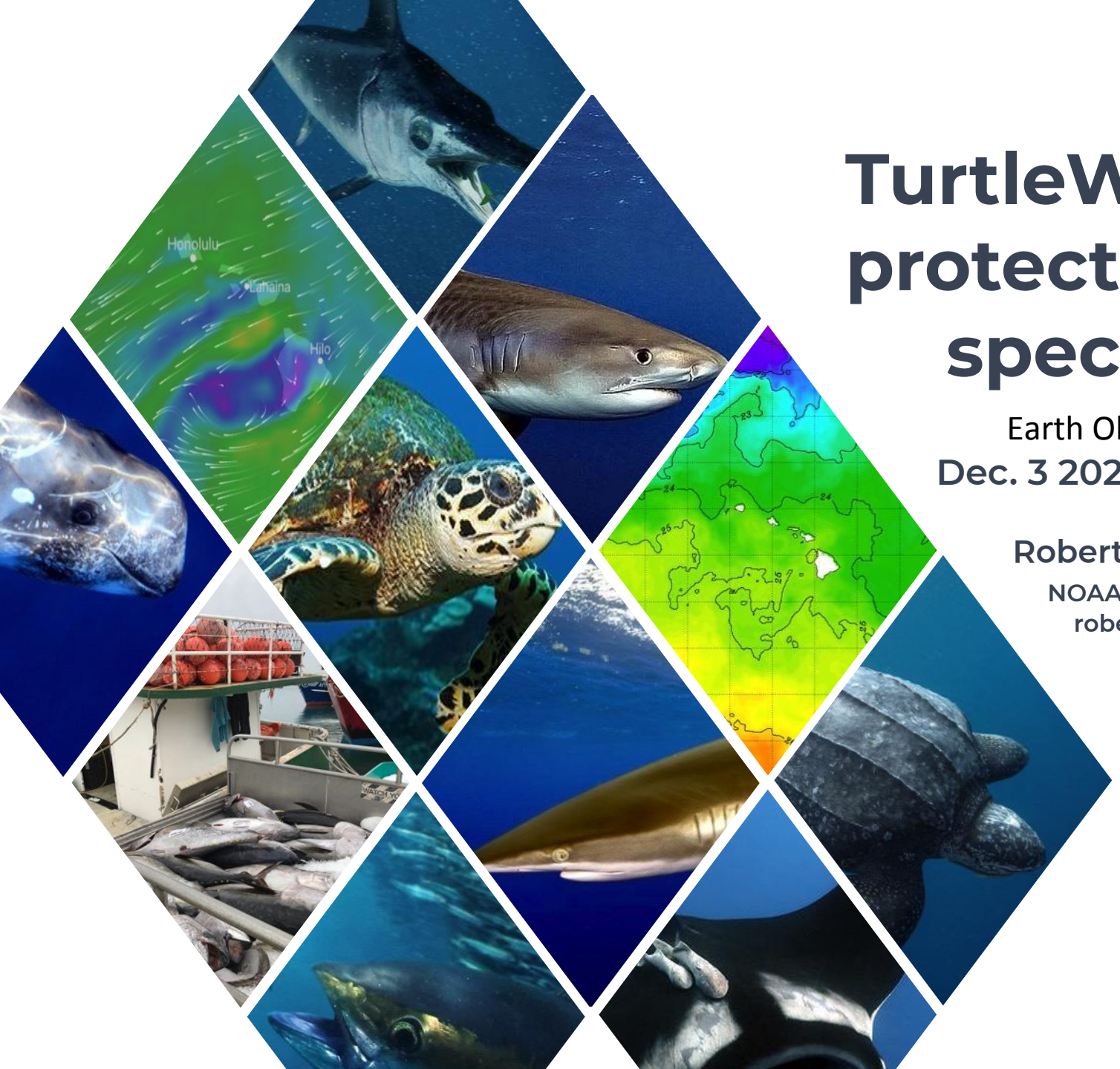

TurtleWatch - reducing protected species interaction?

Earth Observations for Tuna Fisheries Workshop

Dec. 3 2020

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TurtleWatch (December 26, 2006)

Preprint, 2008
doi: 10.3354/esr00096

ENDANGERED SPECIES RESEARCH
Endang Species Res

Published online July 1, 2008

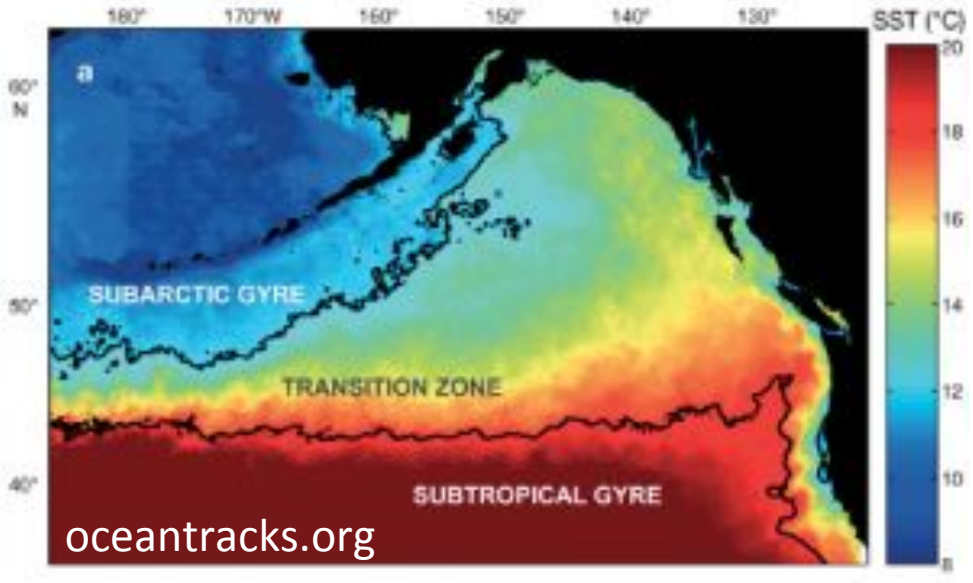
Contribution to the Theme Section 'Fisheries bycatch: problems and solutions'

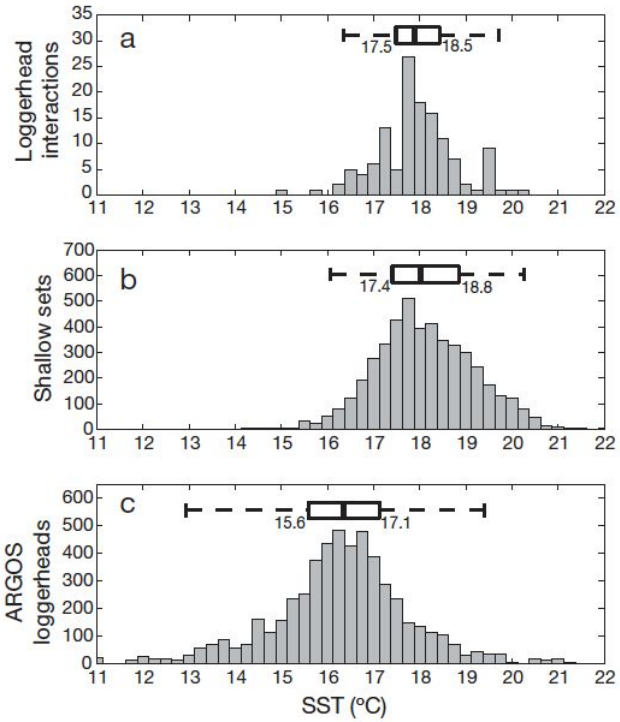
OPEN ACCESS

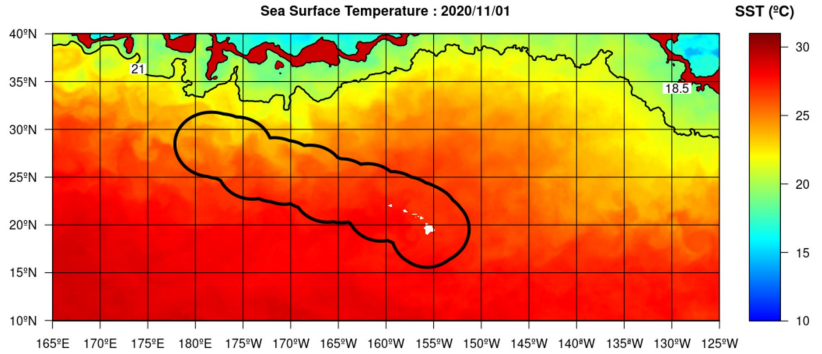
TurtleWatch: a tool to aid in the bycatch reduction of loggerhead turtles *Caretta caretta* in the Hawaii-based pelagic longline fishery

