

Ocean Predictions for Marine Resource Management

NOAA's Changing Ecosystems and Fisheries Initiative (CEFI)

Mike Jacox*

NOAA Southwest Fisheries Science Center
NOAA Physical Sciences Laboratory

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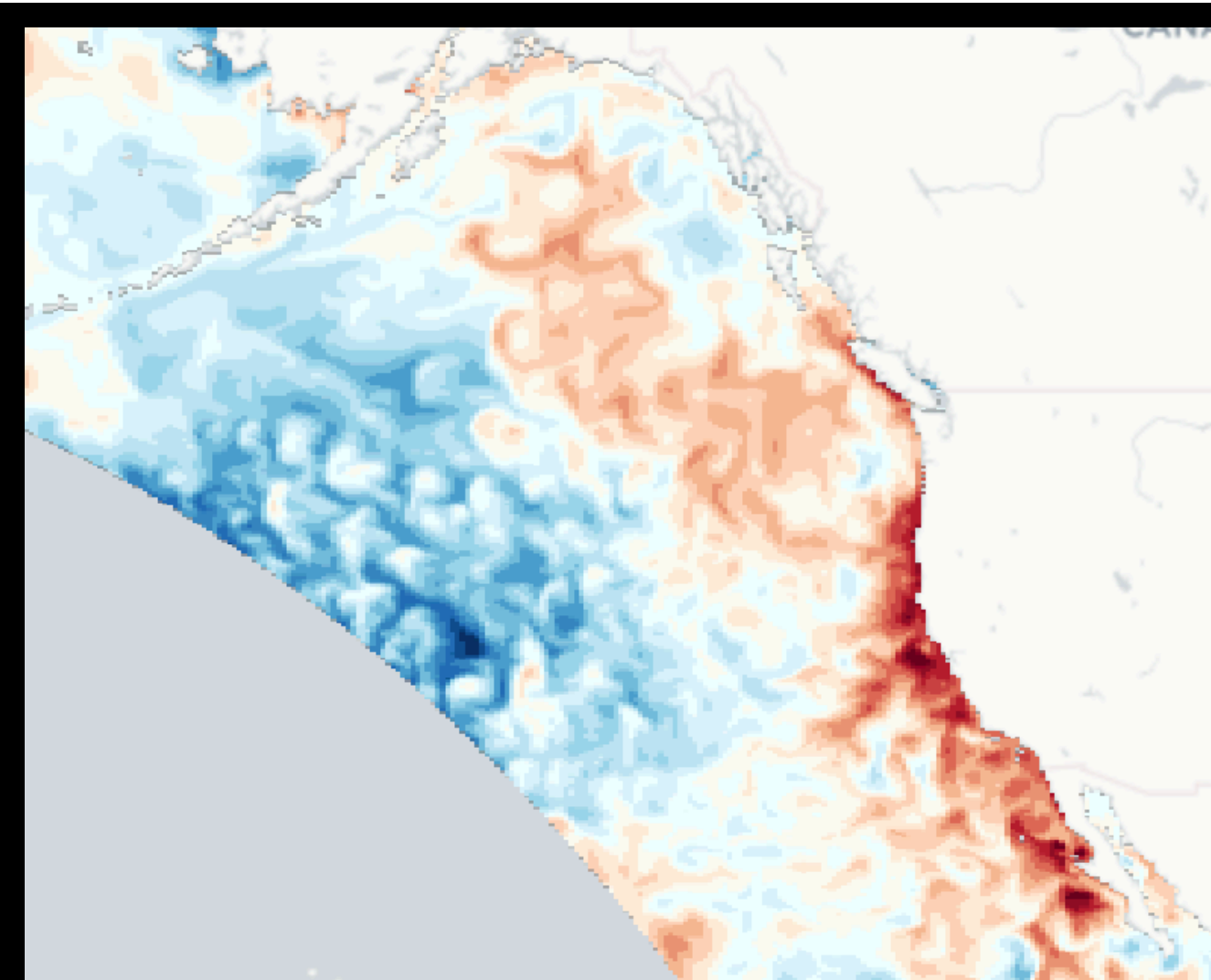
*with contributions from the CEFI ocean modeling, data portal, and decision support teams



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NOAA's Changing Ecosystems and Fisheries Initiative (CEFI)

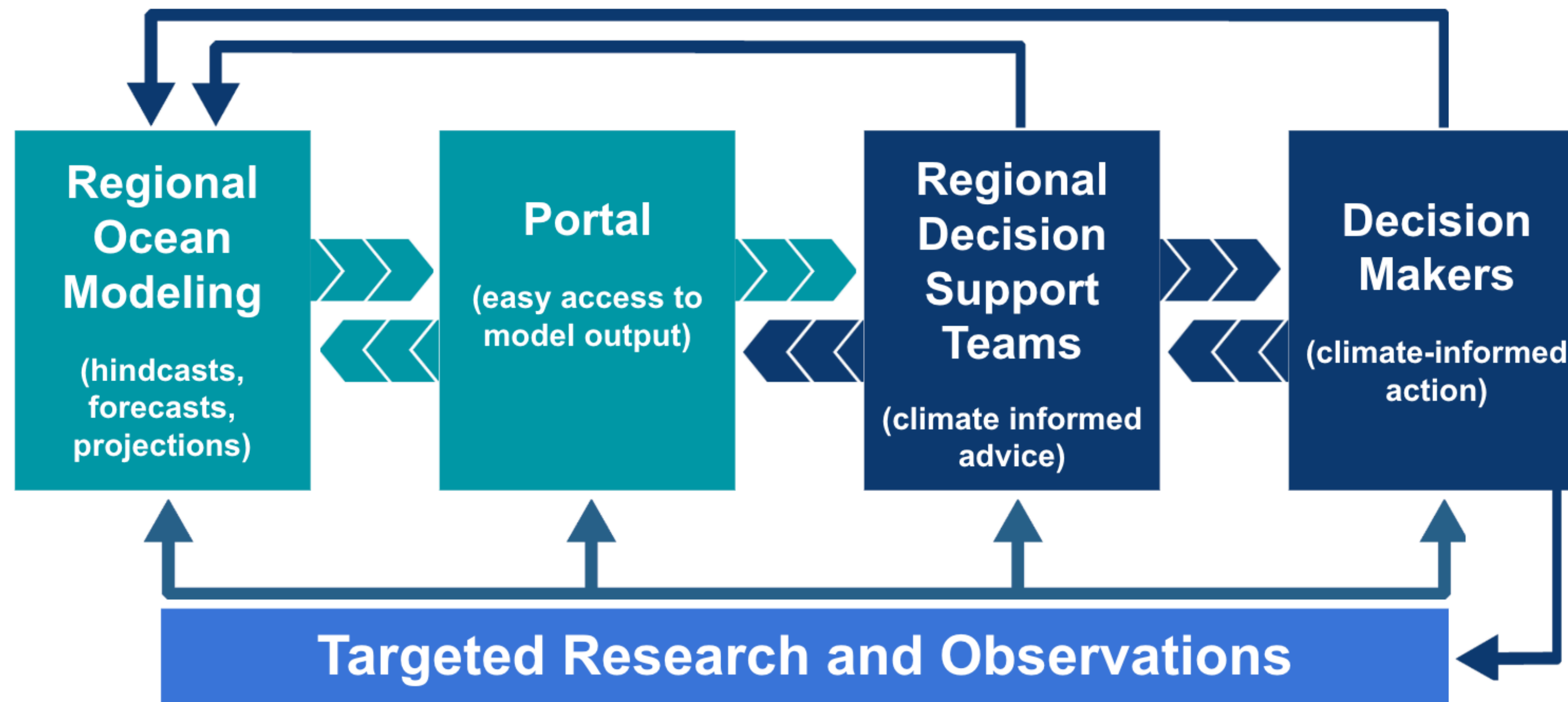
Provide ocean forecasts and decision support tools that enable resource managers and stakeholders to adapt to changing ocean conditions and related impacts on marine ecosystems and fisheries



