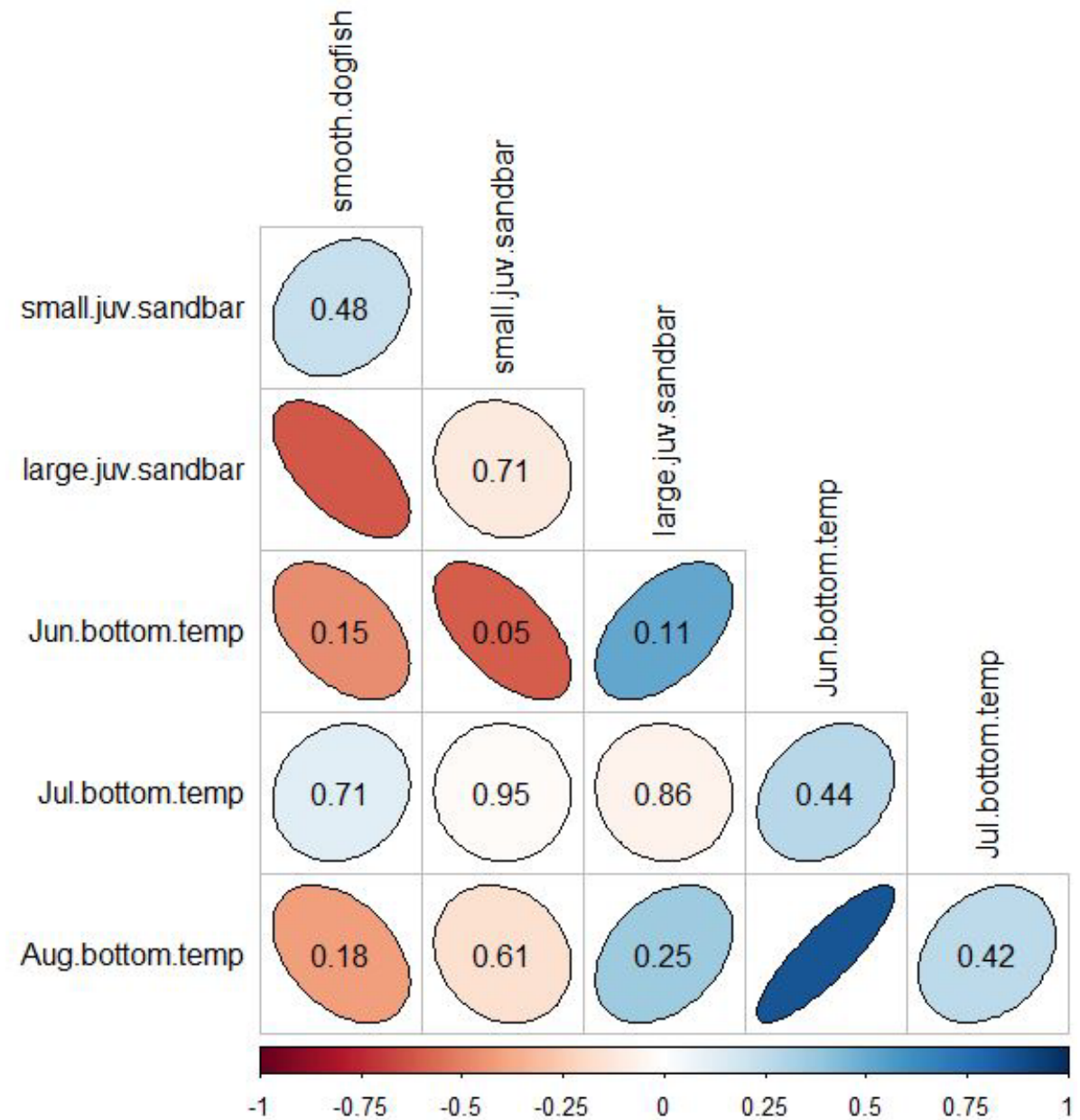


Fishery independent survey data along Atlantic coast



Delaware Bay correlation analysis of:

- Smooth dogfish relative abundance
- Small juvenile sandbar shark relative abundance
- Large juvenile sandbar shark relative abundance
- June bottom water temperature
- July bottom water temperature
- August bottom water temperature



Post-release survivorship

Sandbar shark (Spargo 2001)

- Physiological recovery 6-10 hours (captive); up to 20 min fight times
- Conventional tag recaptures up to 1 year after study

Sand tiger (Kneebone et al 2013)

- Physiological recovery 12-24 hours (captive); 3 min fight times
- Conventional tag recapture 2 years after study
- Gut hooking additional stress reduced long-term survival (acoustic)

Volunteers must use safe release practices that minimize handling

- Leave the shark in the water and remove the hook when possible
- Do NOT drag the shark on dry sand or on a boat deck
- Treat the shark as gently as possible (avoid gills, do not sit on them)
- Release prohibited species immediately

The CSTP makes a difference... to science, management, and conservation

In one participant's words:

“the CSTP has been instrumental in instilling a desire in recreational anglers to learn about proper identification, conservation, and safe handling techniques of sharks...