Evan A. Howell[1,*], Donald R. Kobayashi[1,2], Denise M. Parker[1,3], George H. Balazs[1], Jeffrey J. Polovina[1]

The 18°C winter isotherm identifies the North Pacific Transition Zone (NPTZ), which is associated with as the Transition Zone Chlorophyll Front (TZCF).



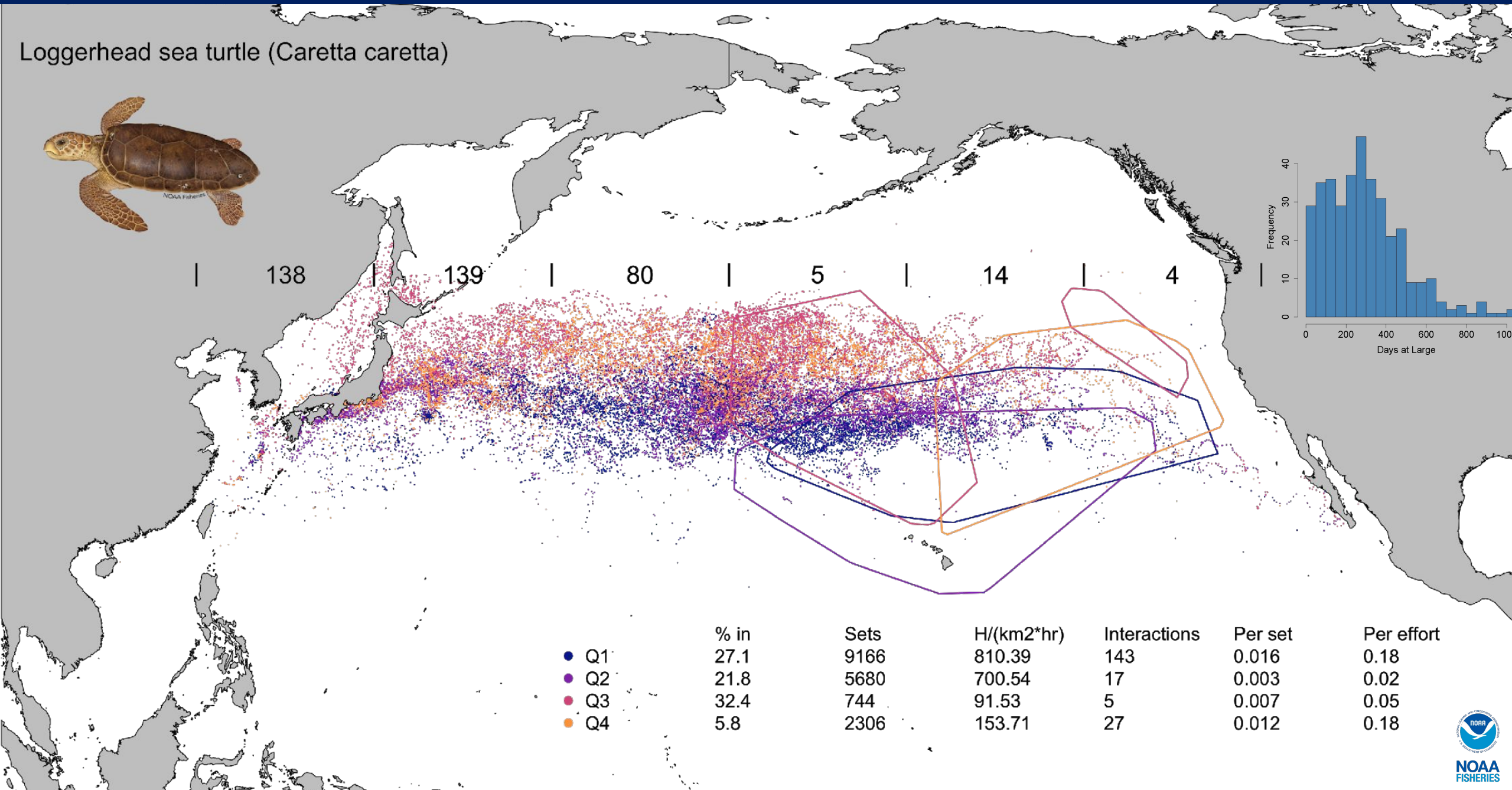




PACIFIC ISLANDS FISHERIES SCIENCE CENTER
ECOSYSTEM SCIENCES DIVISION
1845 Wasp Blvd, Honolulu, HI 96818
http://www.pifsc.noaa.gov/eod/turtlewatch.php
contact: melanie.abecassis@noaa.gov
Data provided by the OceanWatch - Central Pacific node

TurtleWatch

North Pacific Ocean DPS and Hawai'i shallow set longline MCHs



	% in	Sets	H/(km2*hr)	Interactions	Per set	Per effort
Q1	27.1	9166	810.39	143	0.016	0.18
Q2	21.8	5680	700.54	17	0.003	0.02
Q3	32.4	744	91.53	5	0.007	0.05
Q4	5.8	2306	153.71	27	0.012	0.18

