

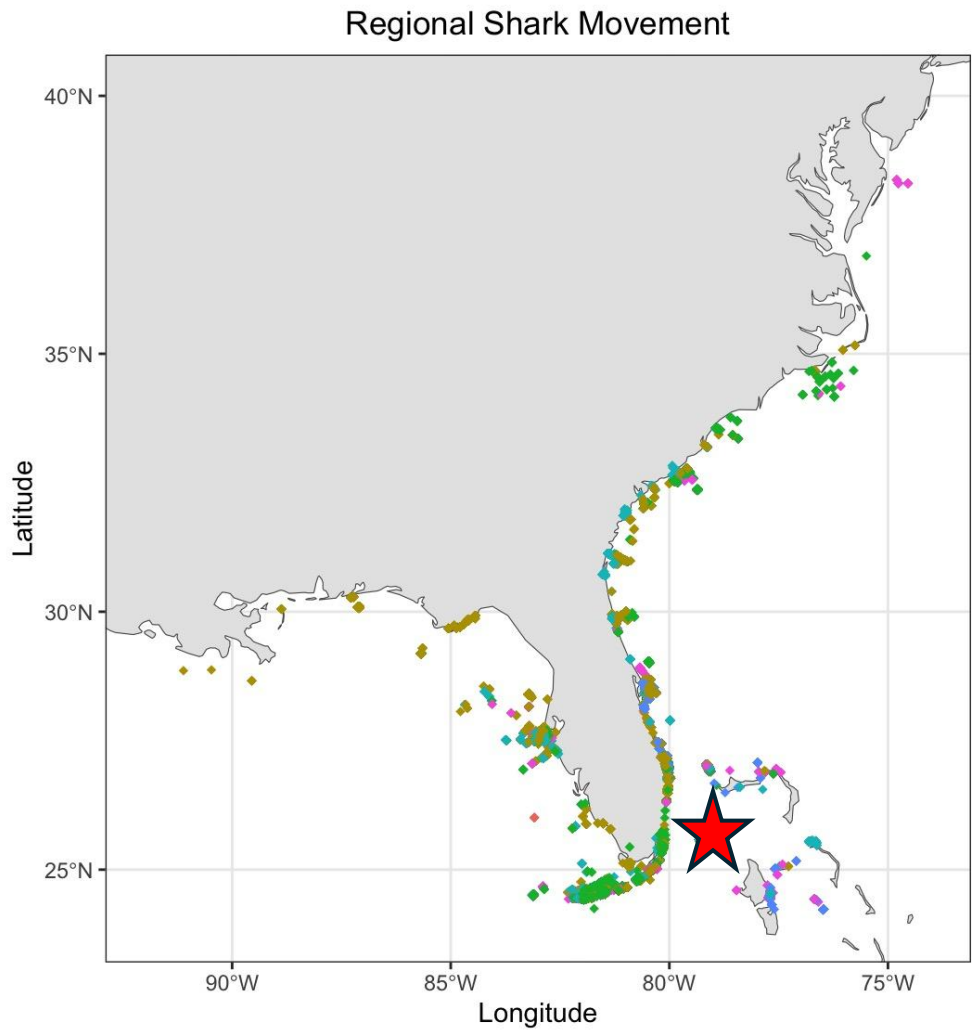


IMPACTS OF THE ‘ANOMALOUS FISH SPINNING’ CONDITIONS ON THE HEALTH AND RELATIVE ABUNDANCE OF COASTAL SHARKS IN THE LOWER FLORIDA KEYS

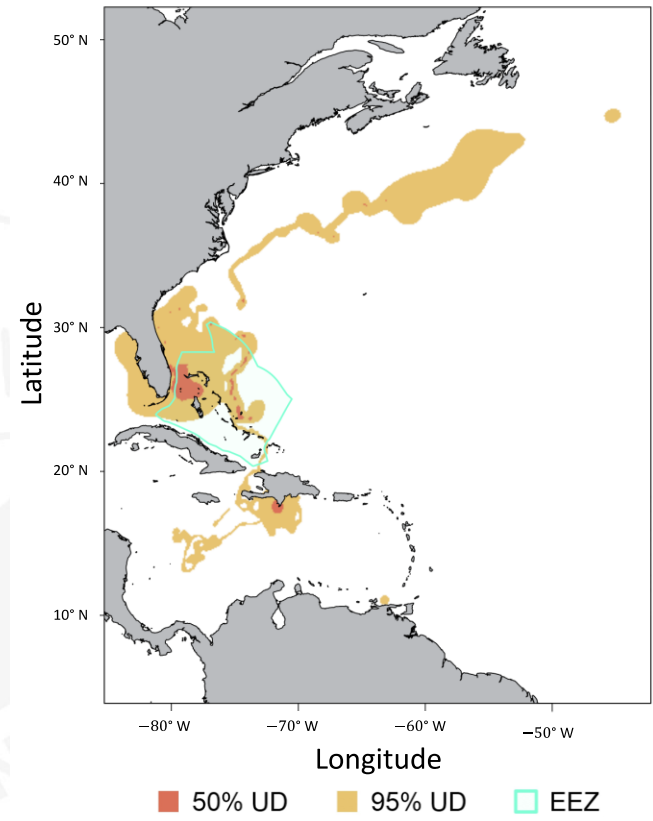
**MATTHEW J. SMUKALL, WYATT ALBERT, ALEXANDRA DRAIME, ALINA HUSSEY,
MICHELLE BLAIS, CHRIS MALINOWSKI, JEN WYFFLES, R. DEAN GRUBBS**

BACKGROUND

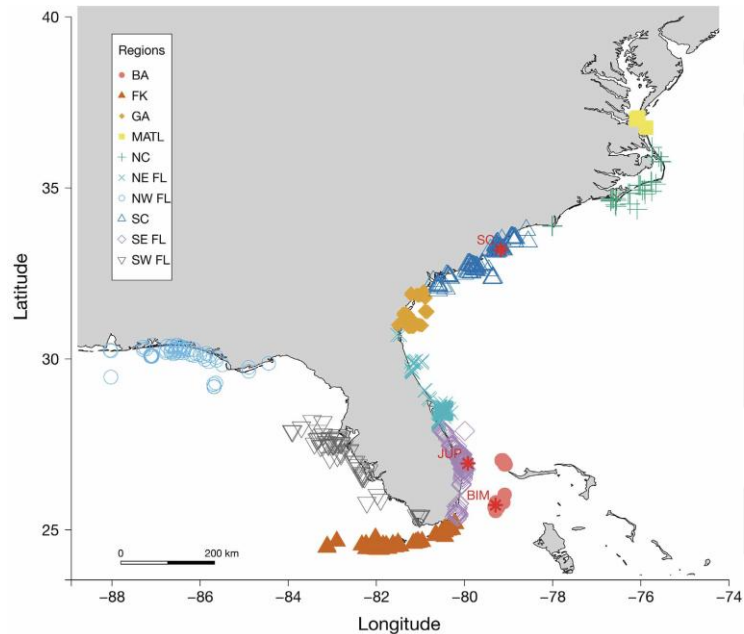
Bimini located ~ 80 km east of Miami, Florida
Significant movement between The Bahamas and Florida Keys



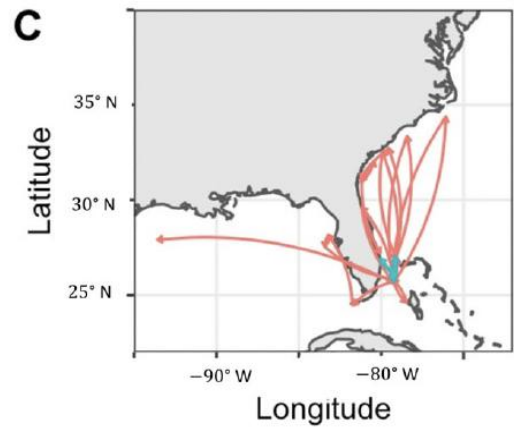
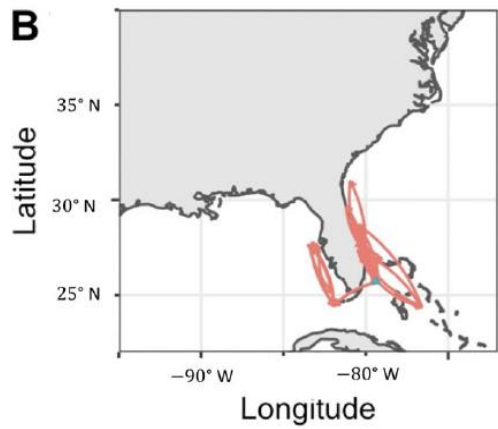
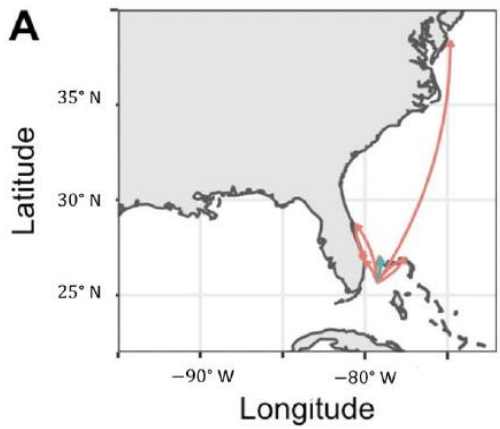
- Species
- blacktip shark
 - bull shark
 - great hammerhead
 - lemon shark
 - nurse shark
 - tiger shark