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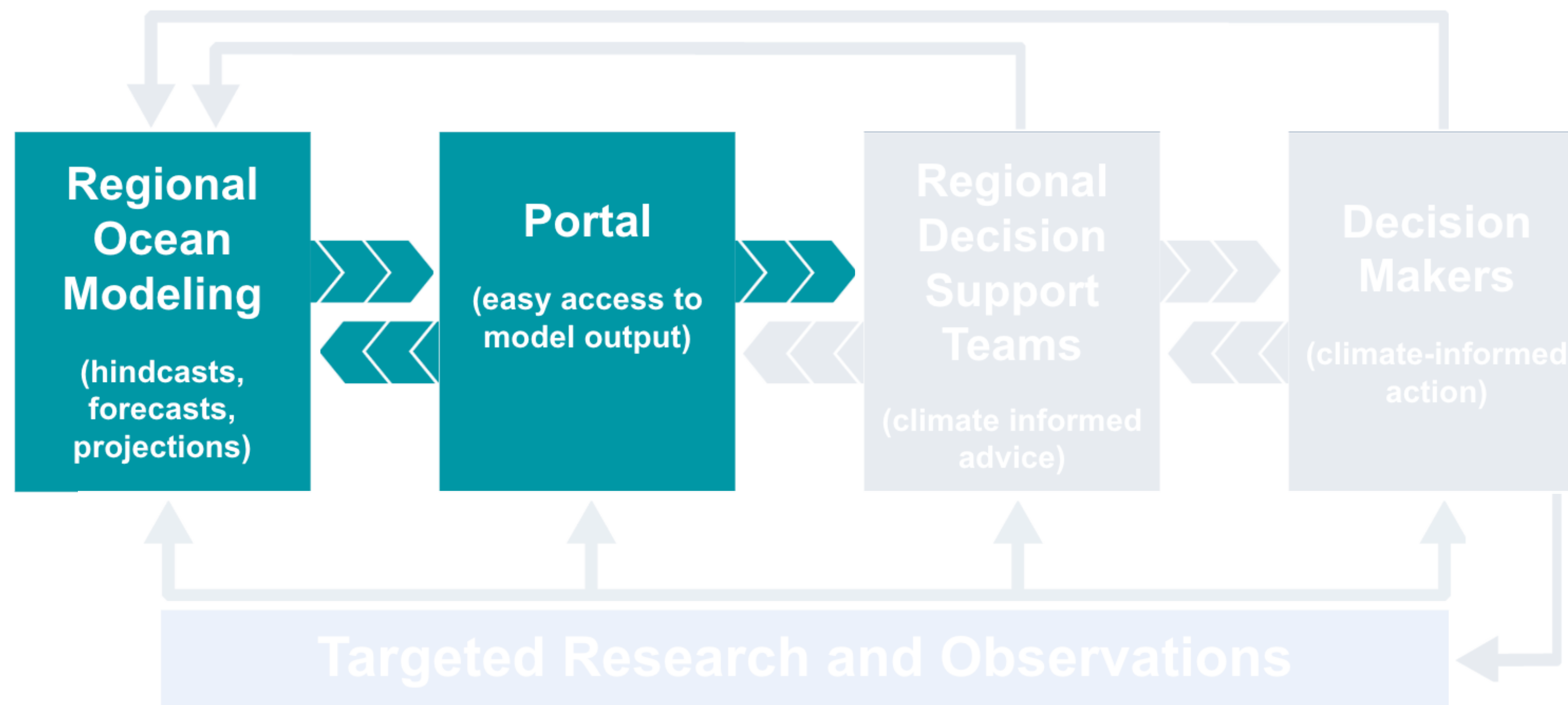
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MOM6-COBALT configuration

Ocean - sea ice - biogeochemistry
ERA5 + GLORYS12 historical forcing
6-12 km resolution
z* vertical coordinate

Products (frequency)

Historical (annual update)
Seasonal forecast (4x per year)
Decadal forecast (1x per year)
Long-term projection (every ~5 years)

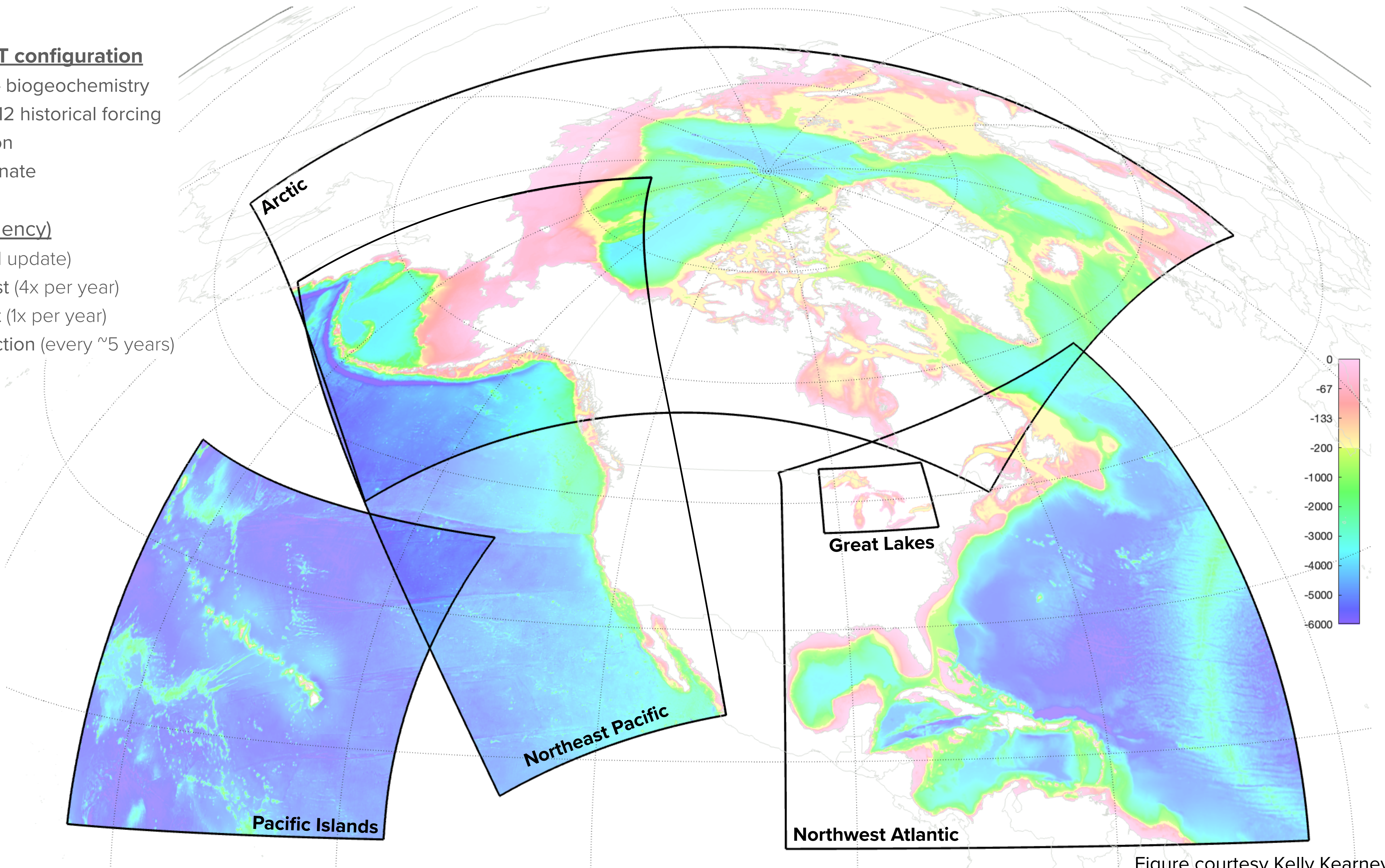


Figure courtesy Kelly Kearney

Northwest Atlantic

Historical ([Ross et al. 2023](#))