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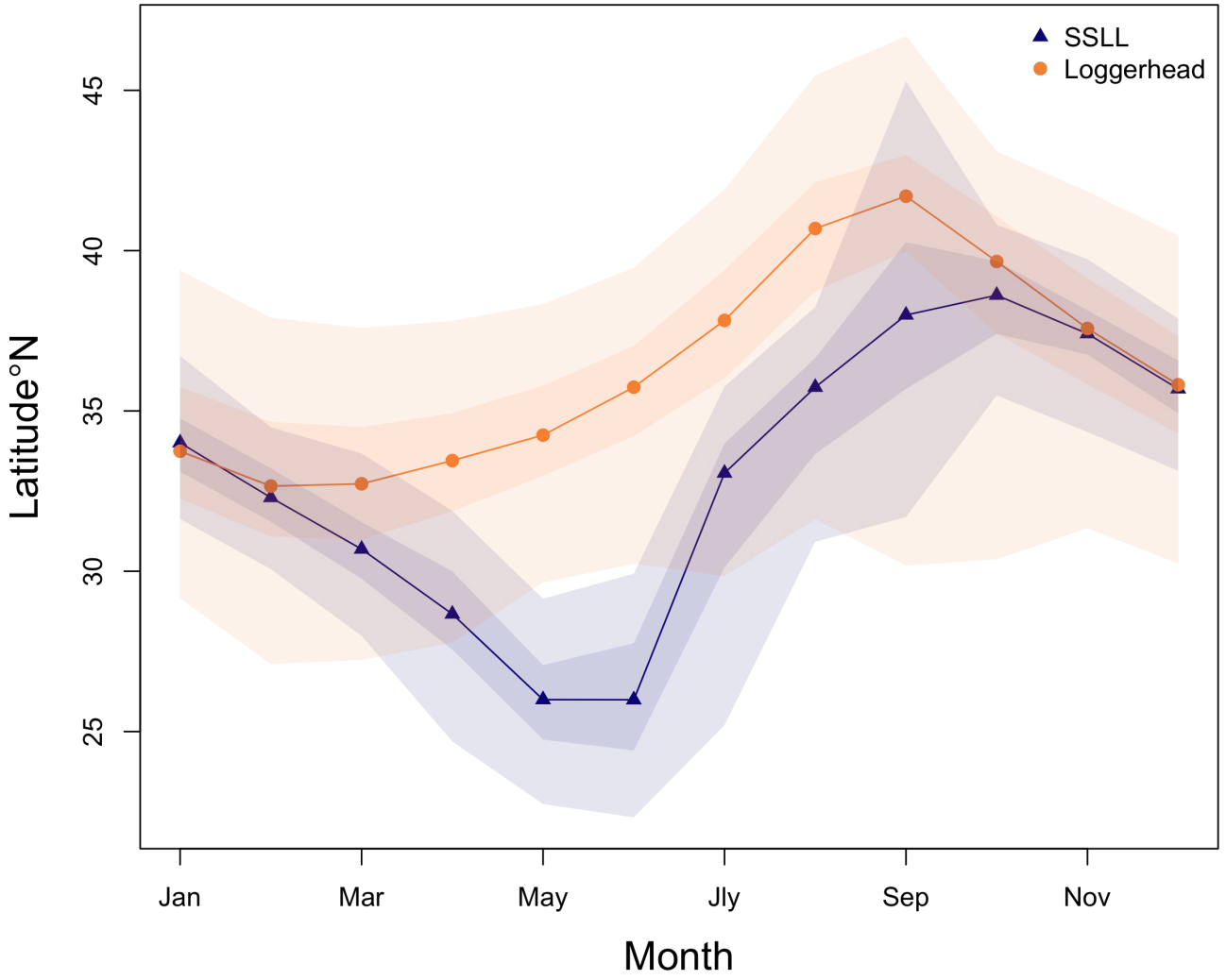
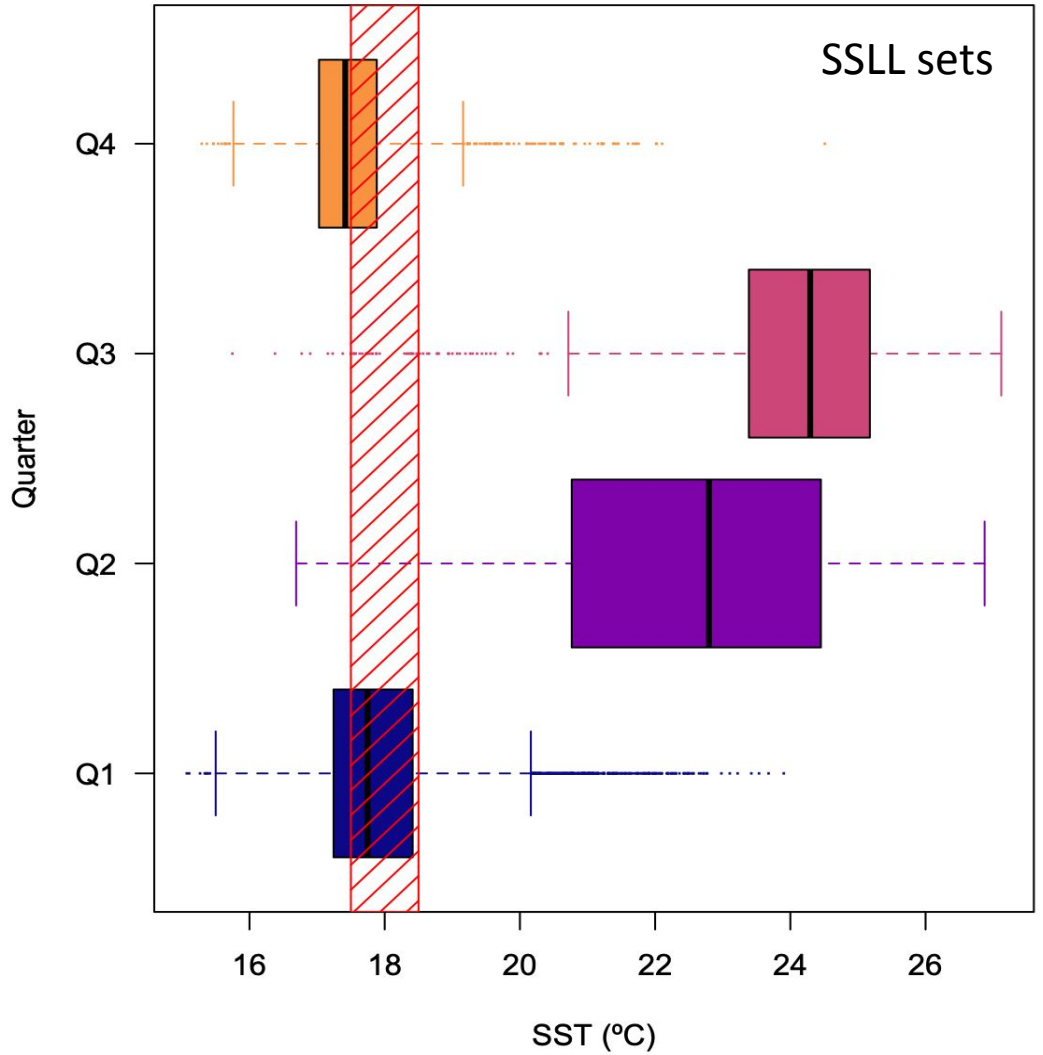
Seasonal movement of loggerhead and SSLL