BACKGROUND



Nyce et al., 2025



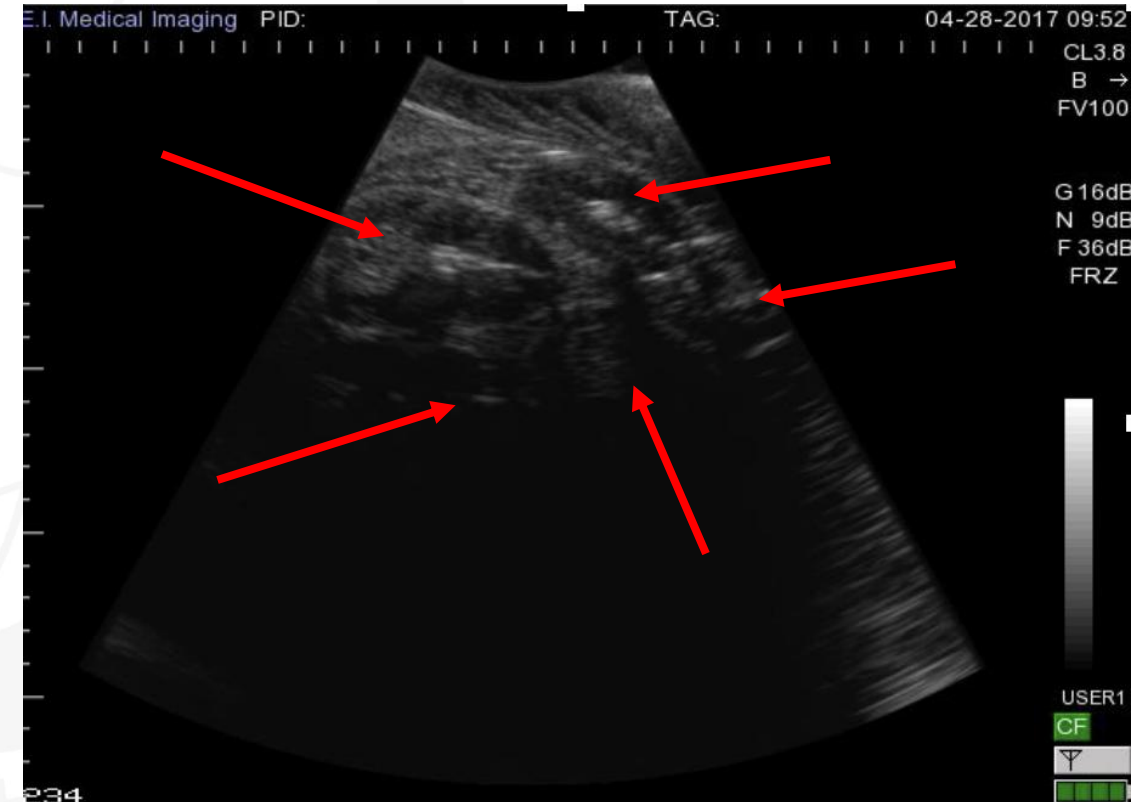
Sex
— Female
— Male



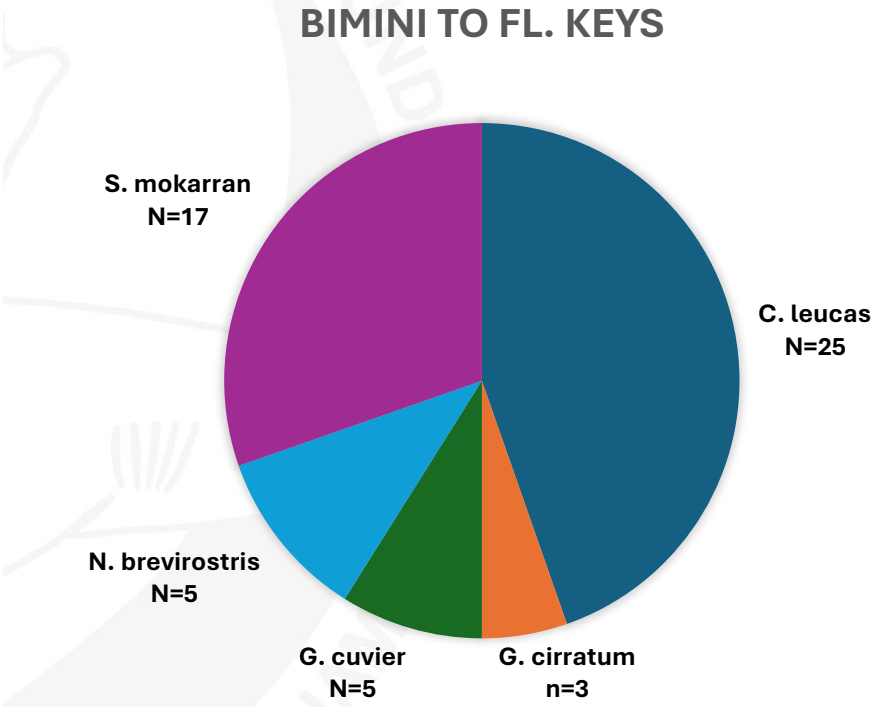
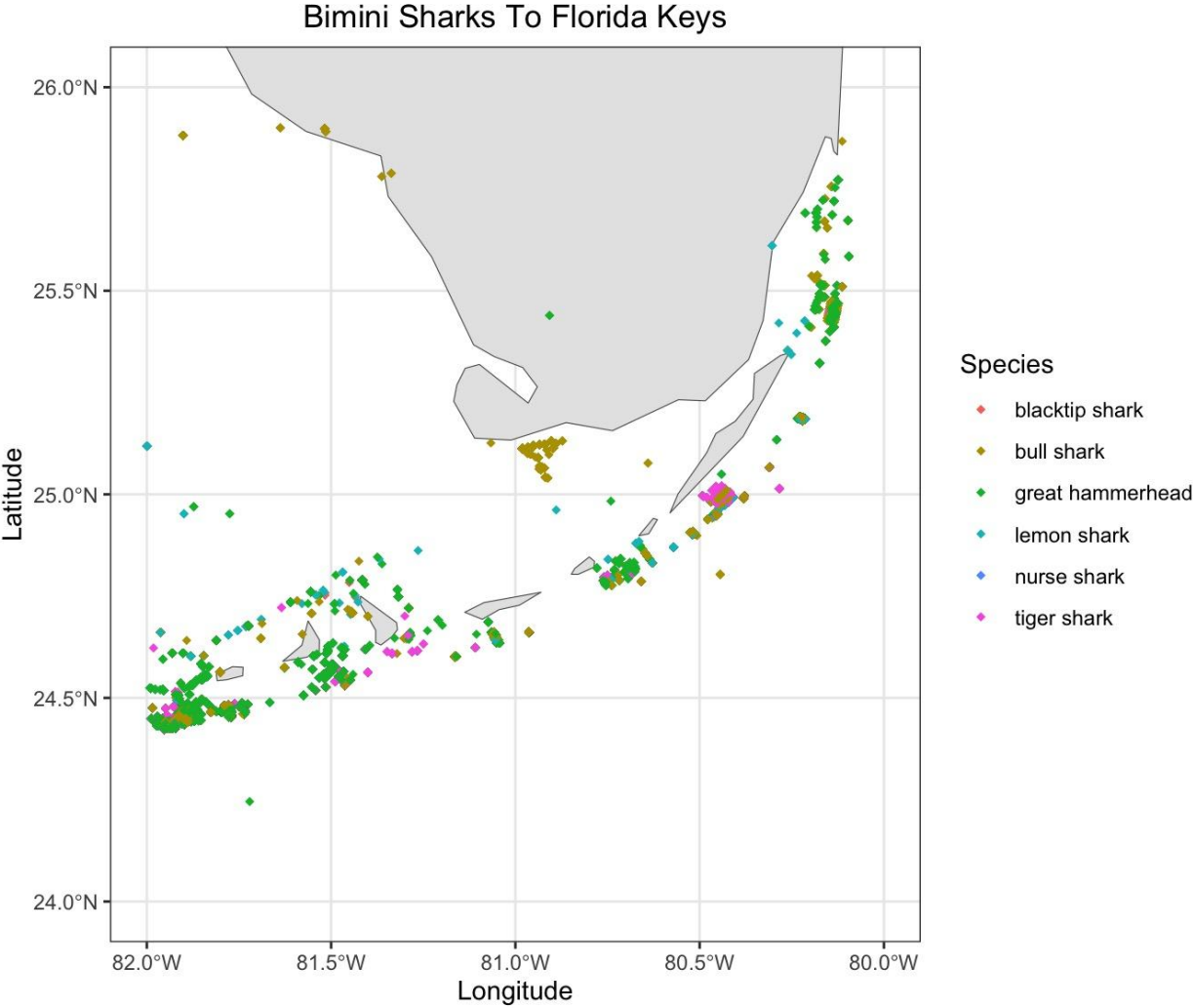
BACKGROUND