Retrospective seasonal forecasts ([Ross et al. 2024](#))

Real-time seasonal forecasts (data portal)

Retrospective decadal forecasts ([Koul et al. 2024](#))

Long-term projections (in prep)

Northeast Pacific

Historical ([Drenkard et al. 2023](#))

Retrospective seasonal forecasts (in prep)

Arctic

Historical (in prep)

Pacific Islands

Historical (in prep)

Great Lakes

Historical (in prep)

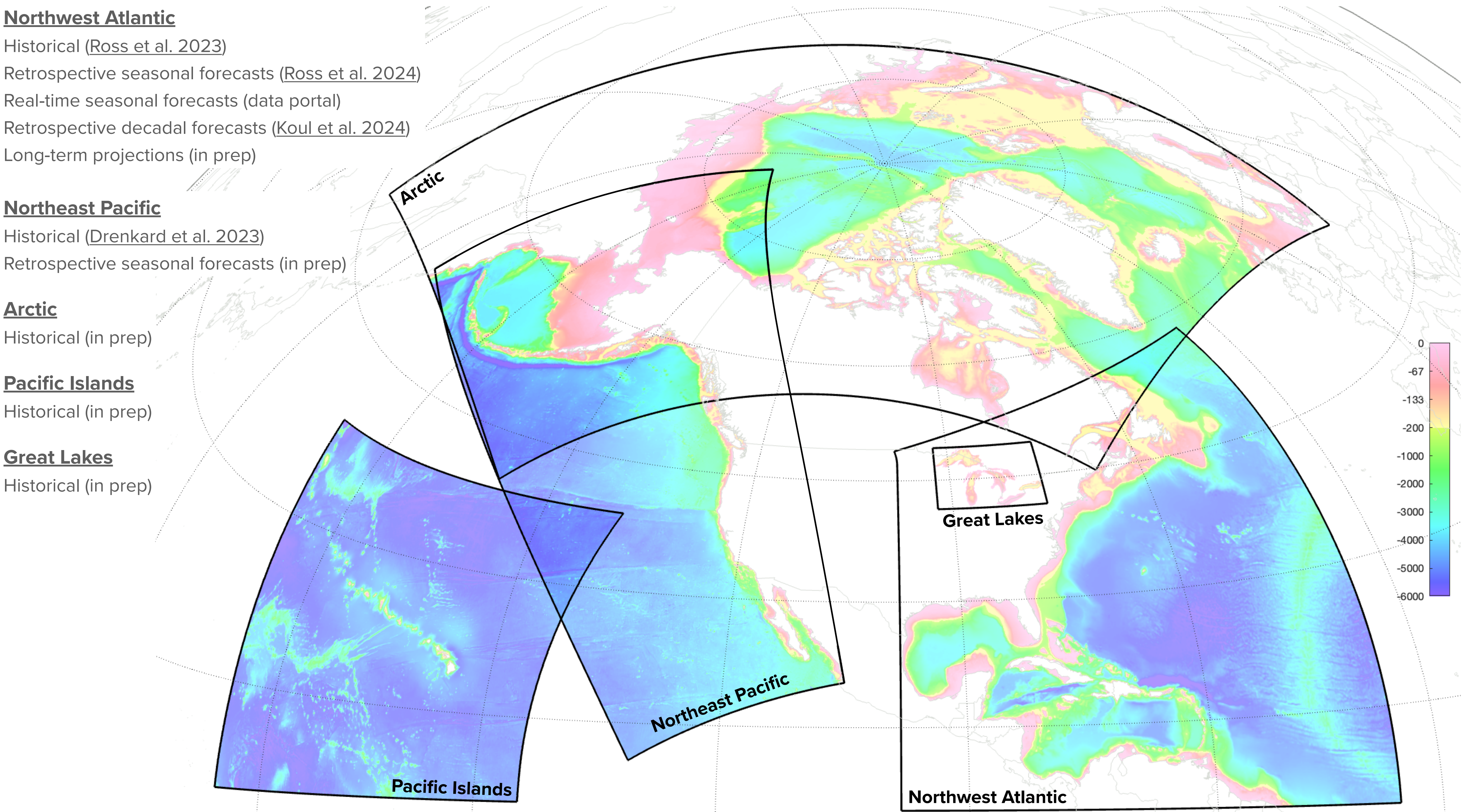


Figure courtesy Kelly Kearney

Data Access via

psl.noaa.gov/cefi_portal

Visualization | Download | THREDDS/OPeNDAP | Cloud | Cookbooks

Regional MOM6 COBALT - Hindcast

Data Options

Region :

Subregion :

Frequency :

Data Category :

Variable :

Statistics :

Depth :

Blocked depth :

Analyses dashboard :

Figure options

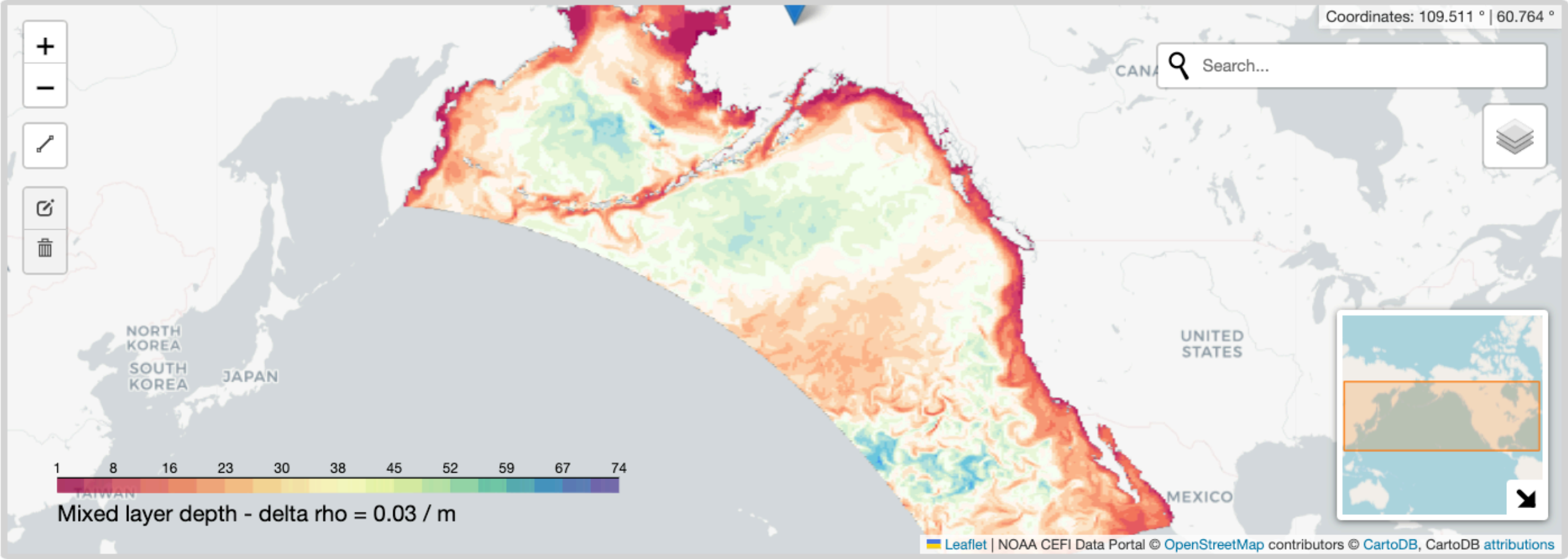
Maximum Value :