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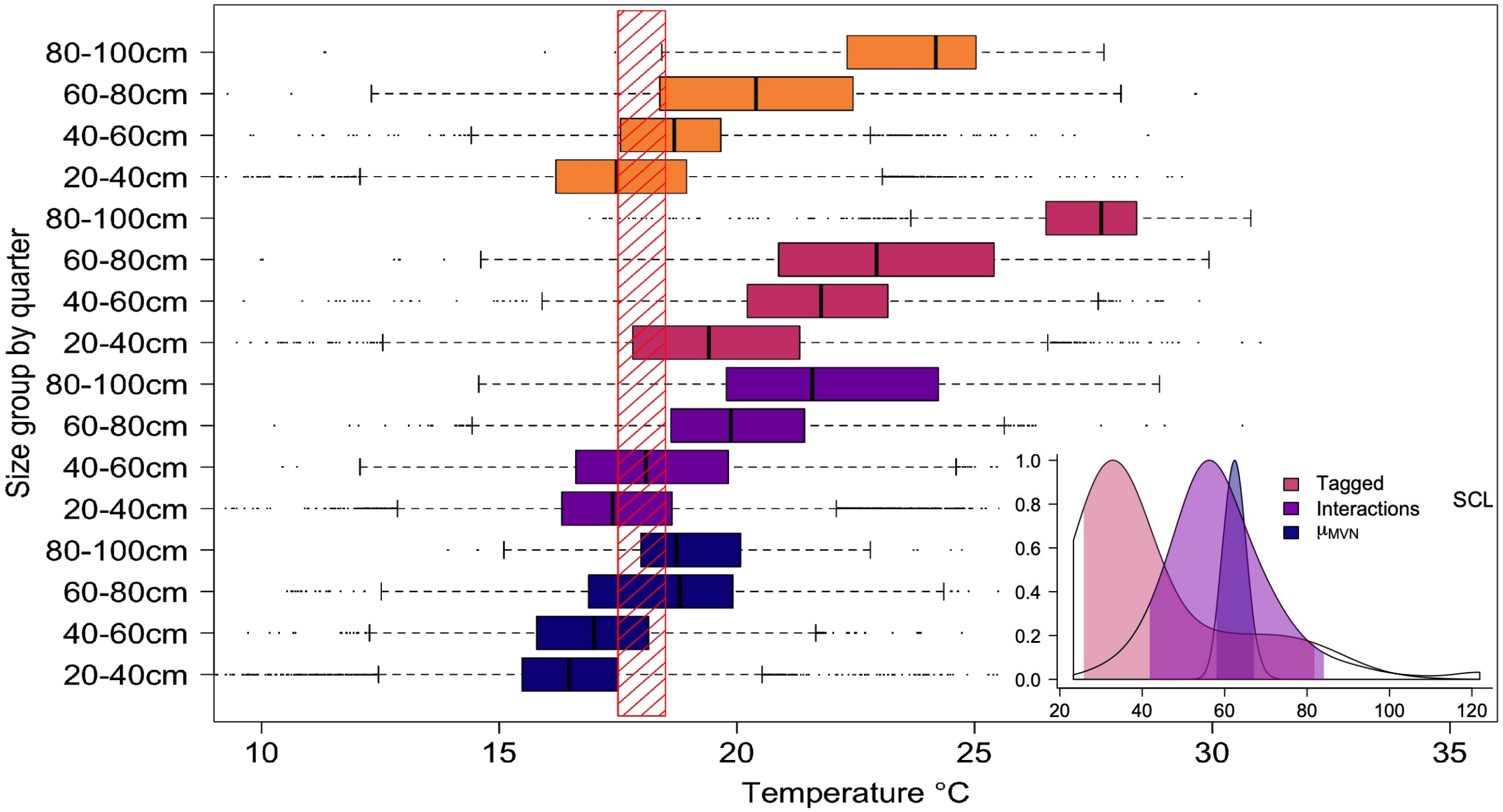
Loggerhead temperature distribution by size (SCL)



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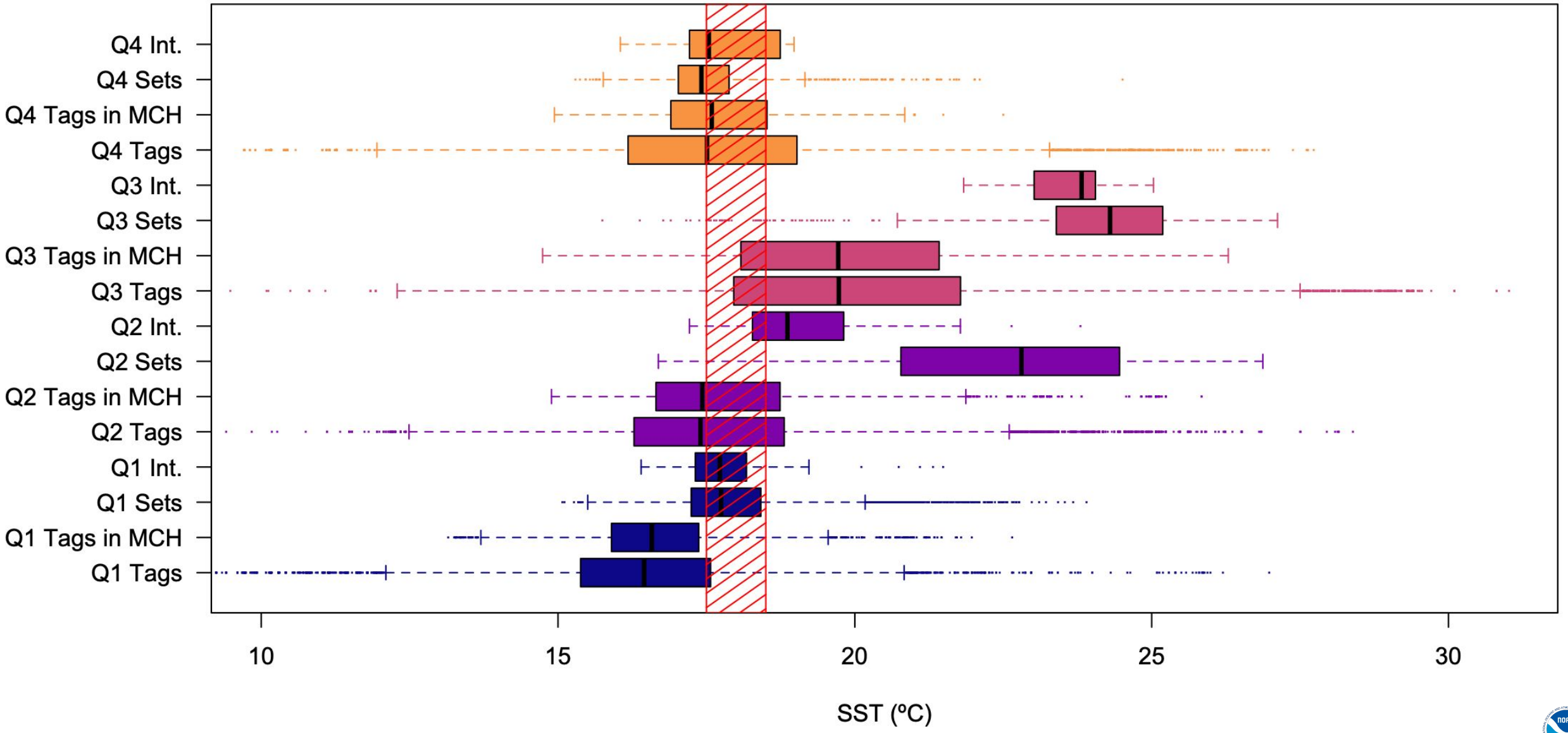
Quarterly temperature distribution of tags, sets and intercepts