Primarily during the spring and summer

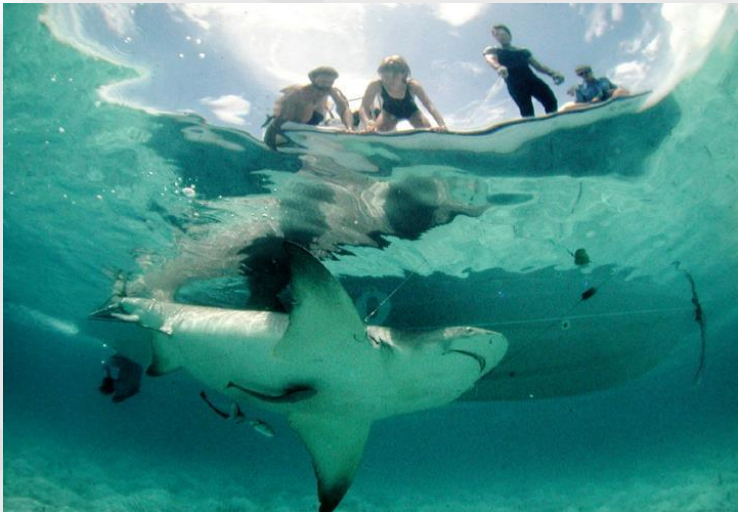
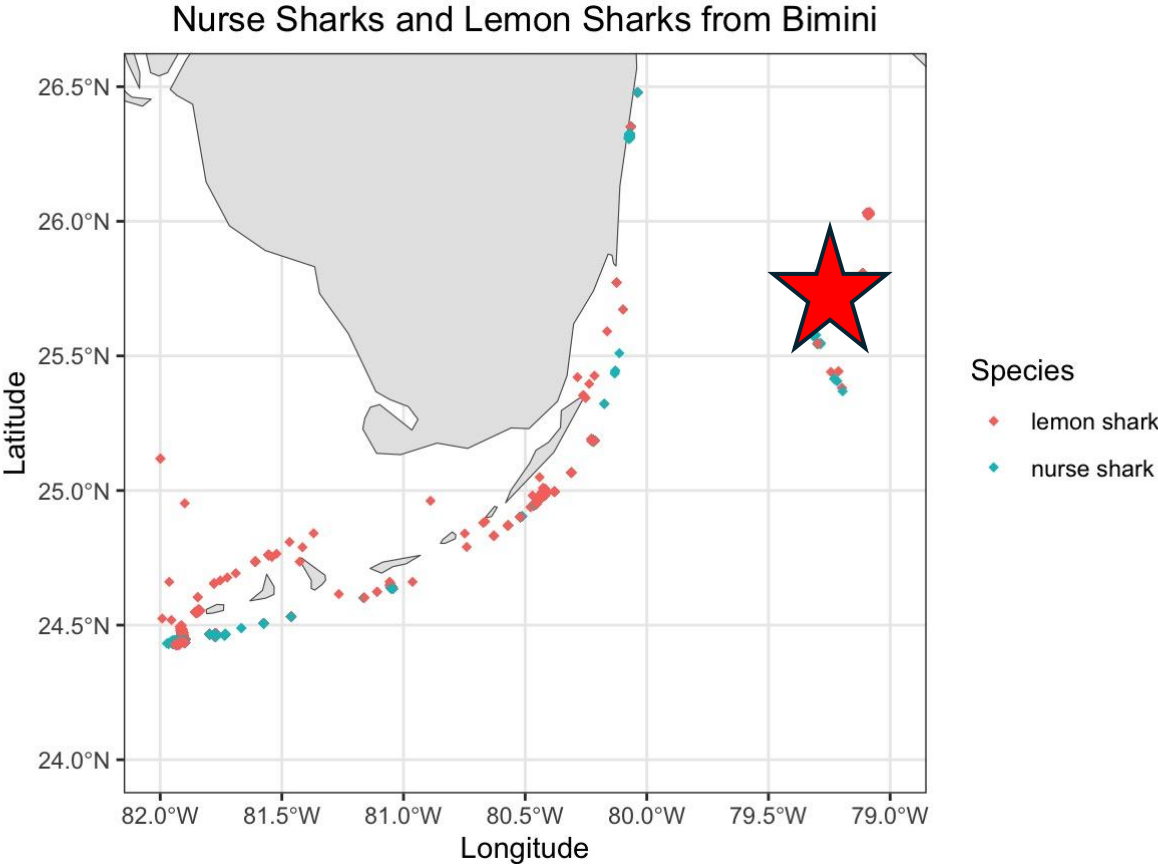
Likely to be partially driven by reproduction for some species



BACKGROUND



BACKGROUND



Predator–prey landscapes of large sharks and game fishes in the Florida Keys

Lucas P. Griffin¹ | Grace A. Casselberry¹ | Susan K. Lowerre-Barbieri² | Alejandro Acosta³ | Aaron J. Adams^{4,5} | Steven J. Cooke⁶ | Alex Filous¹ | Claudia Friess² | Tristan L. Guttridge⁷ | Neil Hammerschlag⁸ | Vital Heim^{9,10} | Danielle Morley^{1,3} | Mitchell J. Rider⁸ | Gregory B. Skomal¹¹ | Matthew J. Smukall⁹ | Andy J. Danylchuk¹ | Jacob W. Brownscombe⁶

ORIGINAL ARTICLE

Movescapes and eco-evolutionary movement strategies in marine fish: Assessing a connectivity hotspot

Susan K. Lowerre-Barbieri^{1,2} | Claudia Friess² | Lucas P. Griffin³ | Danielle Morley^{3,4} | Gregory B. Skomal⁵ | Joel W. Bickford² | Neil Hammerschlag⁶ | Mitchell J. Rider⁶ | Matthew J. Smukall⁷ | Maurits P. M. van Zinnicq Bergmann^{7,8} | Tristan L. Guttridge⁹ | Andrea M. Kroetz¹⁰ | R. Dean Grubbs¹¹ | Carissa L. Gervasi¹² | Jennifer S. Rehage¹² | Gregg R. Poulakis¹³ | Kim Bassos-Hull¹⁴ | Jayne M. Gardiner¹⁵ | Grace A. Casselberry³ | Joy Young¹⁶ | Matt Perkinson¹⁷ | Debra L. Abercrombie¹⁸ | Dustin T. Addis² | Barbara A. Block¹⁹ | Alejandro Acosta⁴ | Aaron J. Adams^{20,21} | Andy J. Danylchuk³ | Steven J. Cooke²² | Frederick G. Whoriskey²³ | Jacob W. Brownscombe²⁴



WILEY



Vol. 663: 157–177, 2021 https://doi.org/10.3354/meps13637	MARINE ECOLOGY PROGRESS SERIES Mar Ecol Prog Ser	Published March 31
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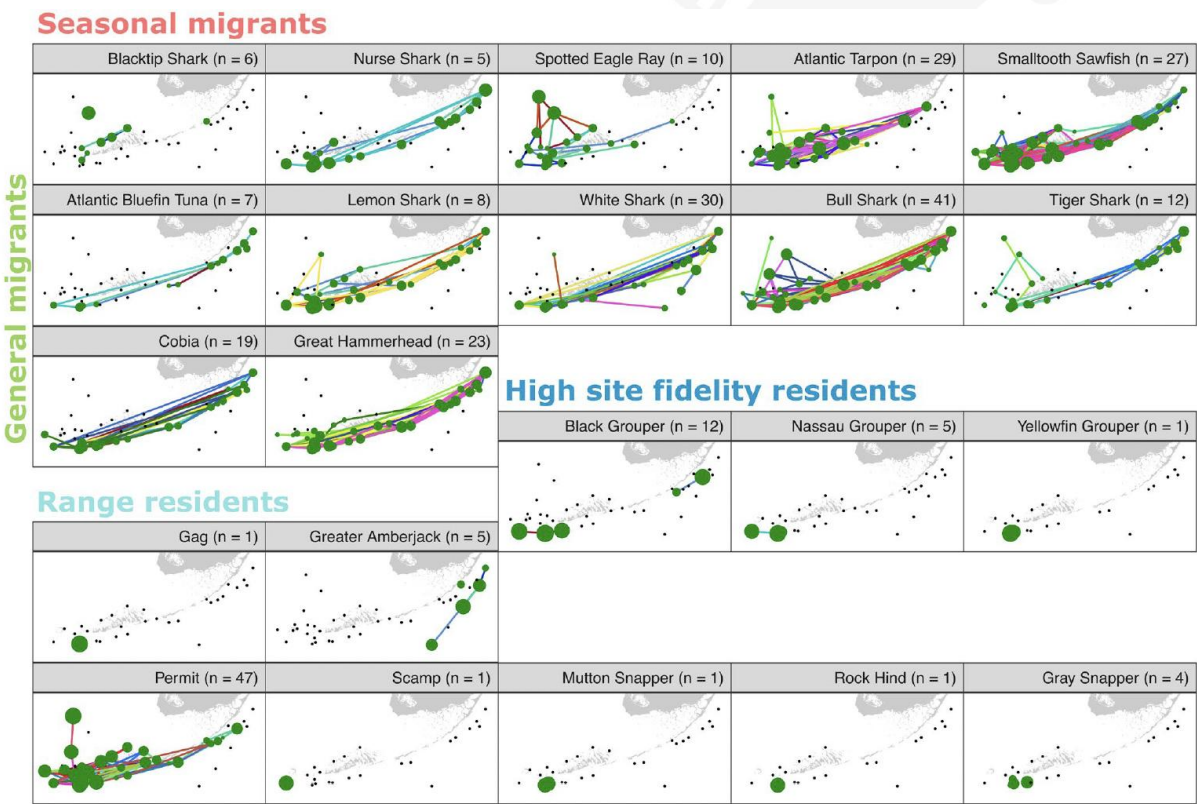