Minimum Value :

Number of Discrete Values:

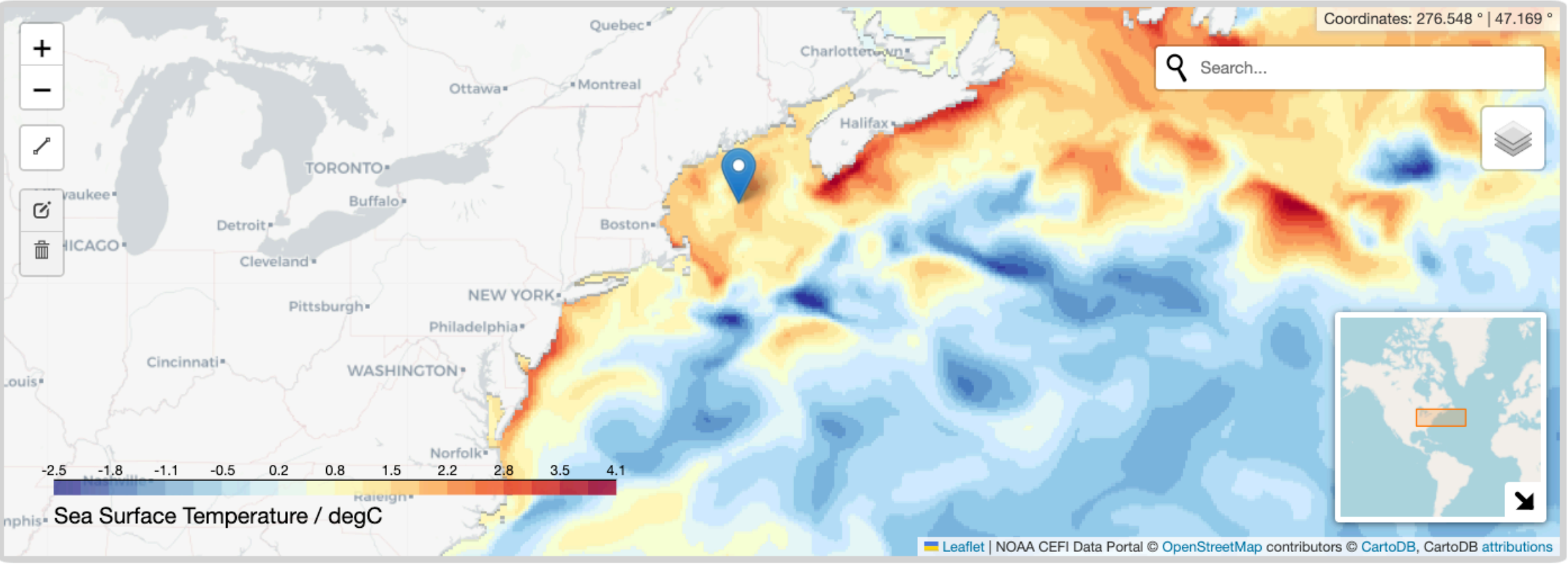
Colorbar ? :

Northeast Pacific Mixed Layer Depth (m)



Hindcast time : 1994-10

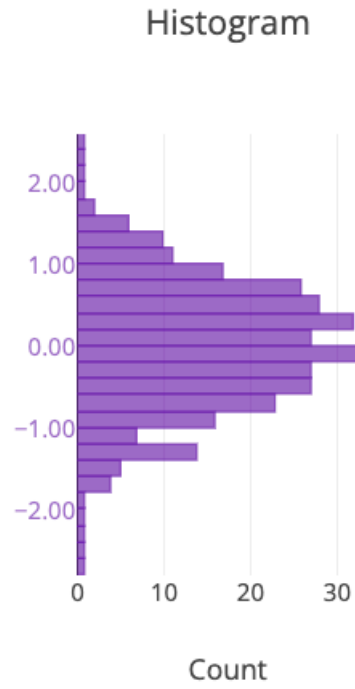
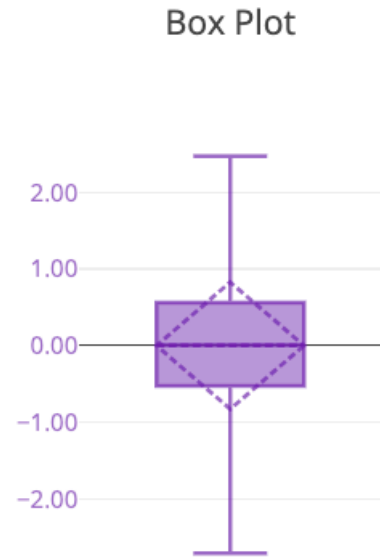
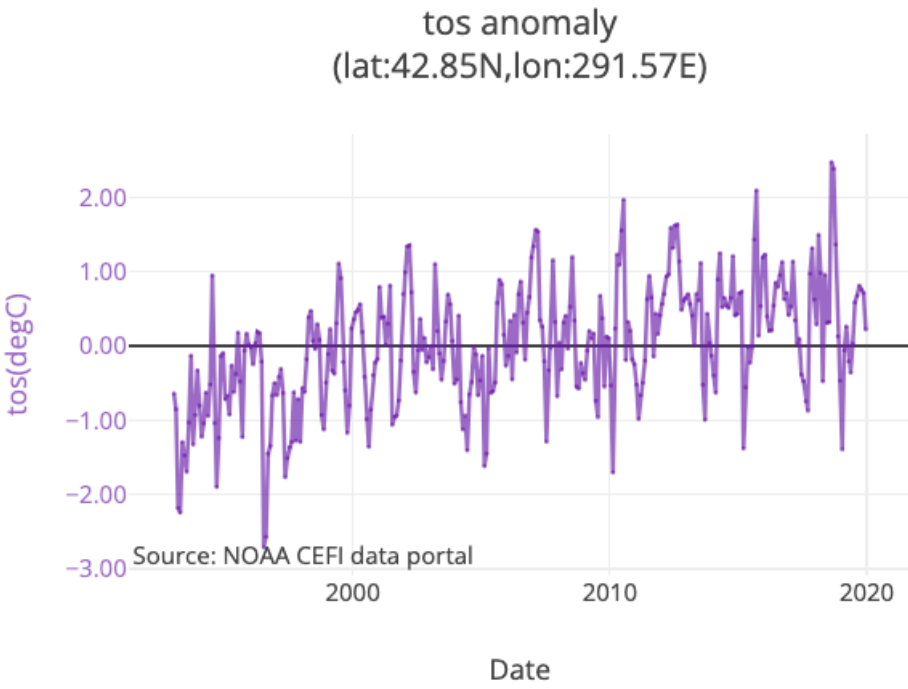
Northwest Atlantic SST Anomaly (°C)