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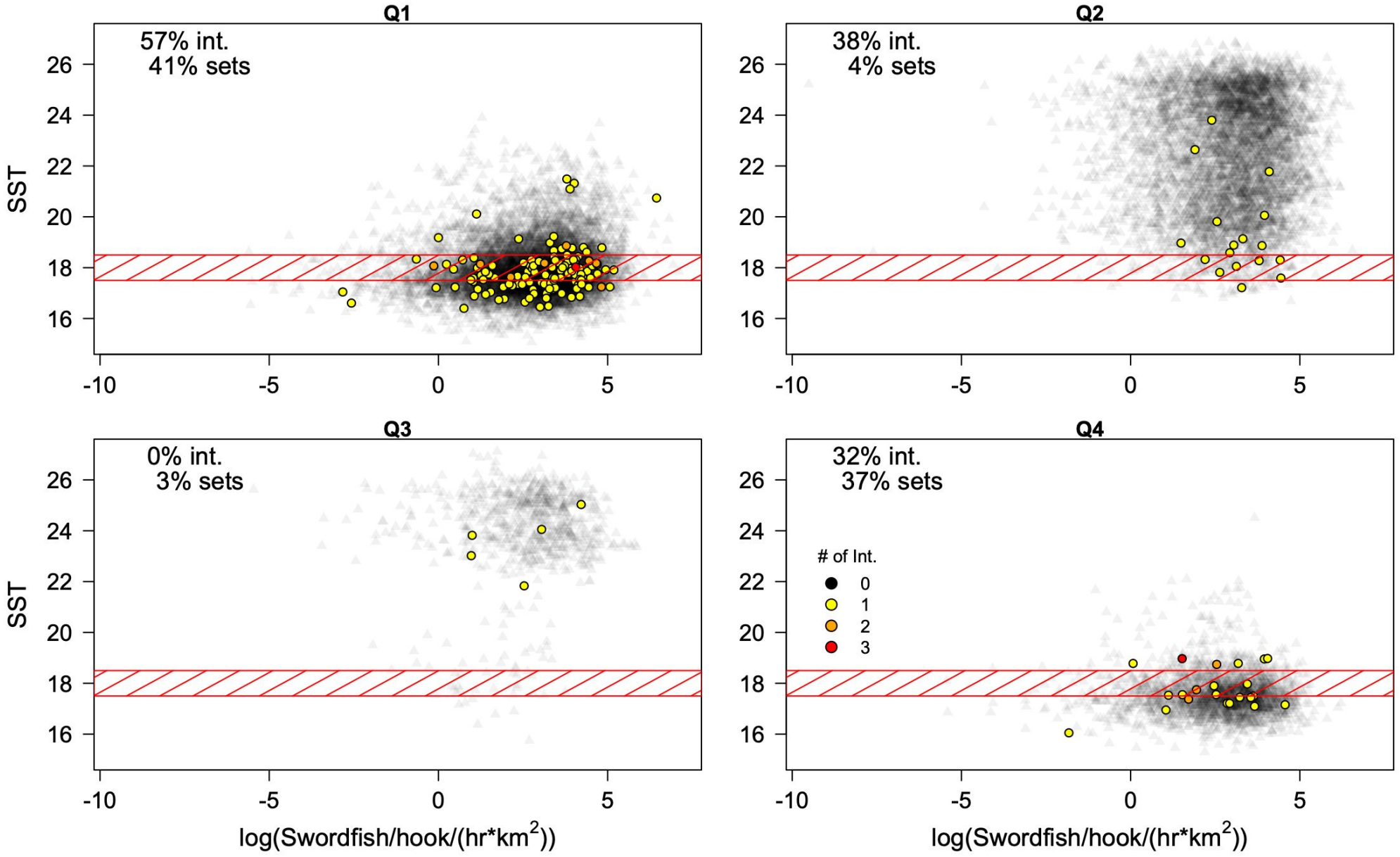
Swordfish catch rate by SST with loggerhead intercepts



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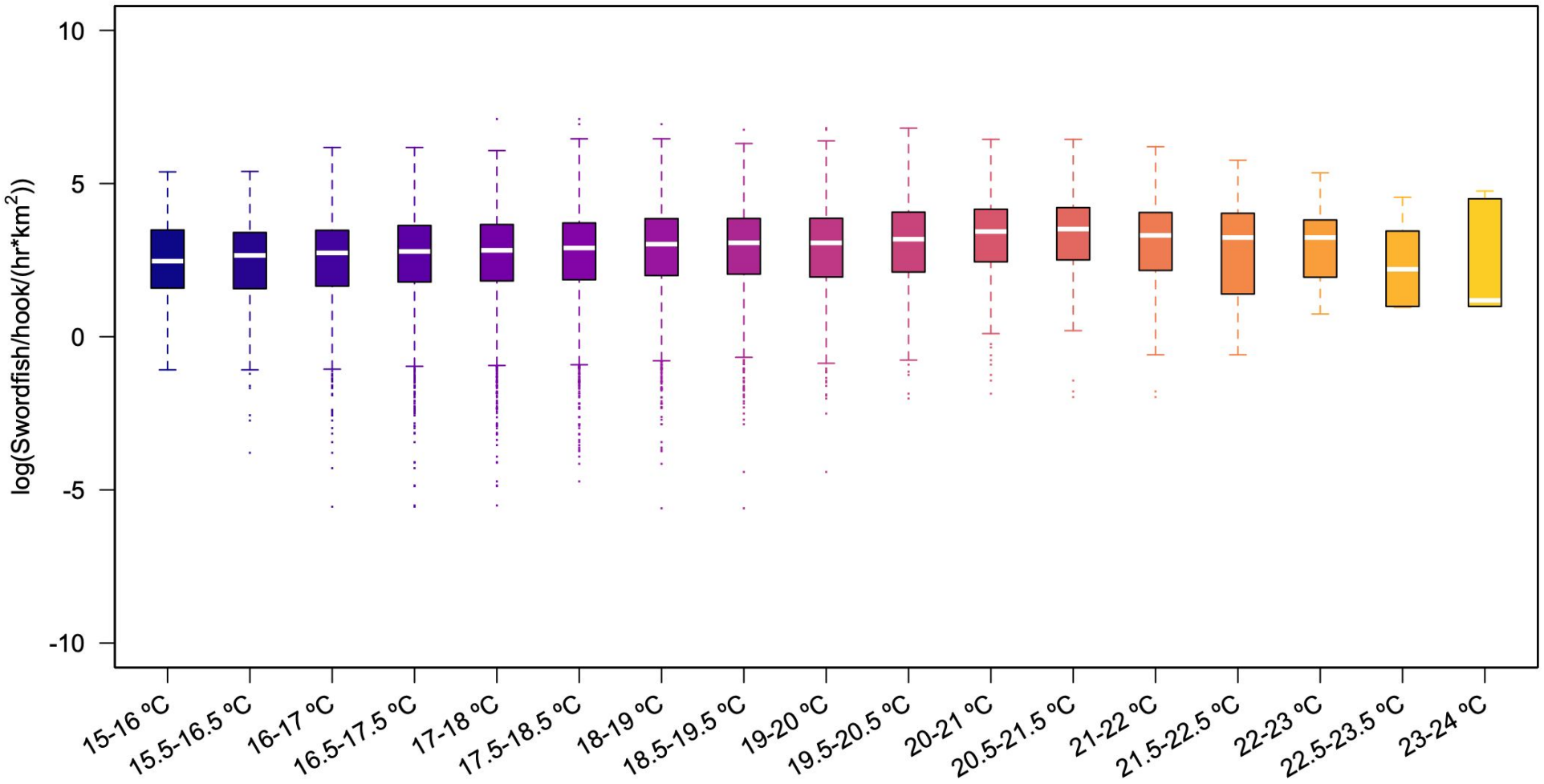
Swordfish Q1 catch rate by 1℃ temperature band