Regional-scale variability in the movement ecology of marine fishes revealed by an integrative acoustic tracking network

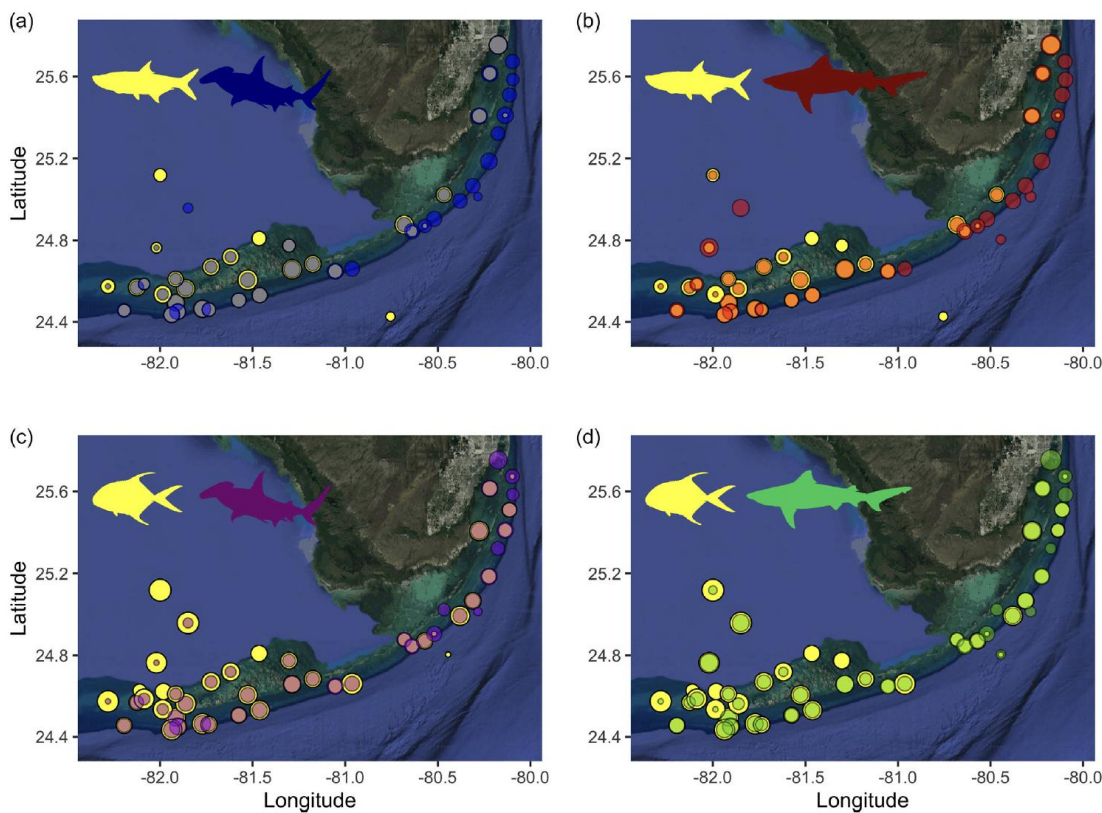
Claudia Friess^{1,*,#}, Susan K. Lowerre-Barbieri^{1,2,#}, Gregg R. Poulakis³, Neil Hammerschlag⁴, Jayne M. Gardiner⁵, Andrea M. Kroetz⁶, Kim Bassos-Hull⁷, Joel Bickford¹, Erin C. Bohaboy⁸, Robert D. Ellis¹, Hayden Menendez¹, William F. Patterson III², Melissa E. Price⁹, Jennifer S. Rehage¹⁰, Colin P. Shea¹, Matthew J. Smukall¹¹, Sarah Walters Burnsed¹, Krystan A. Wilkinson^{7,12}, Joy Young¹³, Angela B. Collins^{1,14}, Breanna C. DeGroot¹⁵, Cheston T. Peterson¹⁶, Caleb Purtlebaugh¹⁷, Michael Randall⁹, Rachel M. Scharer³, Ryan W. Schloesser⁷, Tonya R. Wiley¹⁸, Gina A. Alvarez¹⁹, Andy J. Danylchuk²⁰, Adam G. Fox¹⁹, R. Dean Grubbs²¹, Ashley Hill²², James V. Locascio⁷, Patrick M. O'Donnell²³, Gregory B. Skomal²⁴, Fred G. Whoriskey²⁵, Lucas P. Griffin²⁰

¹Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, St. Petersburg, FL 33701, USA
Full author addresses are given in the Appendix

BACKGROUND



Lowerre-Barbieri et al., 2021

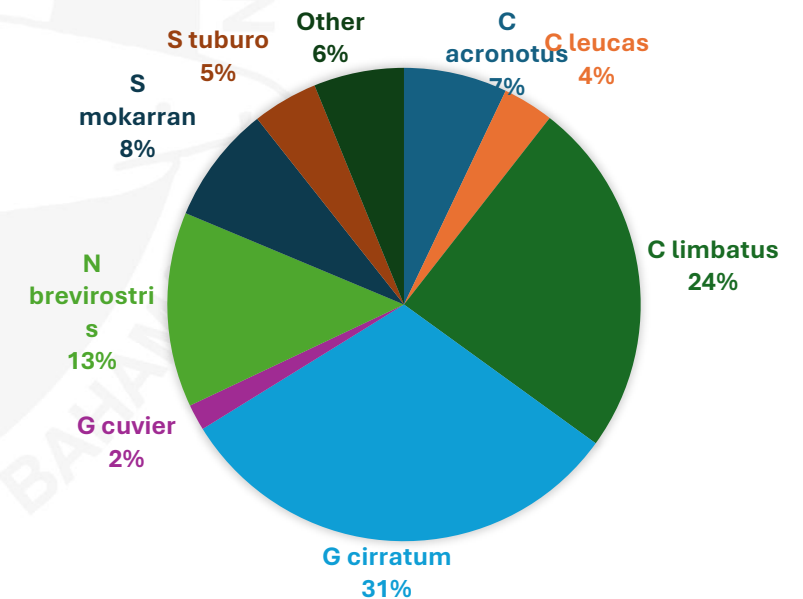
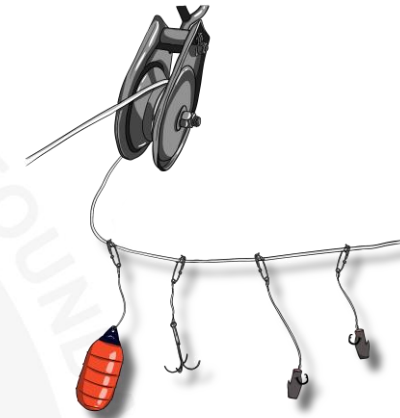


Griffin and Casselberry et al., 2022

CURRENT RESEARCH



~900 longline sets between 2022 and 2026



CURRENT RESEARCH



CURRENT RESEARCH



CURRENT RESEARCH



Stockpile of historical samples

Provide 'baseline' of pre-event



SPINNING FISH CONDITIONS



How are other benthic elasmobranchs impacted?

Reports from fishing local guides of few 'stingrays' and very few lemon sharks in the shallows during the spinning conditions.