Hindcast time : 2012-07



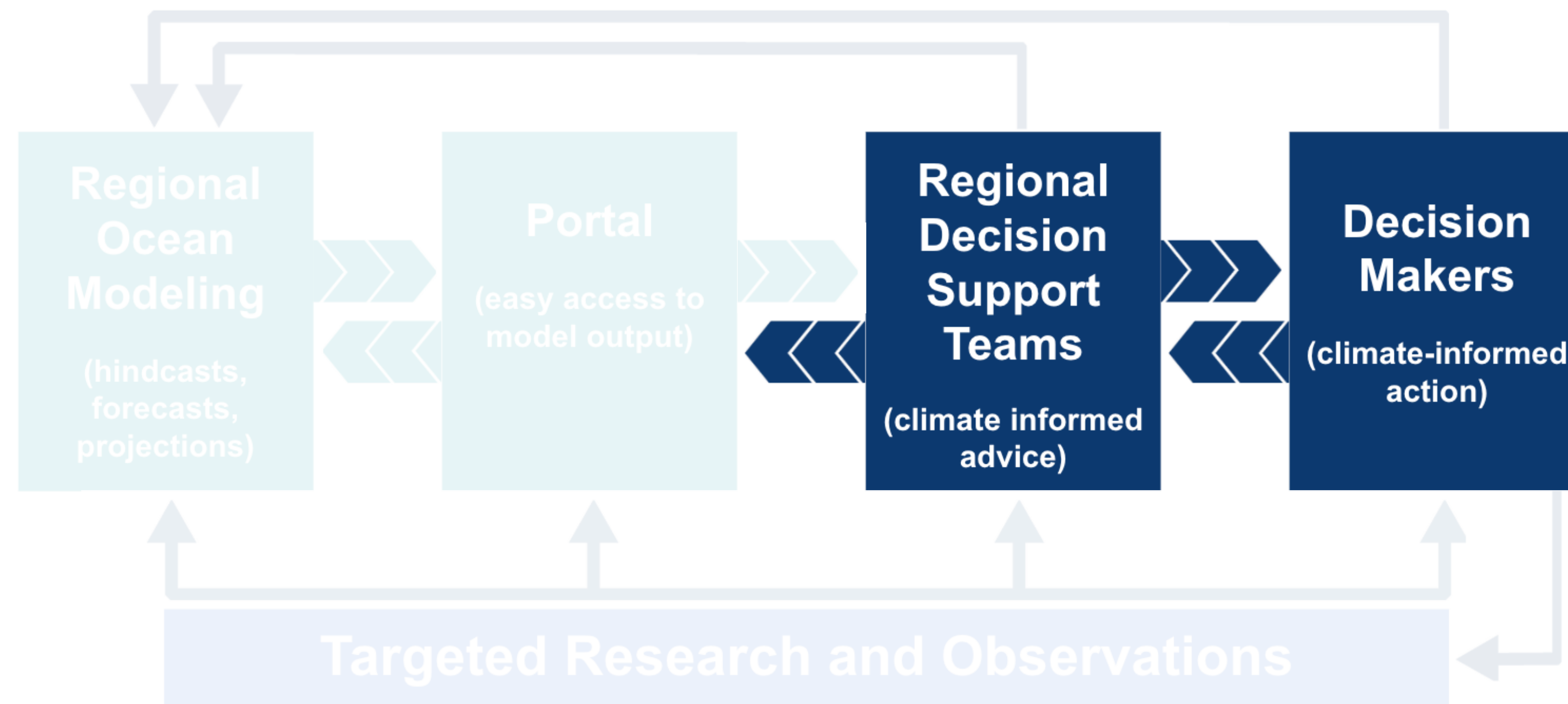
Time Series Analyses

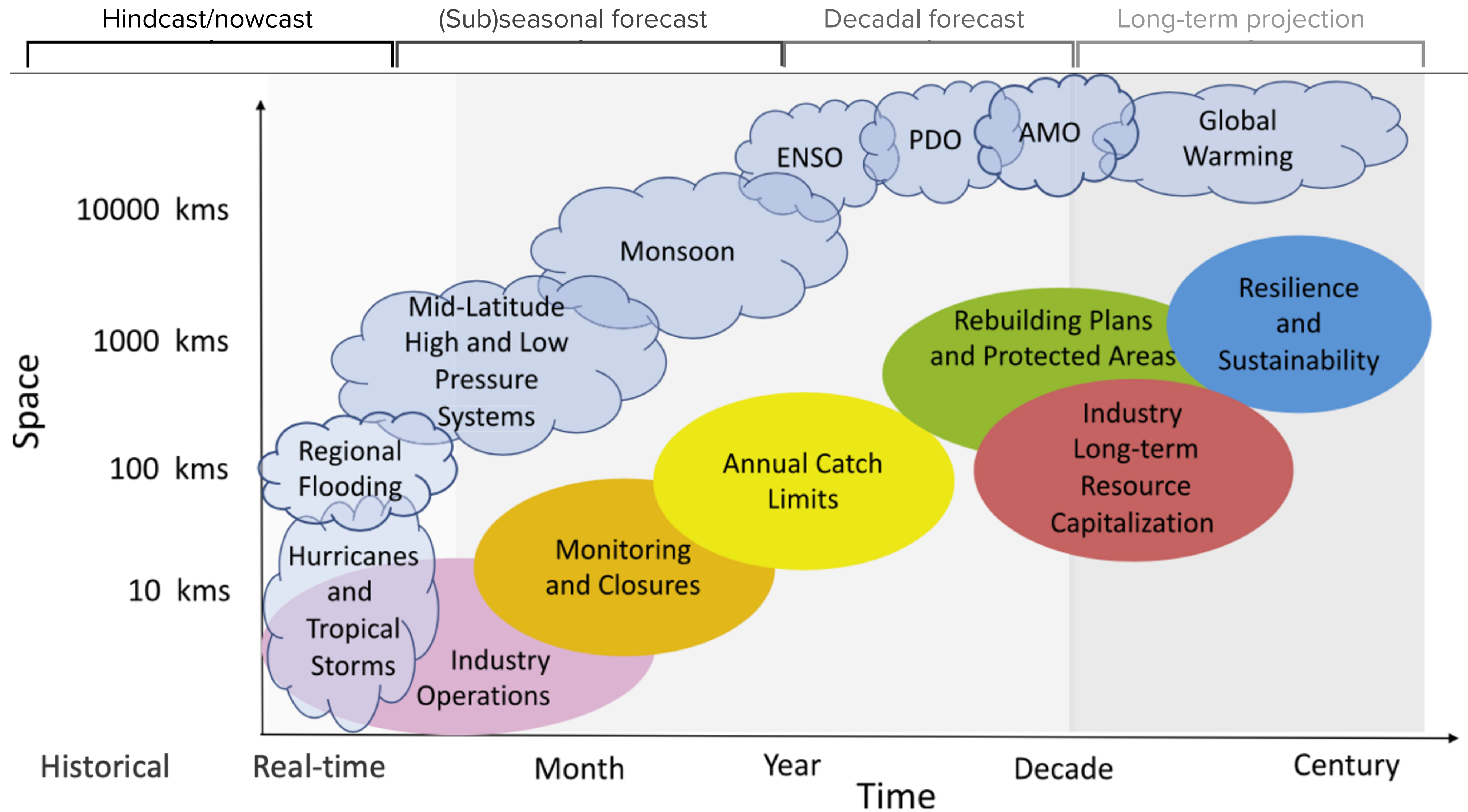