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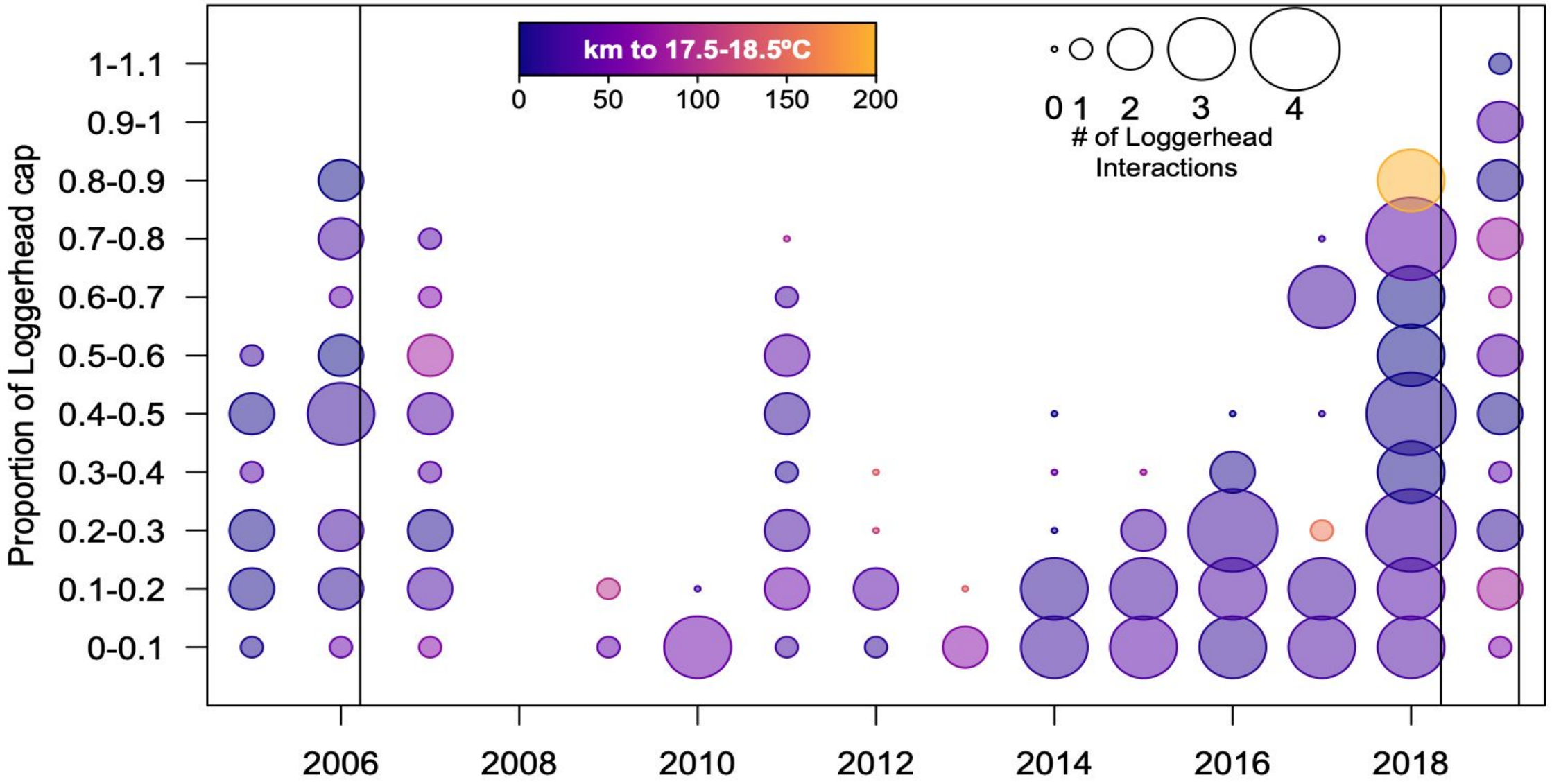
Loggerhead interactions and distance to TurtleWatch band vs. proximity to cap



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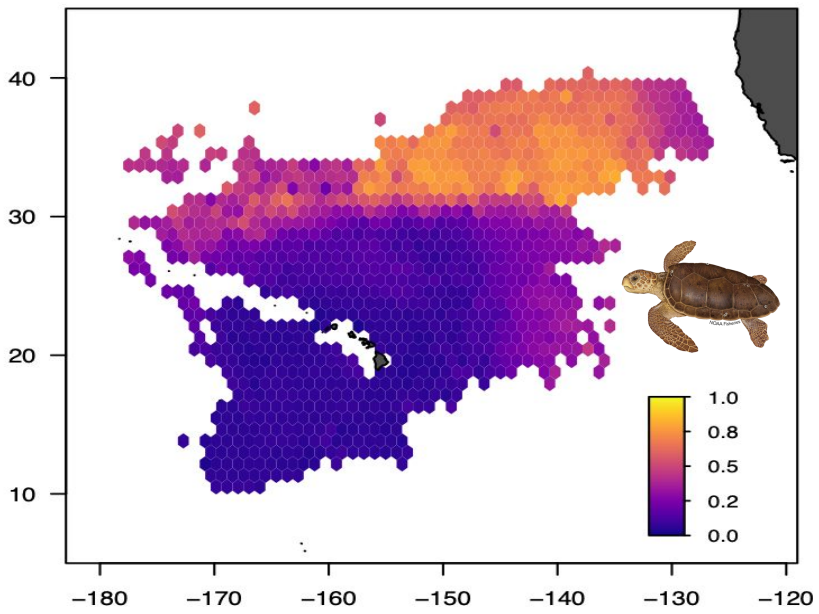
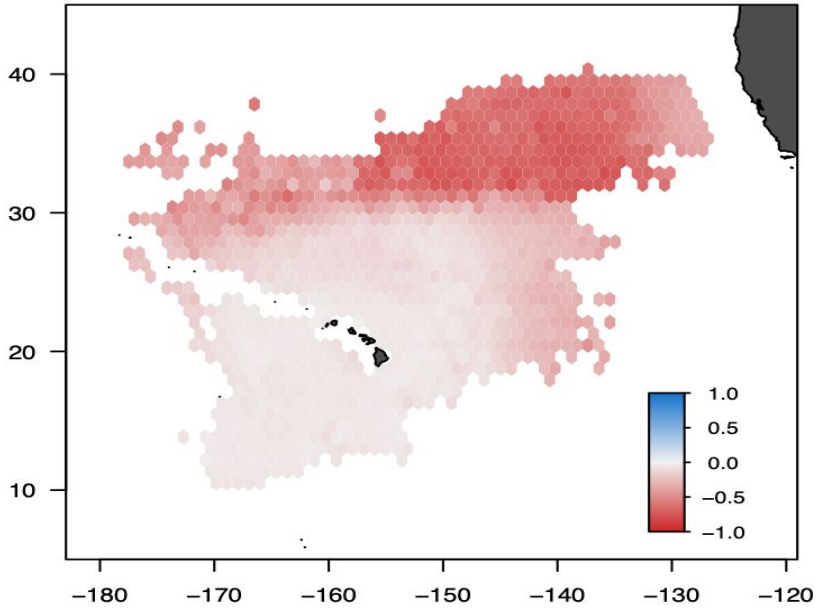
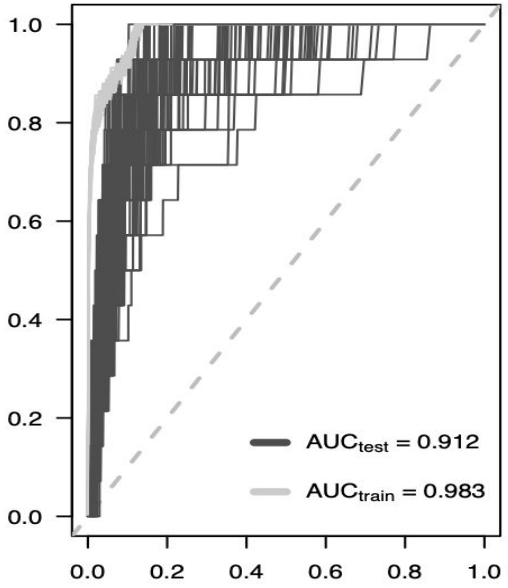
Beyond a single metric?