~900 longline sets between 2022 and 2026



RESEARCH COLLABORATIONS – THANK YOU



CURRENT RESEARCH

SHARK HEALTH



CURRENT RESEARCH

SHARK HEALTH



Biological samples

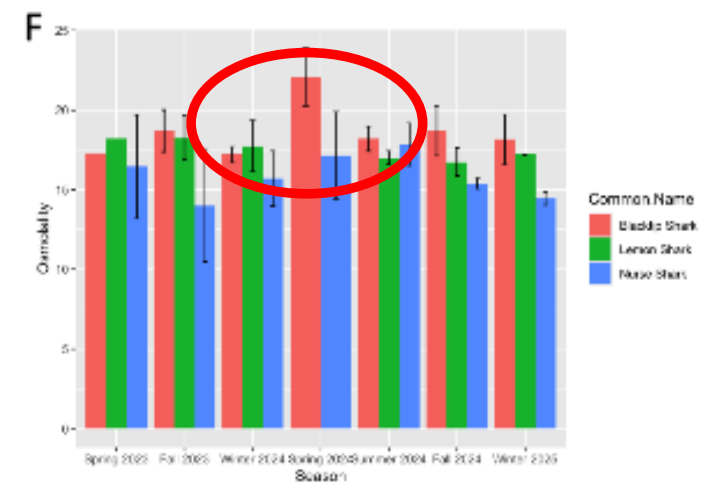
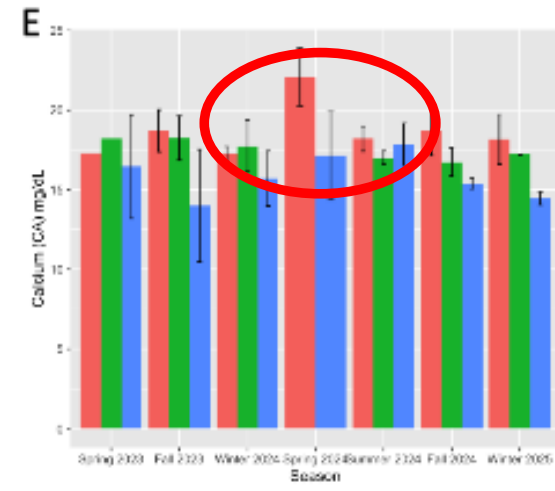
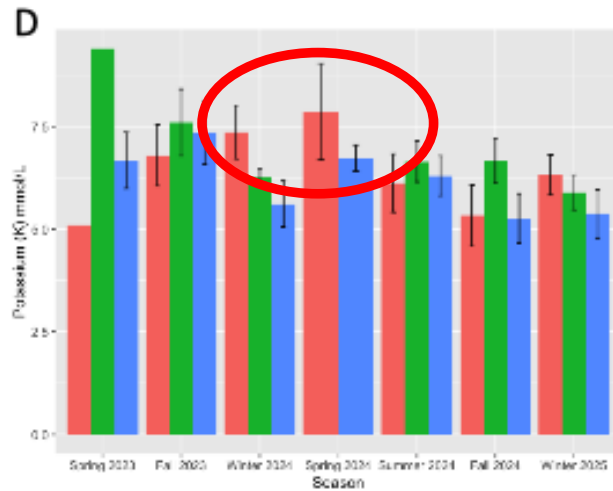
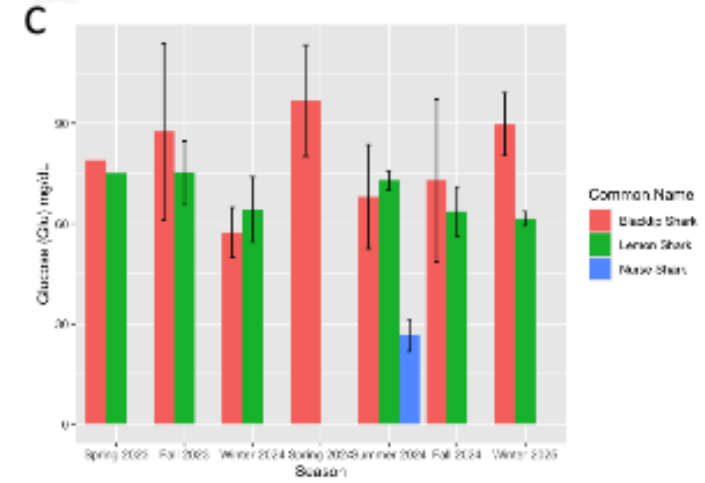
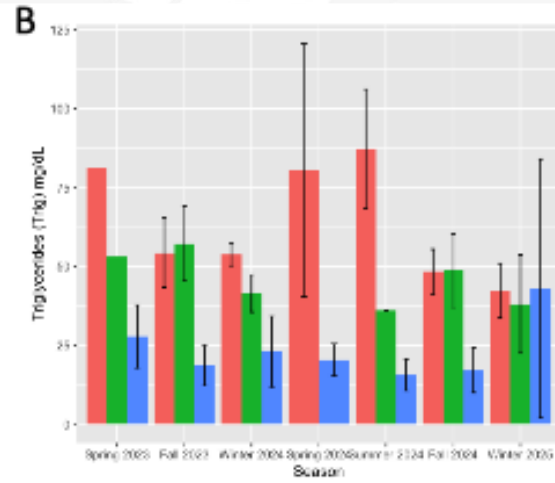
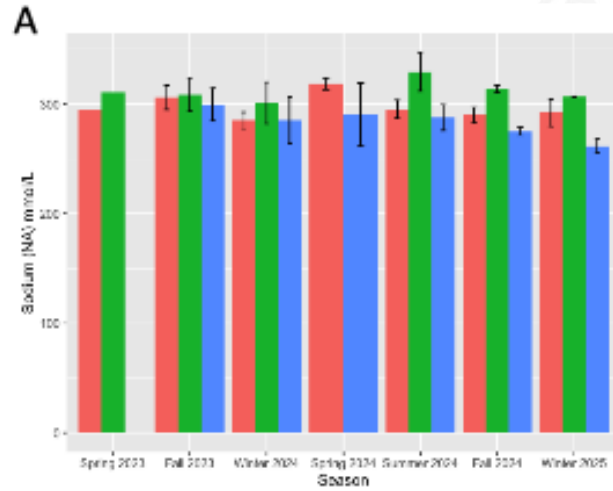
- Ongoing reproductive, trophic ecology, life history studies
- Blood, muscle, fin samples
- Lemons, nurses, blacktips, etc