“many anglers have become so passionate about sharks and tagging that they ... regularly visit schools, fishing clubs, and other organizations to help spread the word about shark tagging, biology, and conservation...

“countless sharks have been released rather than being boated simply because anglers had the option and the strong desire to tag their catch...

“And since the CSTP is not involved in the regulatory end of things, it has allowed anglers a refreshing opportunity to engage and work with NMFS on a positive note.”



NOAA
FISHERIES

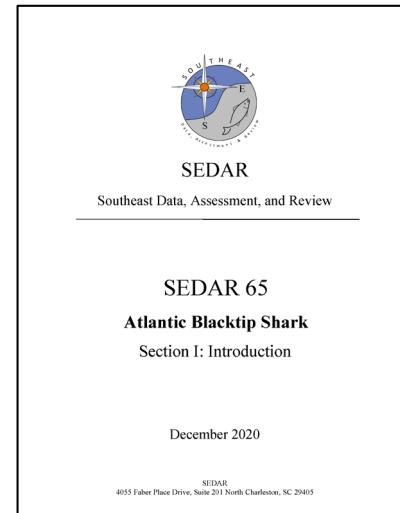
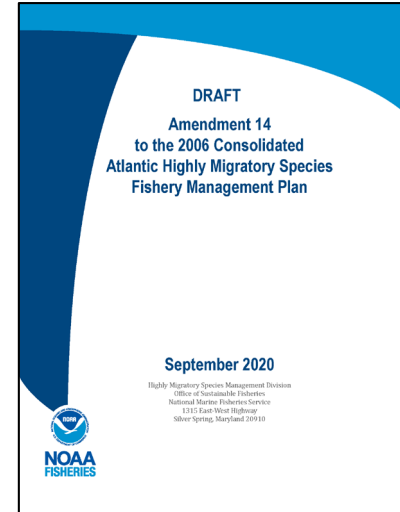
Office of
Sustainable
Fisheries

HMS Shark Management Update

Atlantic Highly Migratory Species Management Division
ASMFC Winter 2021

What has NOAA Fisheries done lately?

- Draft Amendment 14
- Stock Assessments
- Other Actions



Draft Amendment 14

- Goals in brief:
 - Optimize ability to fully harvest shark quotas while considering fairness among sectors.
 - Revise the acceptable biological catch (ABCs) control rule consistent with revised National Standard 1 (NS1) guidelines.
 - Revise annual catch limit (ACL) framework and process for accounting for under/overharvests.
 - Increase management flexibility to react to changes in the fishery and science.
- Amendment 14 does not:
 - Change the ACL for prohibited shark species.
 - Change the quotas automatically. A future rule is needed.

Preferred Management Options

Topic A: ABC Control Rule (Options A1-A3)

- Option A3: Create a tiered ABC control rule.

Topic B: Phase-In ABC Control Rule (Options B1-B4)

- Option B2: Allow consideration of phase-in ABC control rule.

Topic C: ACL Development (Options C1-C6)

- Option C2: Actively manage sector ACLs (commercial and recreational).
- Option C5: Establish ACL for each shark management group, without commercial ACL quota linkages.