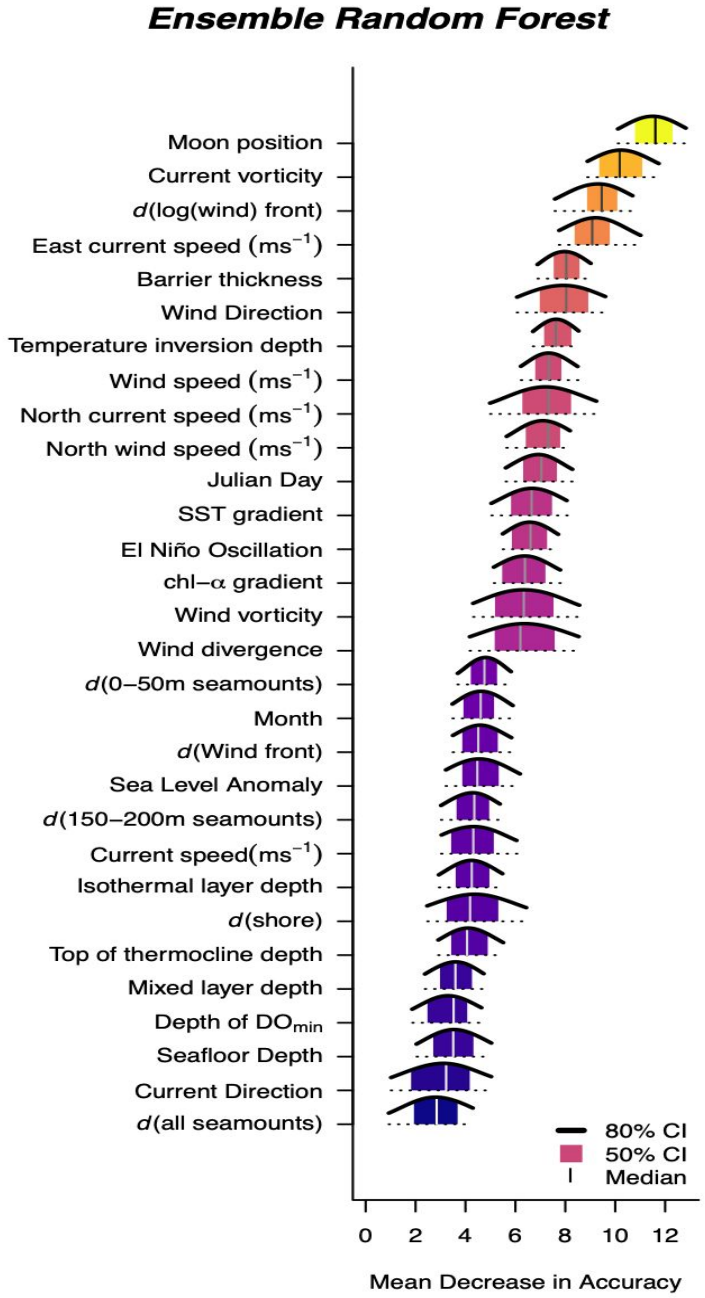


Observed \ Predicted	0	1
0	55212	9136
1	0	139

* from mean predictions



	Train	Test
Accuracy	0.858	0.859
Error	0.142	0.141
FPR	0.142	0.141
Sensitivity	1	0.822
Specificity	0.858	0.859
ϕ	0.113	0.091



Siders, Zachary A., et al. "Ensemble Random Forests as a tool for modeling rare occurrences." ESR 43 (2020): 183-197 https://www.int-res.com/articles/esr2020/43/n043p183.pdf

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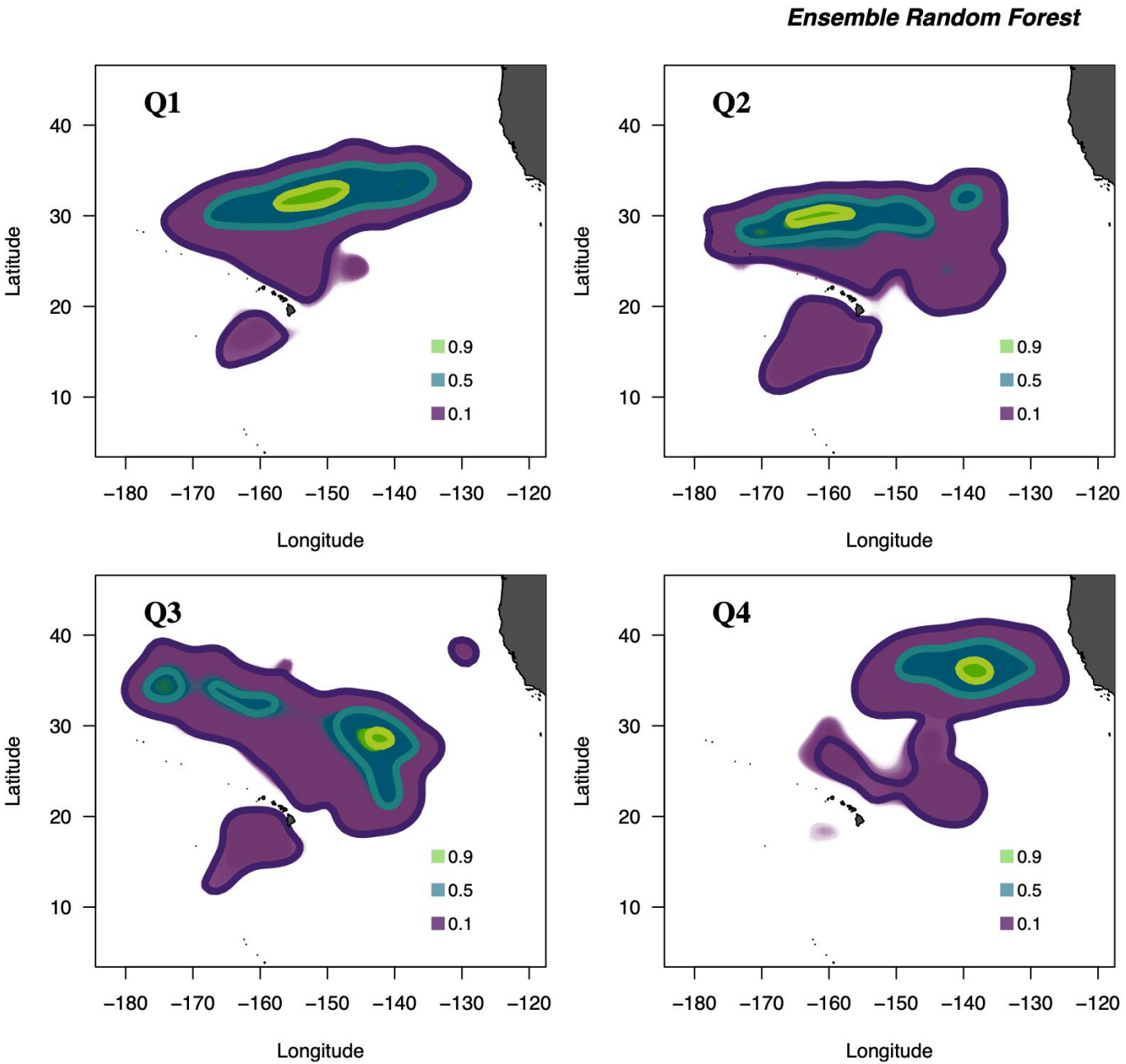
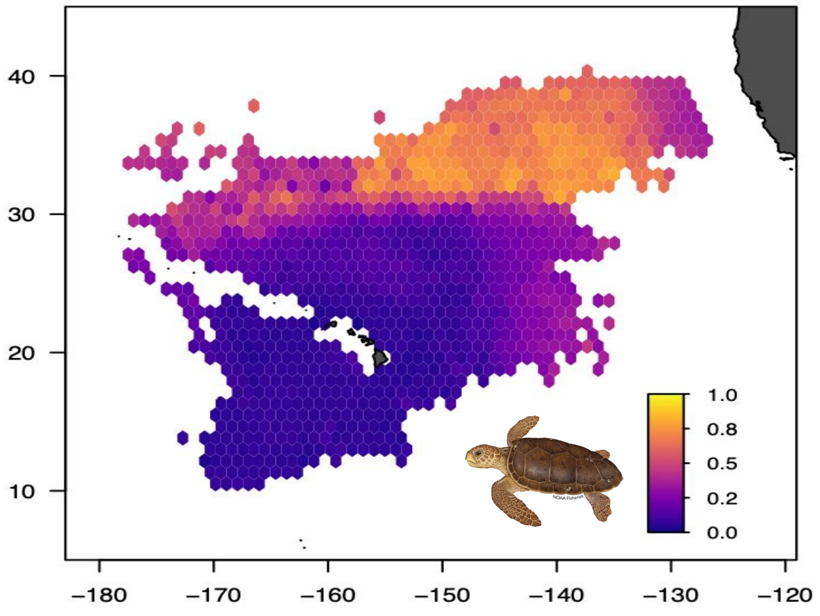
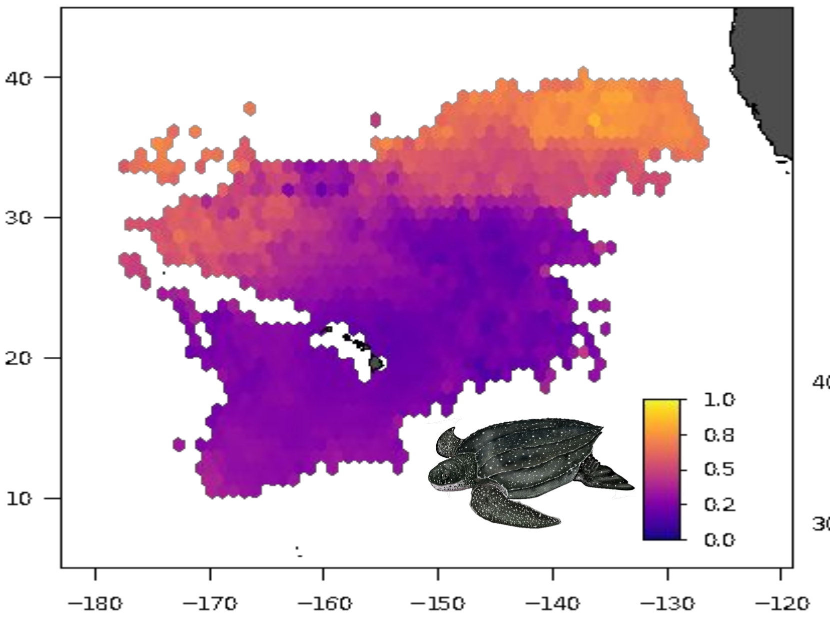
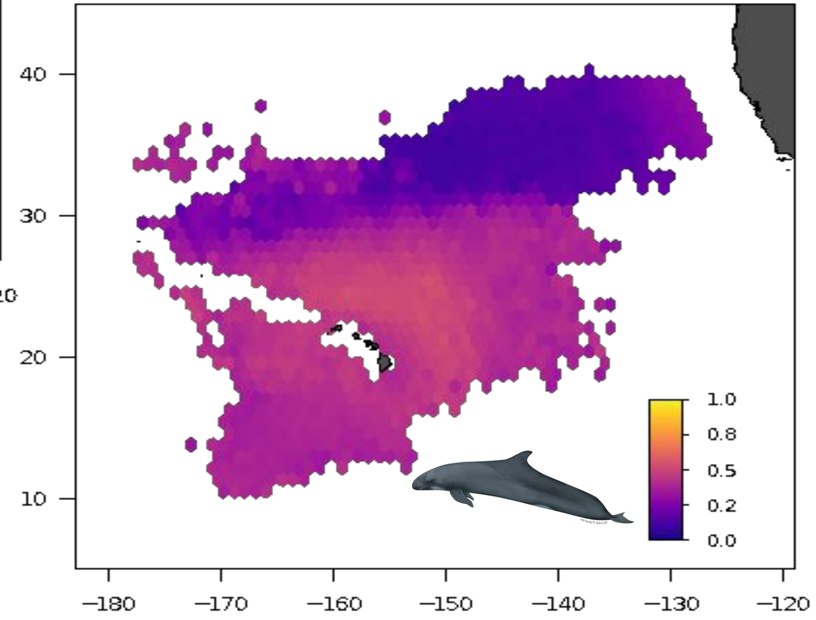
Dynamic ocean management?