Baylie Fadool | Bimini Biological Field Station

CURRENT RESEARCH

SHARK HEALTH

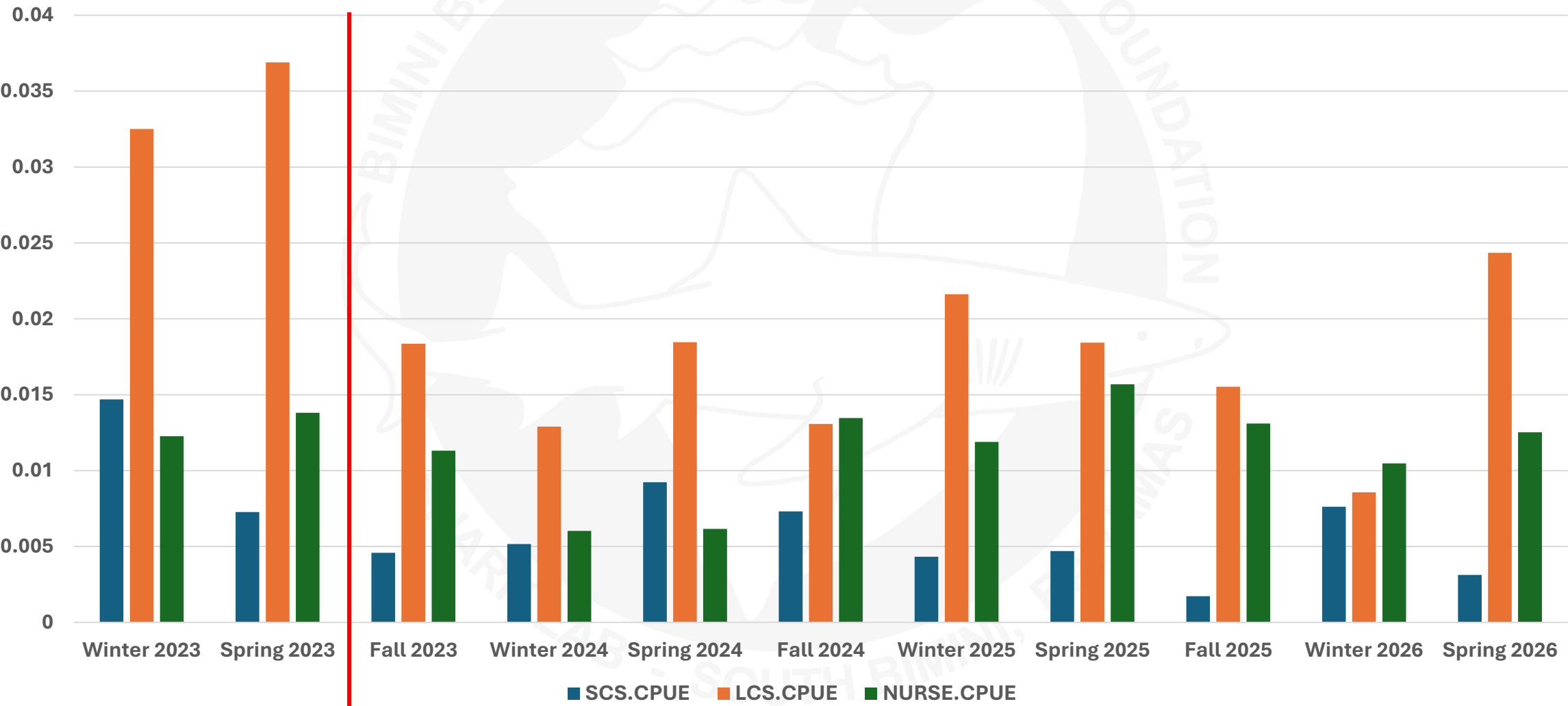


CURRENT RESEARCH

RELATIVE ABUNDANCE



LOWER KEYS TOTAL SHARK CPUE

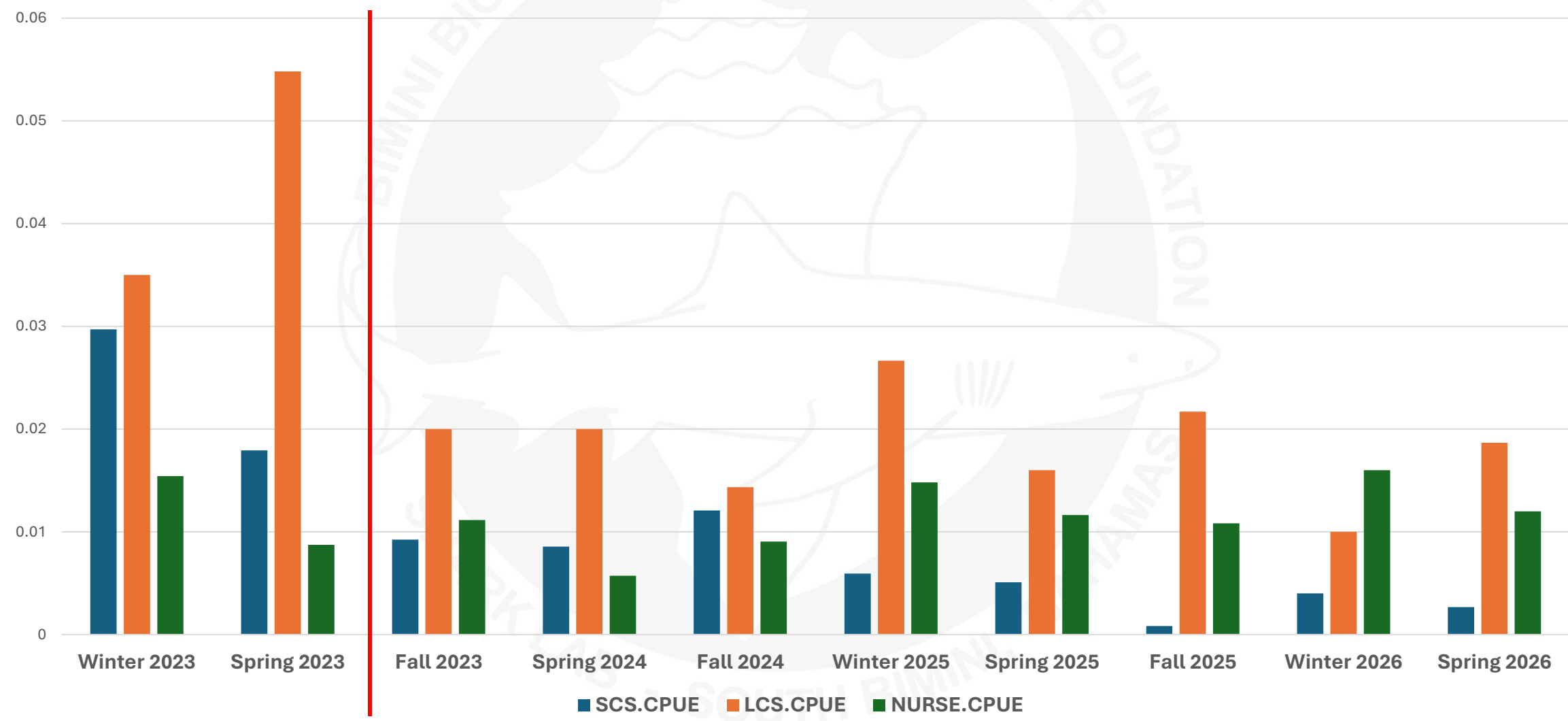


CURRENT RESEARCH

RELATIVE ABUNDANCE

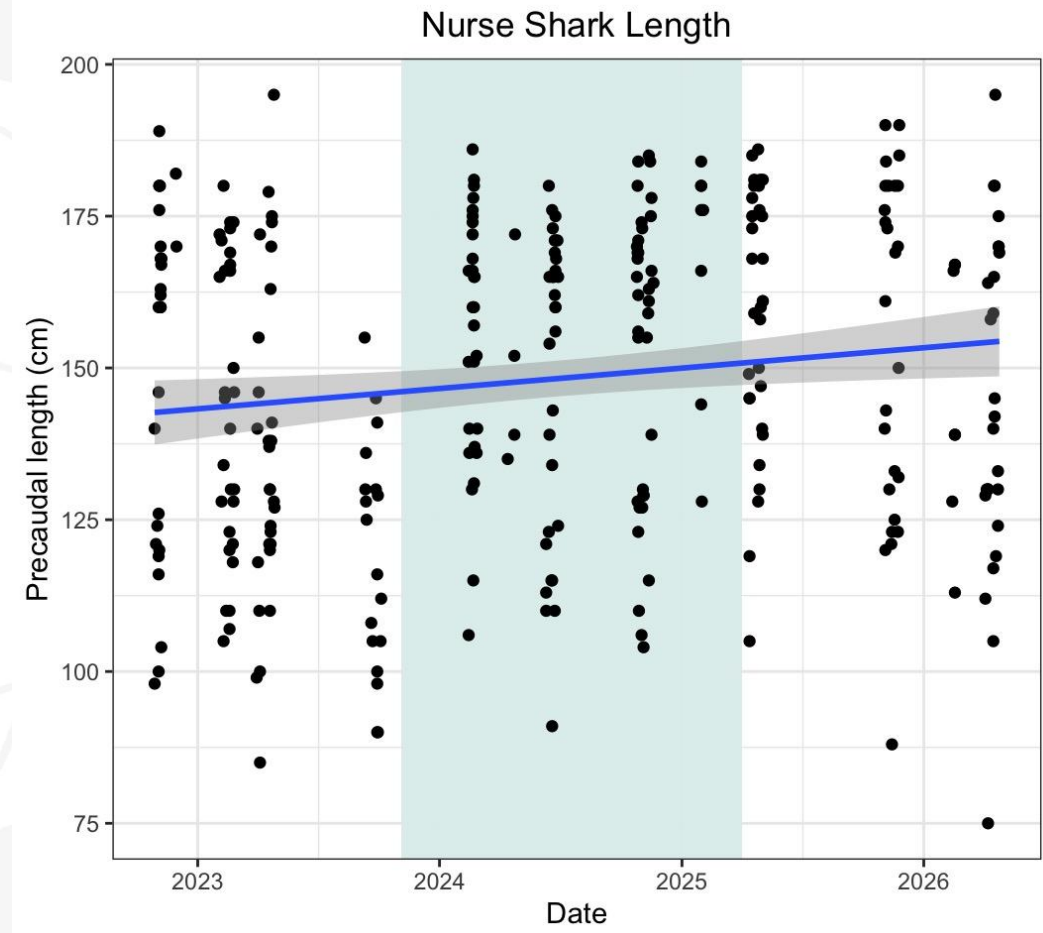
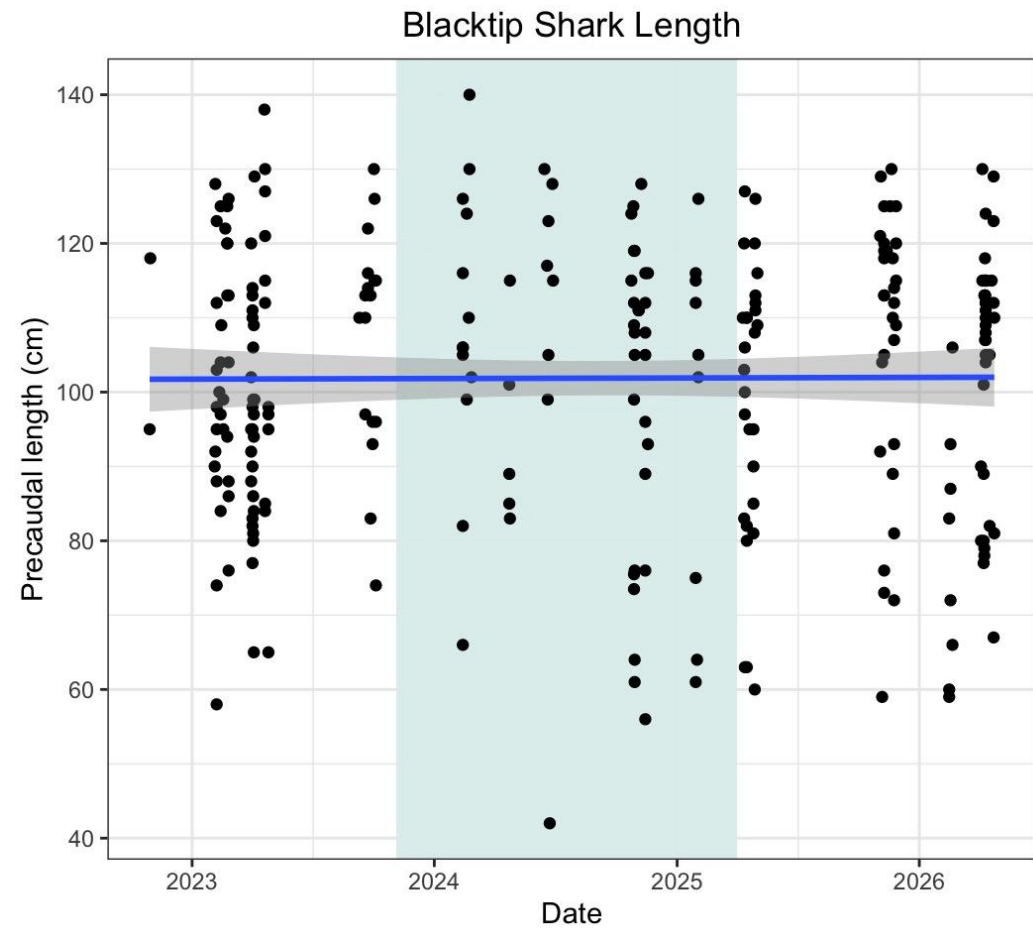