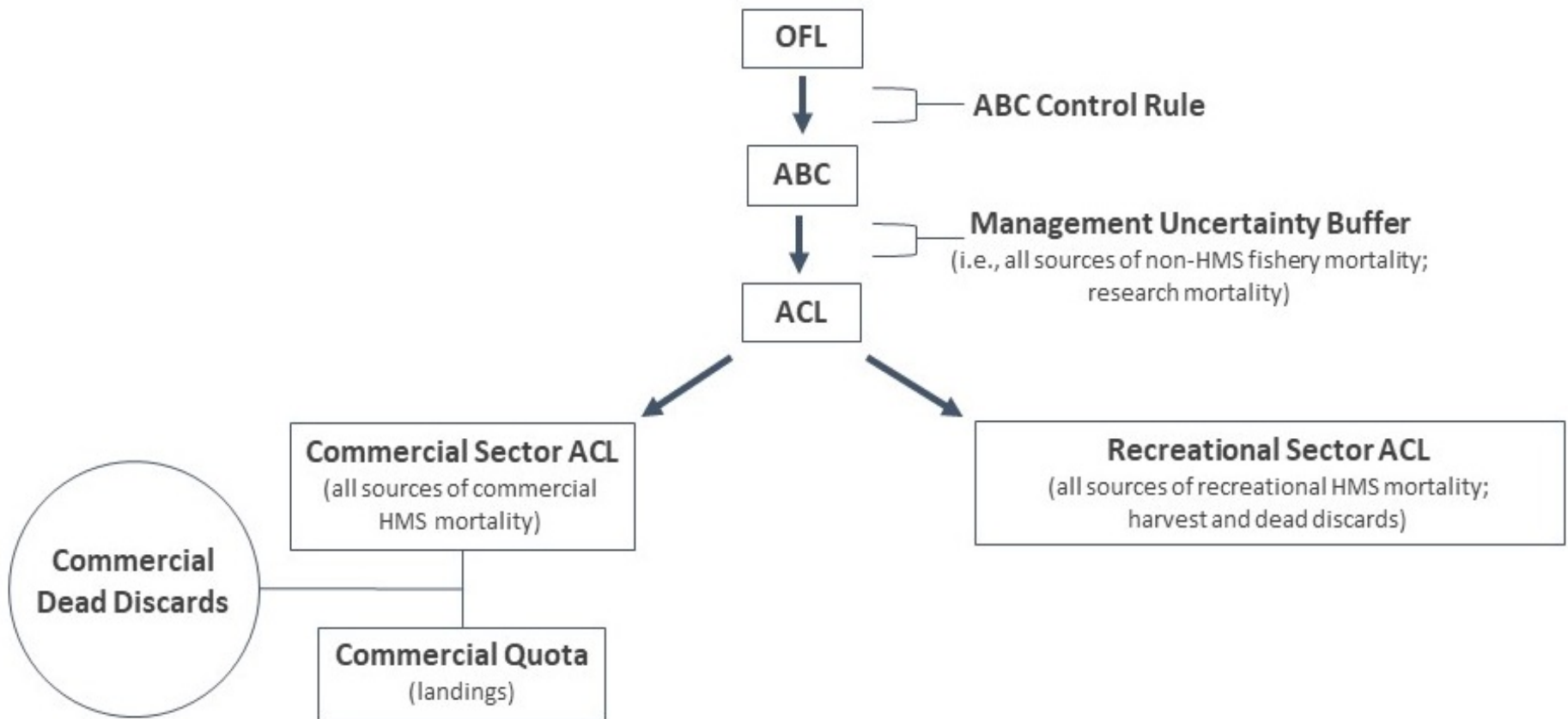
Topic D: Carry-Over of Underharvested ACL (Options D1-D6)

- Option D6: Allow carry-over only for underharvests of commercial quotas (landings only) under certain conditions.

Topic E: Multi-Year Overfishing Status Determination Criteria (Options E1-E3)

- Option E3: Compare a 3-year average of fishing mortality to the OFL to determine overfishing status.

ACL Framework for Non-Prohibited Shark Species



- The ACL framework is under preferred Management Option C2 (Figure 2.1)

Stock Assessments

- Atlantic Blacktip Shark
 - Preliminary Results: Not overfished, no overfishing occurring
 - http://sedarweb.org/docs/sar/SEDAR65_FullSAR_12.8.2020_V3.pdf
- Porbeagle Shark
 - Preliminary Results: Overfished, no overfishing occurring
 - https://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_POR_SA_ENG.pdf
- Lemon Shark (Published manuscript)
 - Preliminary Results: Not overfished, no overfishing occurring
 - <https://afspubs.onlinelibrary.wiley.com/doi/10.1002/nafm.10518>
- **Reviewing the assessments to determine status**

Upcoming Shark Actions

- Final Amendment 14
 - Reviewing comments and working with the SEFSC on the ABC Control Rule.
 - Planning to release later this year.
- Follow-On Rule for Amendment 14
 - Implementation of the framework in Amendment 14.
 - Will consider all recent stock assessments.
- Shark Fishery Review (SHARE)
 - Review of the current state of the commercial and recreational fisheries.
 - Consideration of what the next steps should be.
 - Will include recent hot topics such as depredation.

Shark Depredation

- Increasing number of concerns raised by SAFMC, GMFMC, and others.
- Occurs in many fisheries.
- Currently, limited research regarding the extent of the issue.
- Identified as a management-based research priority:

<https://www.fisheries.noaa.gov/resource/document/atlantic-highly-migratory-species-management-based-research-needs-and-priorities>



Photo credit: Chase Green

Any questions?

If you have any other comments, please contact
Karyl Brewster-Geisz, karyl.brewster-geisz@noaa.gov
301-427-8536