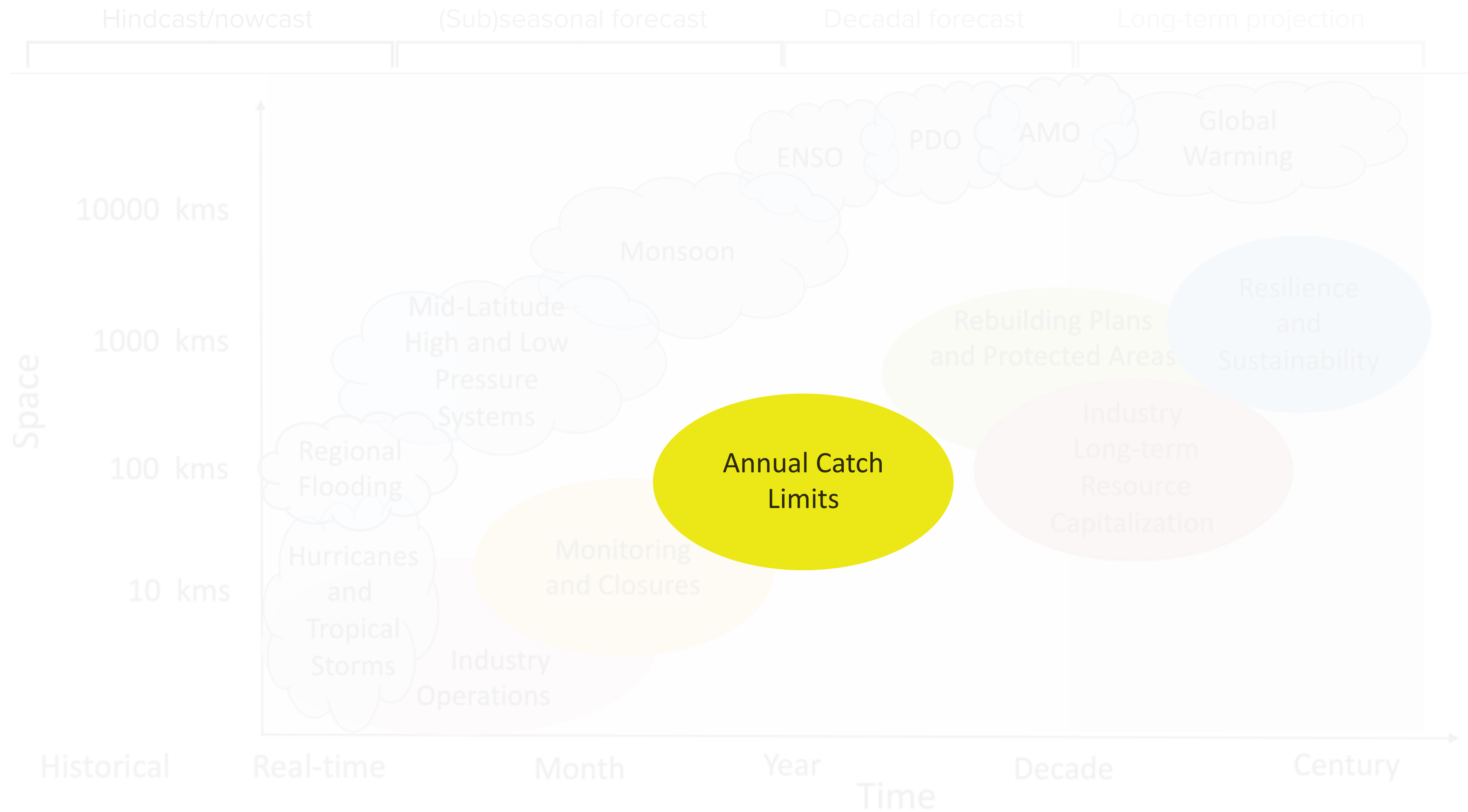
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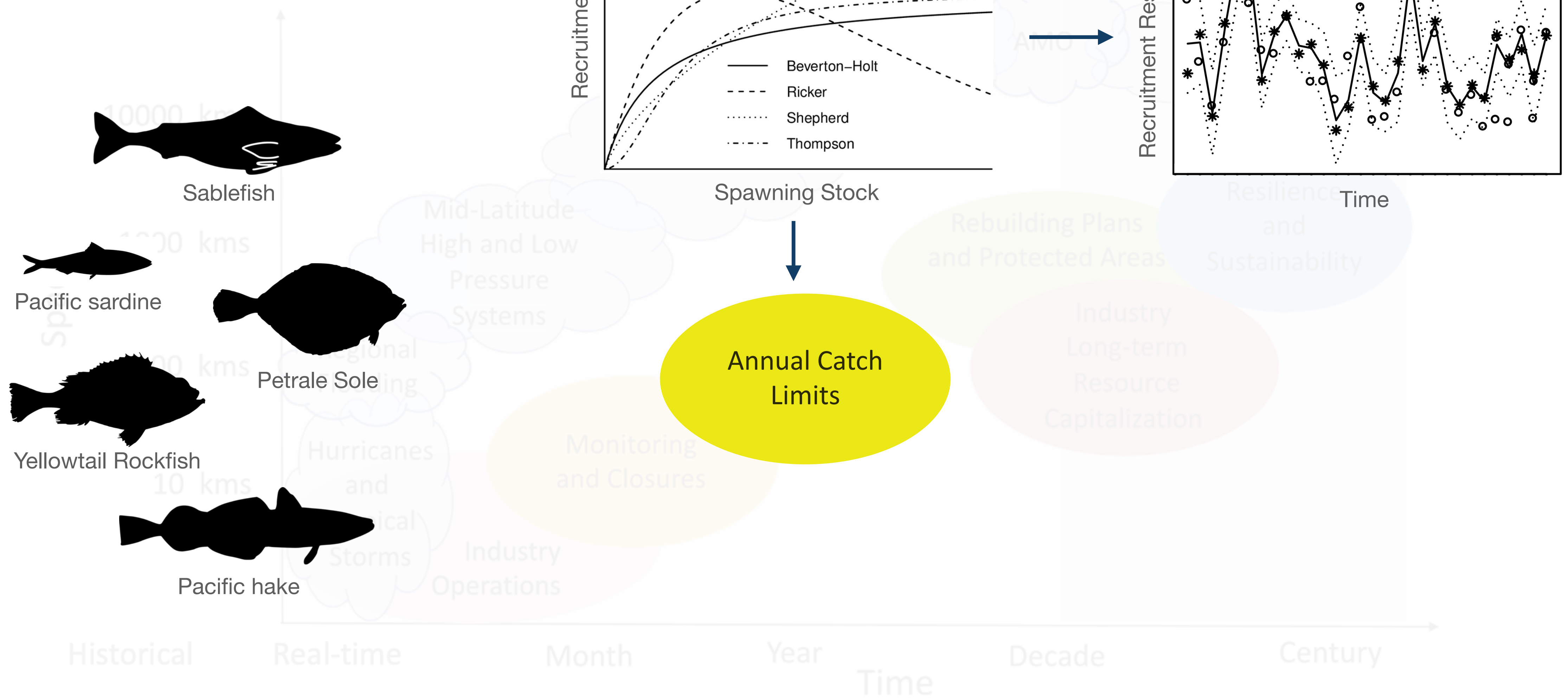