SHARK CPUE IN HOTSPOT AREA



CURRENT RESEARCH

SIZE DISTRIBUTIONS

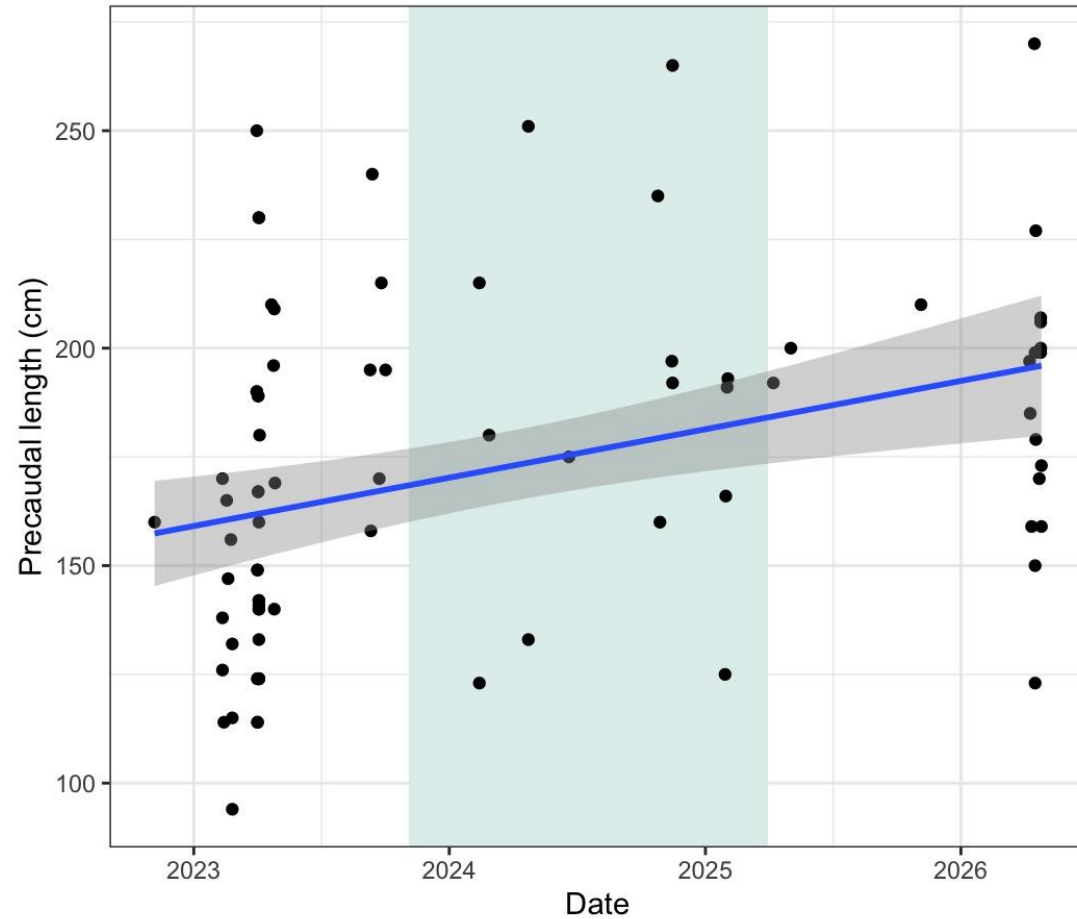


CURRENT RESEARCH

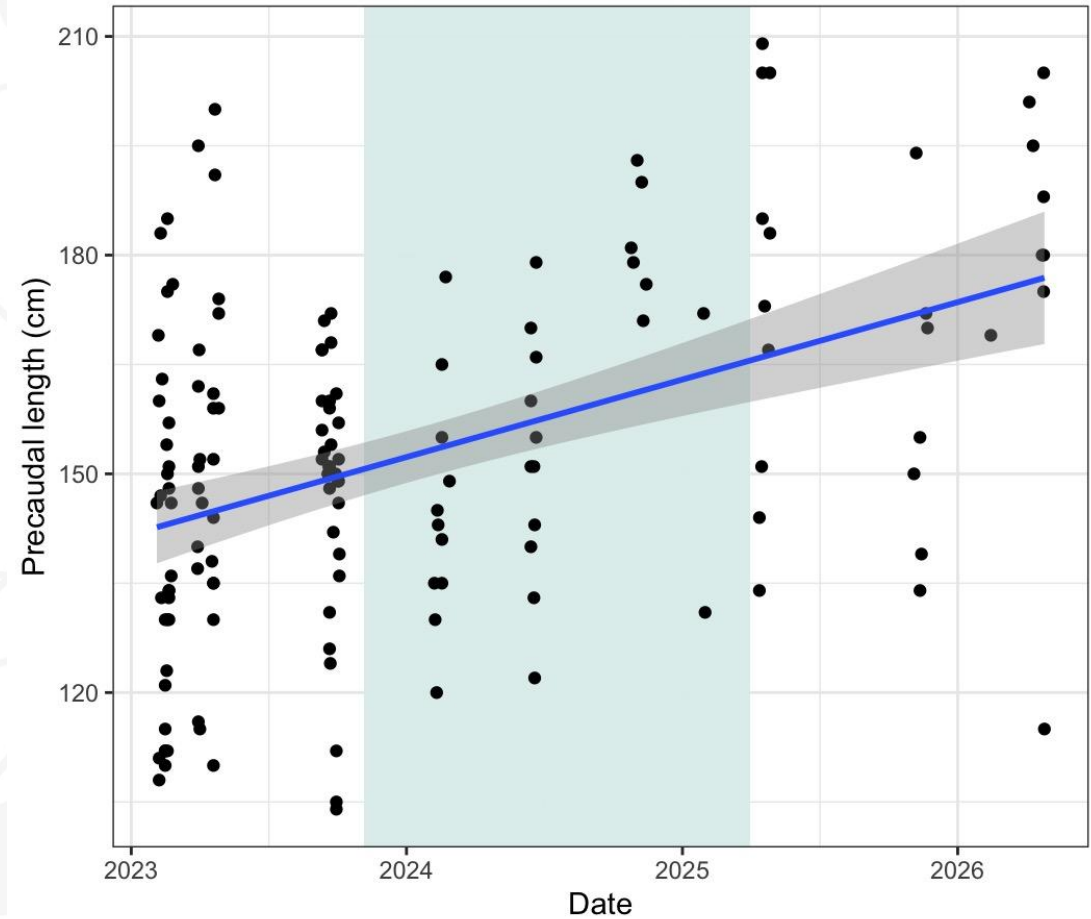
SIZE DISTRIBUTIONS



Great Hammerhead Shark Length



Lemon Shark Length



COLLABORATIVE ACOUSTIC TELEMETRY



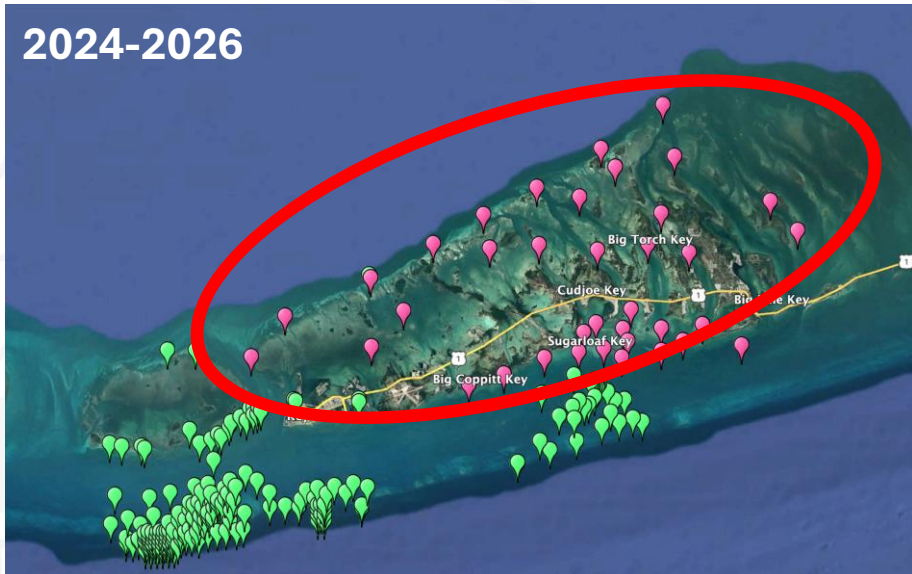
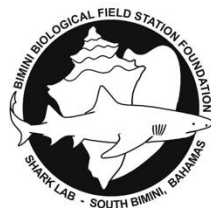
C. leucas (N=17)
C. limbatus (N=21)
G. cirratum (N=18)
G. cuvier (N=14)
N. brevirostris (N=30)
S. mokarran (N=37)

Bimini Sharks (N=50)

Total (N=187)