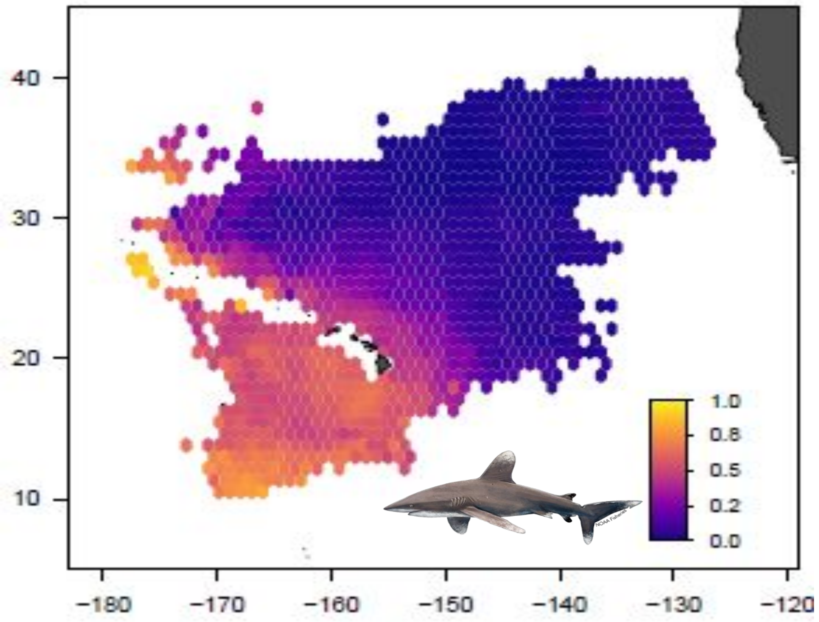


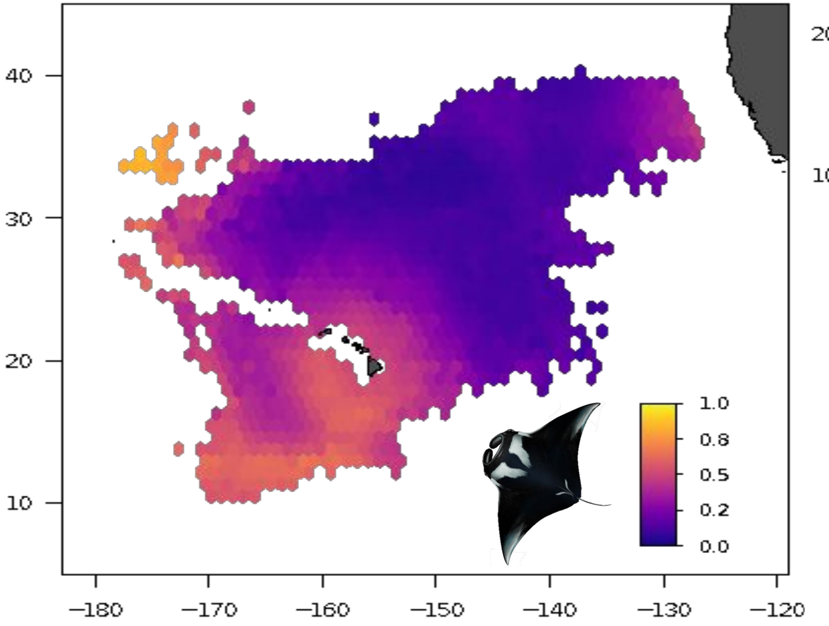
Multiple species?











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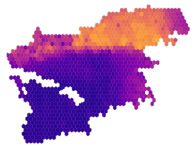
Earth observations for sustainable tuna management and biodiversity



Models of interactions

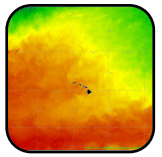
- Even with rare events predictive models can be developed – simple to complex
- The utility of these models will depend on the spatial correlation in the data.

Multiple Species?

- There may be synergistic options that reduce interactions with multiple species.
- There may not be.

Target species catch rate

- How will effort redistribute?
- How will this redistribution impact target species catch rates?



Dynamic observations?

- Consider the nature of the input data carefully.
- What time scale do predictions need to be made on?