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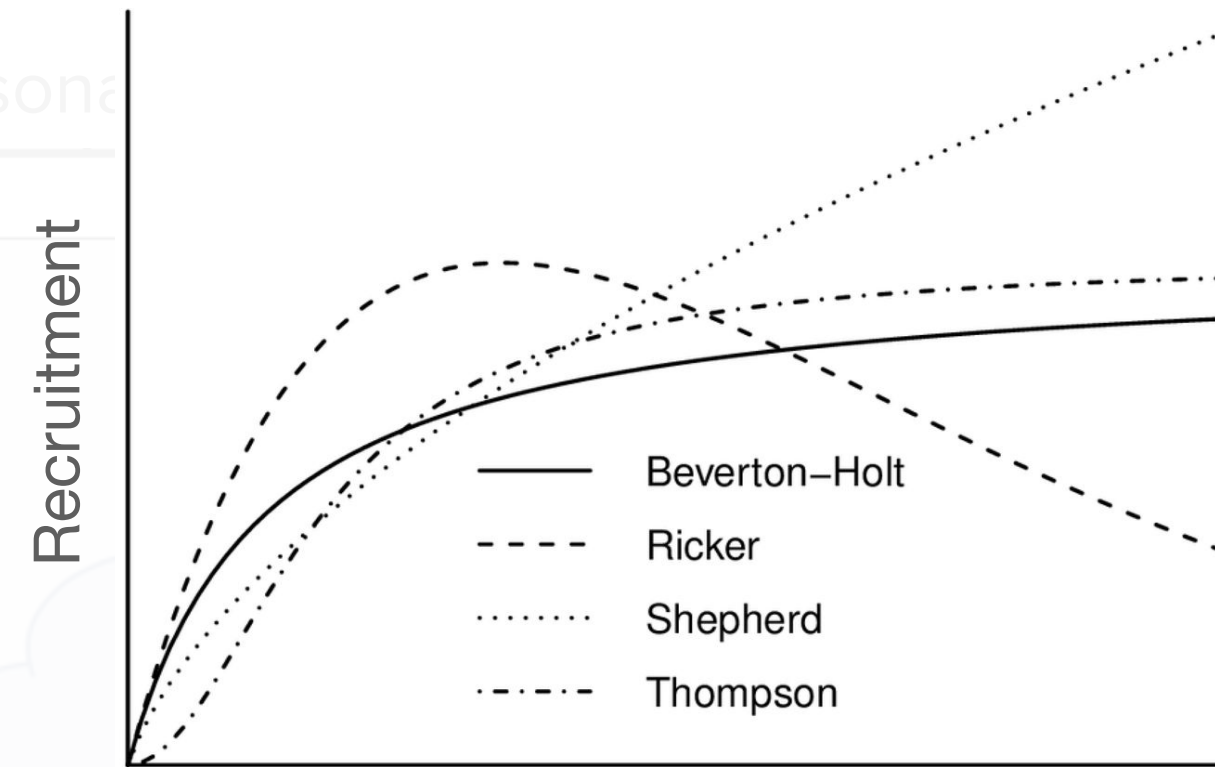
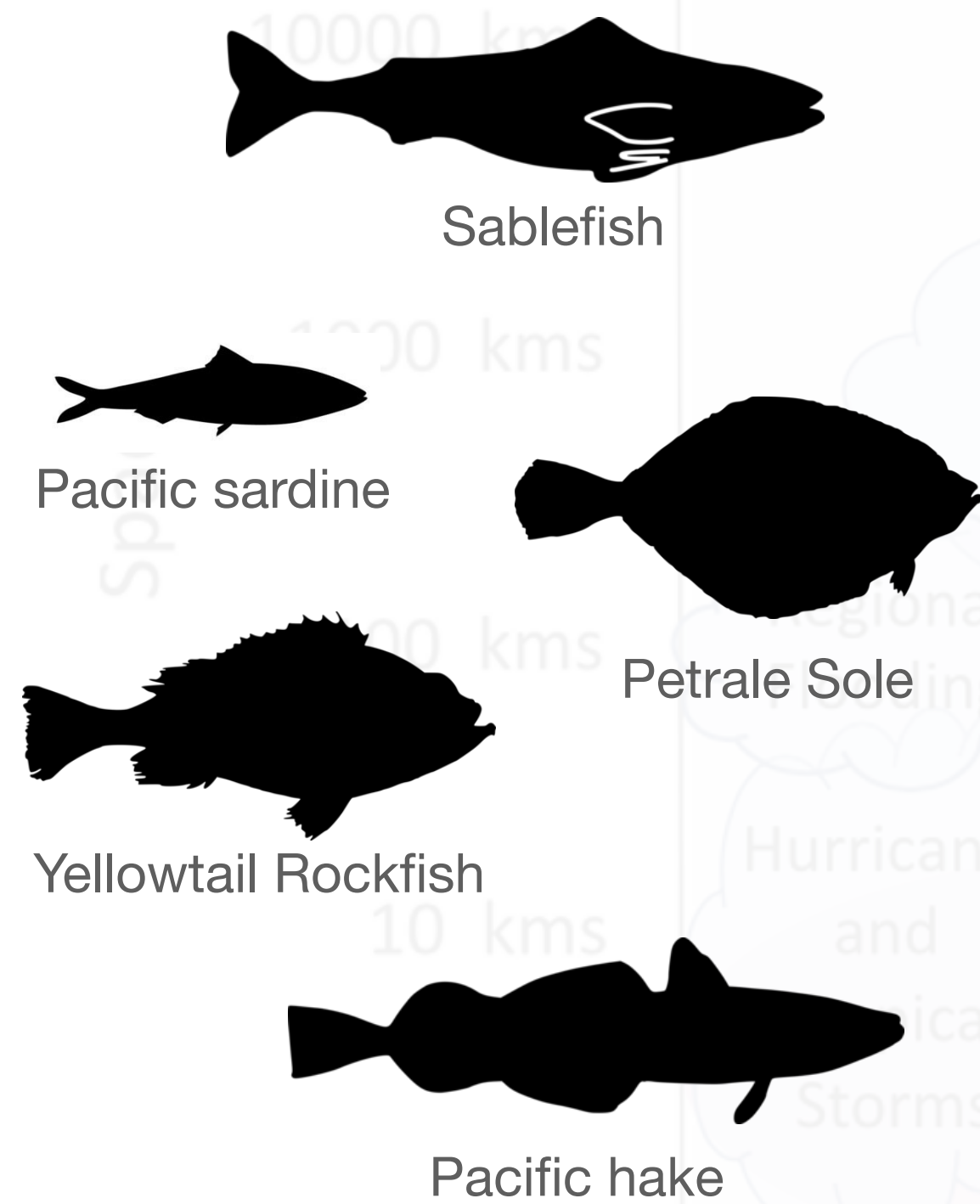