COLLABORATIVE ACOUSTIC TELEMETRY



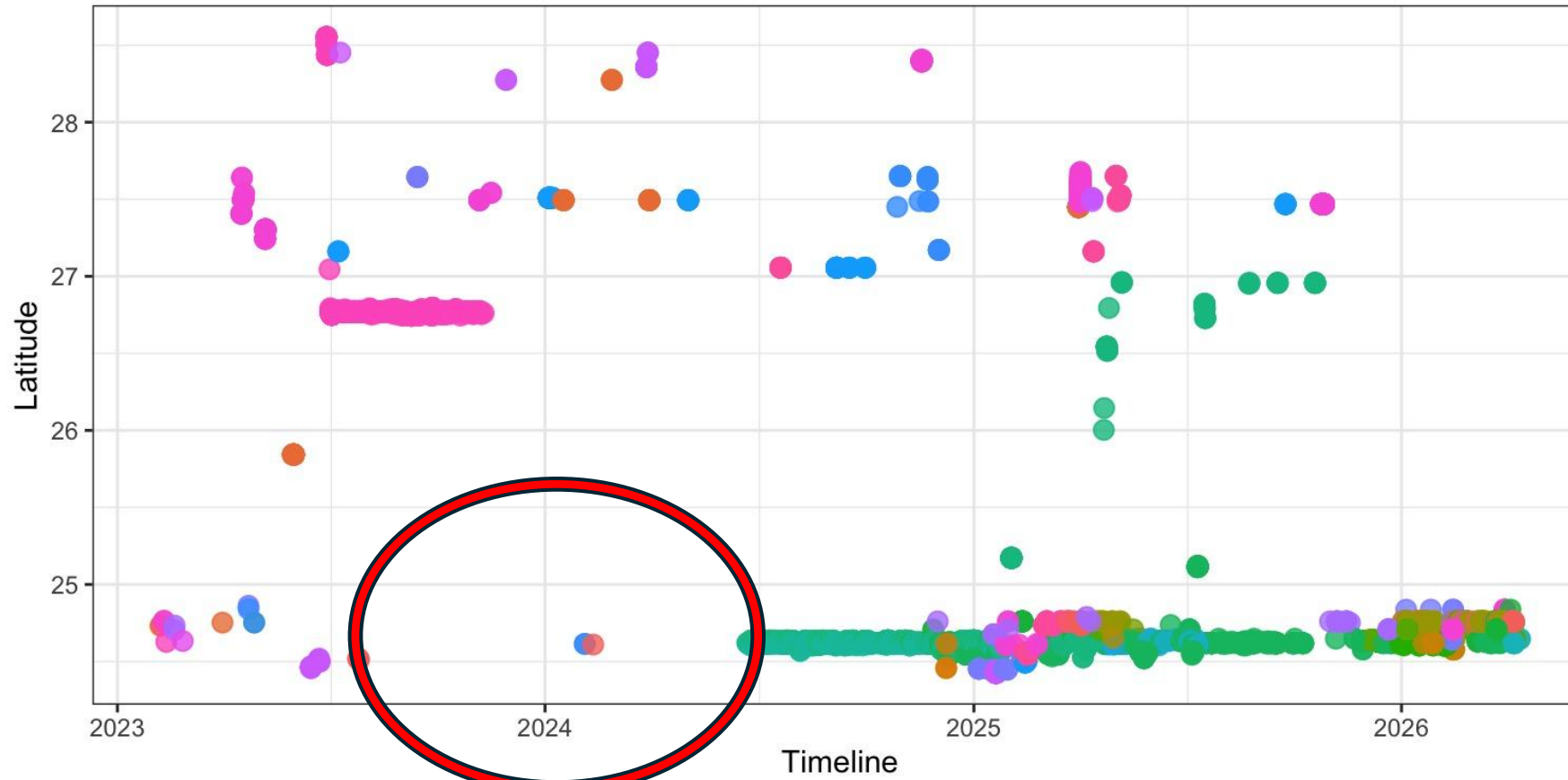
Seasonality?

CURRENT RESEARCH

LEMON SHARK RESIDENCY



Lemon Shark Latitude Across Time



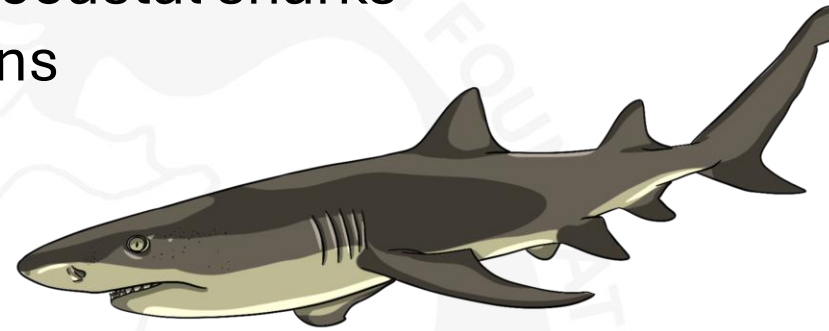
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A69-9001-41691	A69-9001-53729
A69-9001-41692	A69-9001-54410
A69-9001-41694	A69-9001-54412
A69-9001-41706	A69-9001-54413
A69-9001-45656	A69-9001-56018
A69-9001-45657	A69-9001-56019
A69-9001-46520	A69-9001-56021
A69-9001-46522	A69-9001-56025

RESEARCH – SUMMARY



Relative abundances of small and large coastal sharks remain below pre-spinning fish conditions



Juvenile and large juvenile lemon sharks and great hammerhead sharks less common

Some implications on individual health, but still to be determined the extent. These have ceased from late 2025.

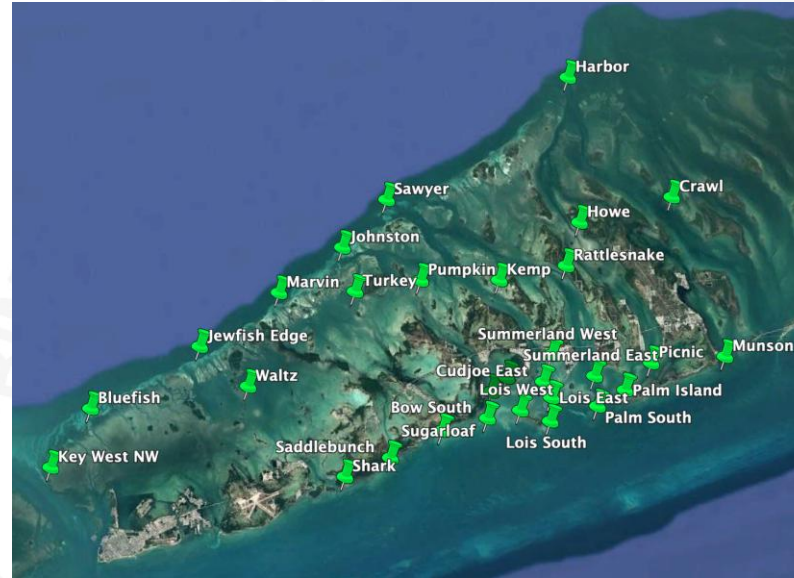


RESEARCH – NEXT STEPS



TELEMETRY

Lemons
Great Hammerheads
Bulls
Blacktips
Tigers
Nurses



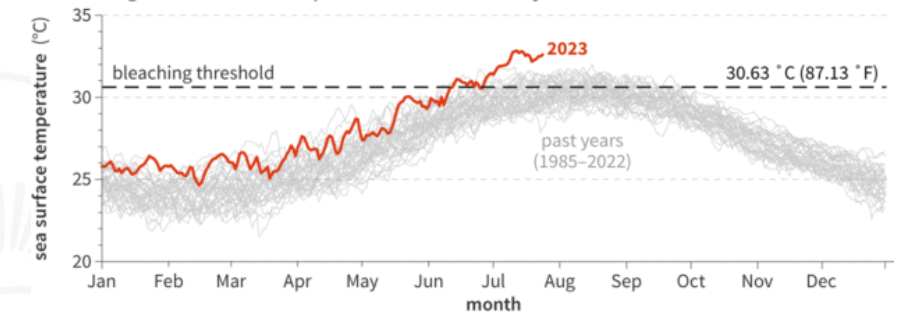
Stable isotope analysis for shifts in trophic position

Assess individual stressors of sharks

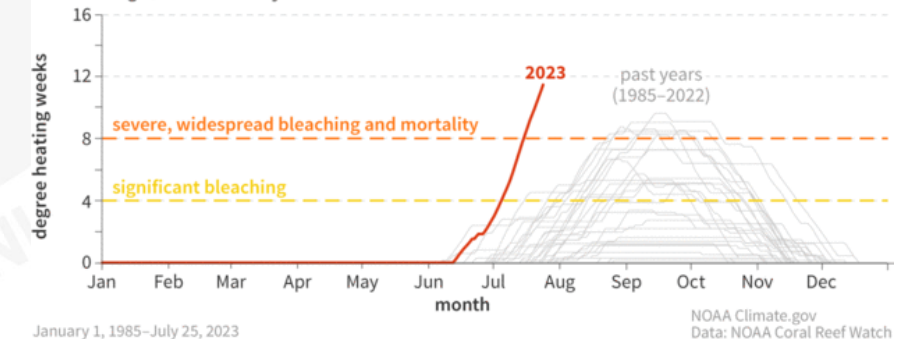


Continue long-term abundance surveys and sample collection

Record-high sea surface temperatures in Florida Keys



Record-high, record-early coral heat stress



Thank You Symposium Sponsors!



save our seas
foundation



All activities performed under
authorization and guidance of
NOAA Fisheries Emergency
Section 7 Consultation
#SERO-2024-00402

and

ESA Section 10 permits
to Gregg Poulakis,
Tonya Wiley, John Carlson, and
Colin Simpendorfer

ACKNOWLEDGEMENTS

SPONSORS & SUPPORT



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mattsmukall@biminisharklab.com