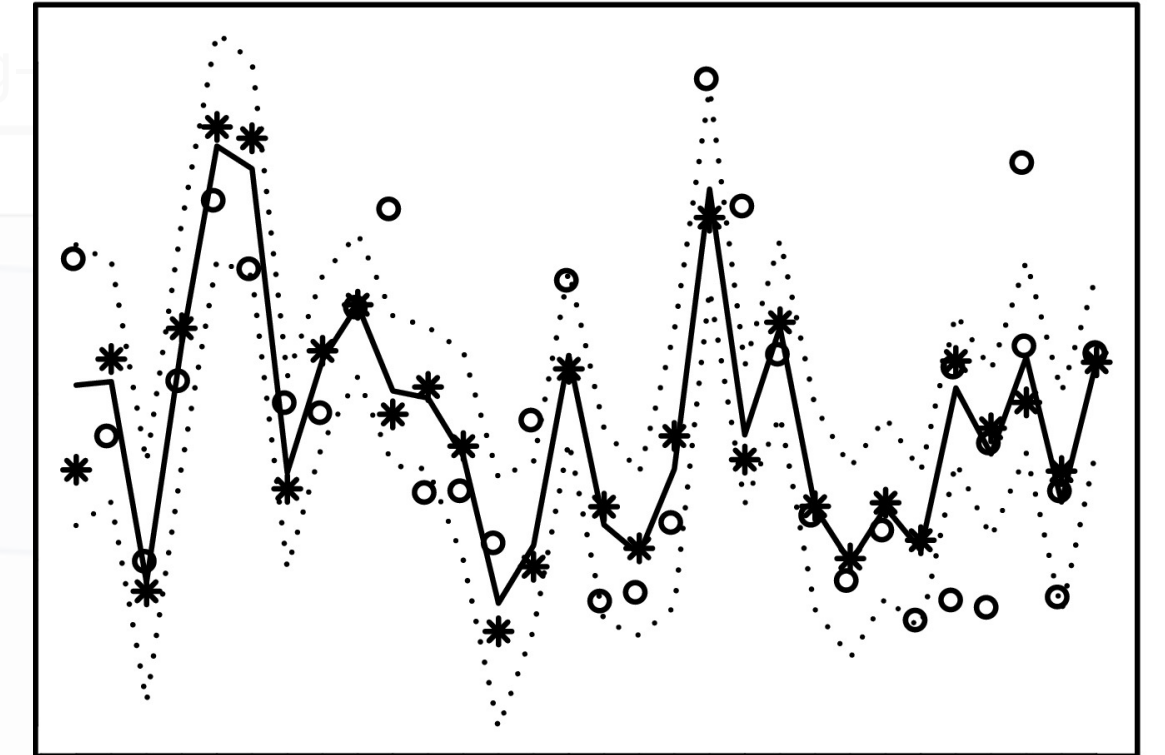
Climate-Enhanced Stock Assessment



Climate-Enhanced Stock Assessment



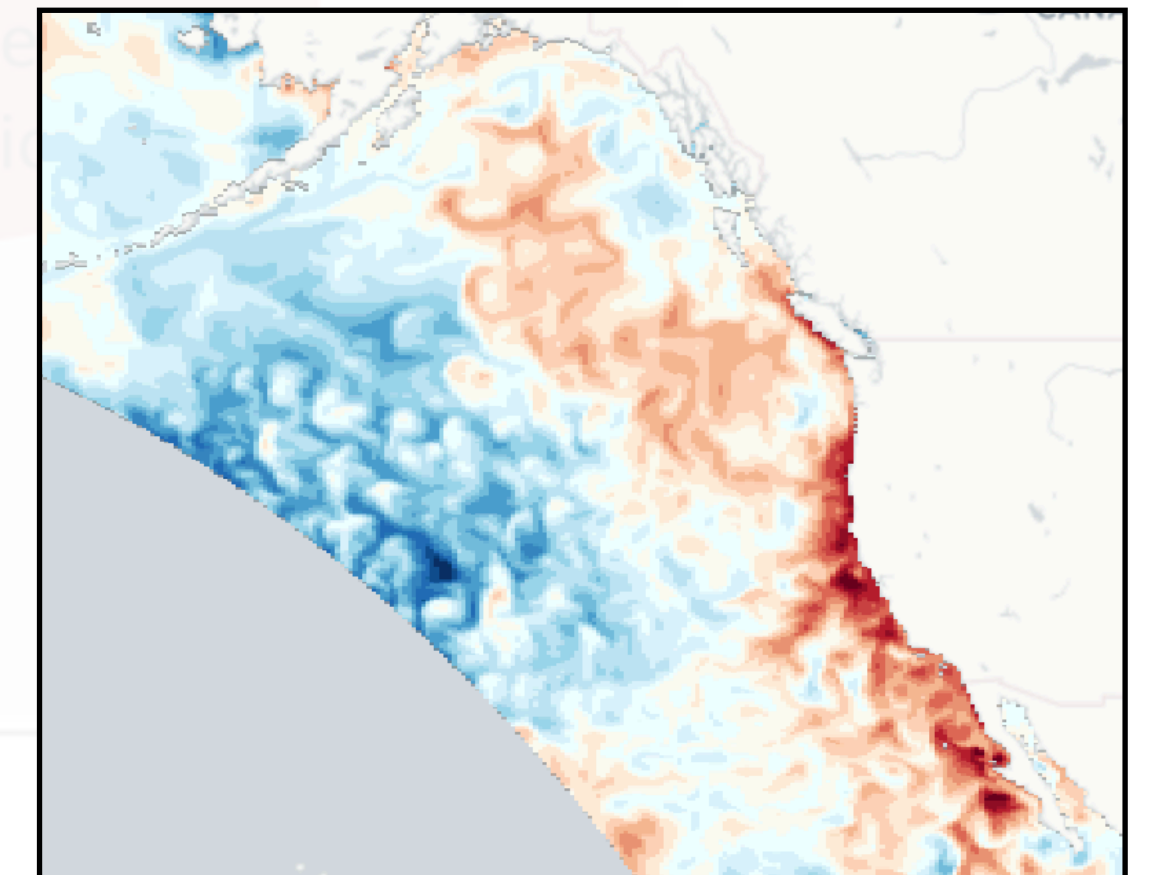
Recruitment Residuals

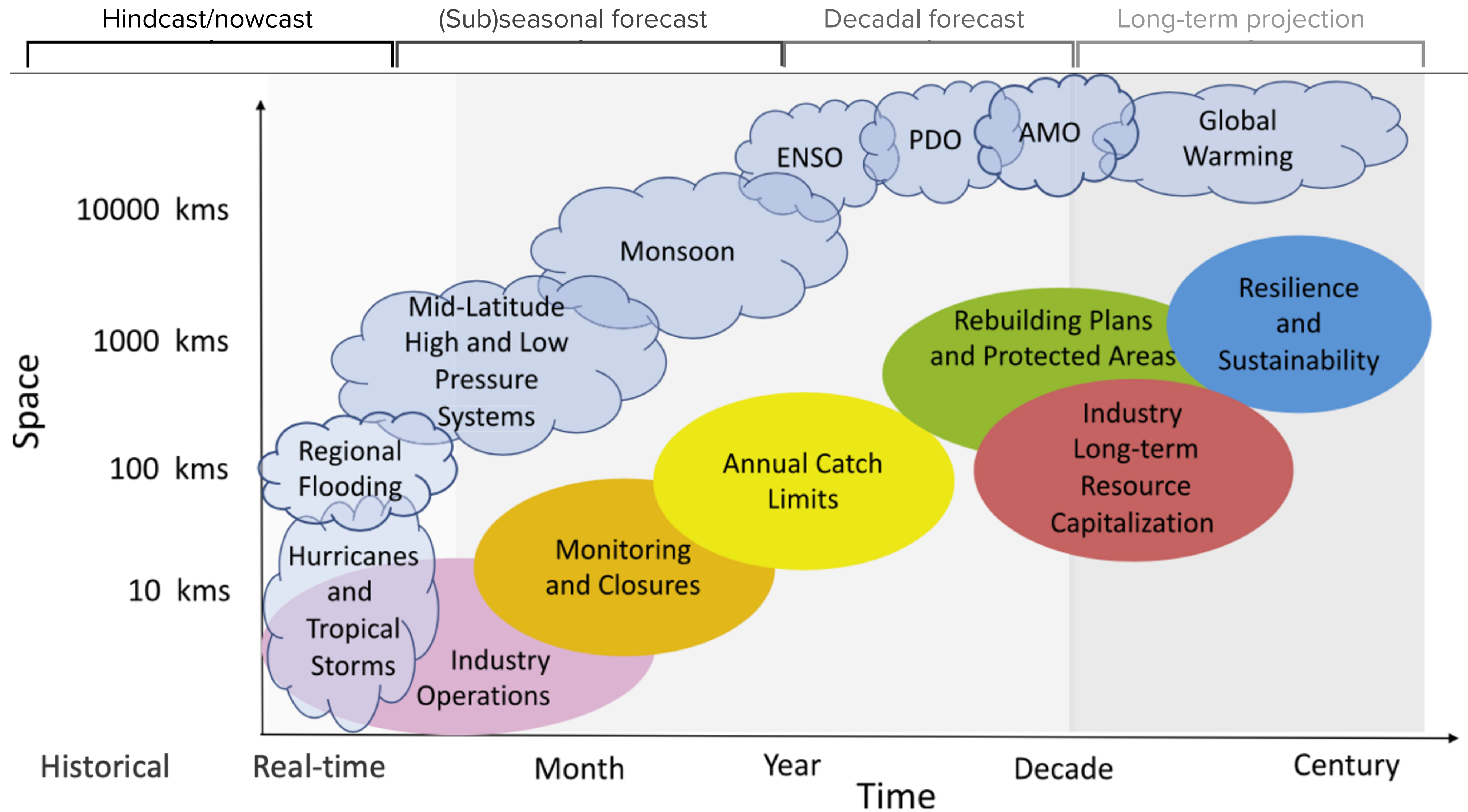


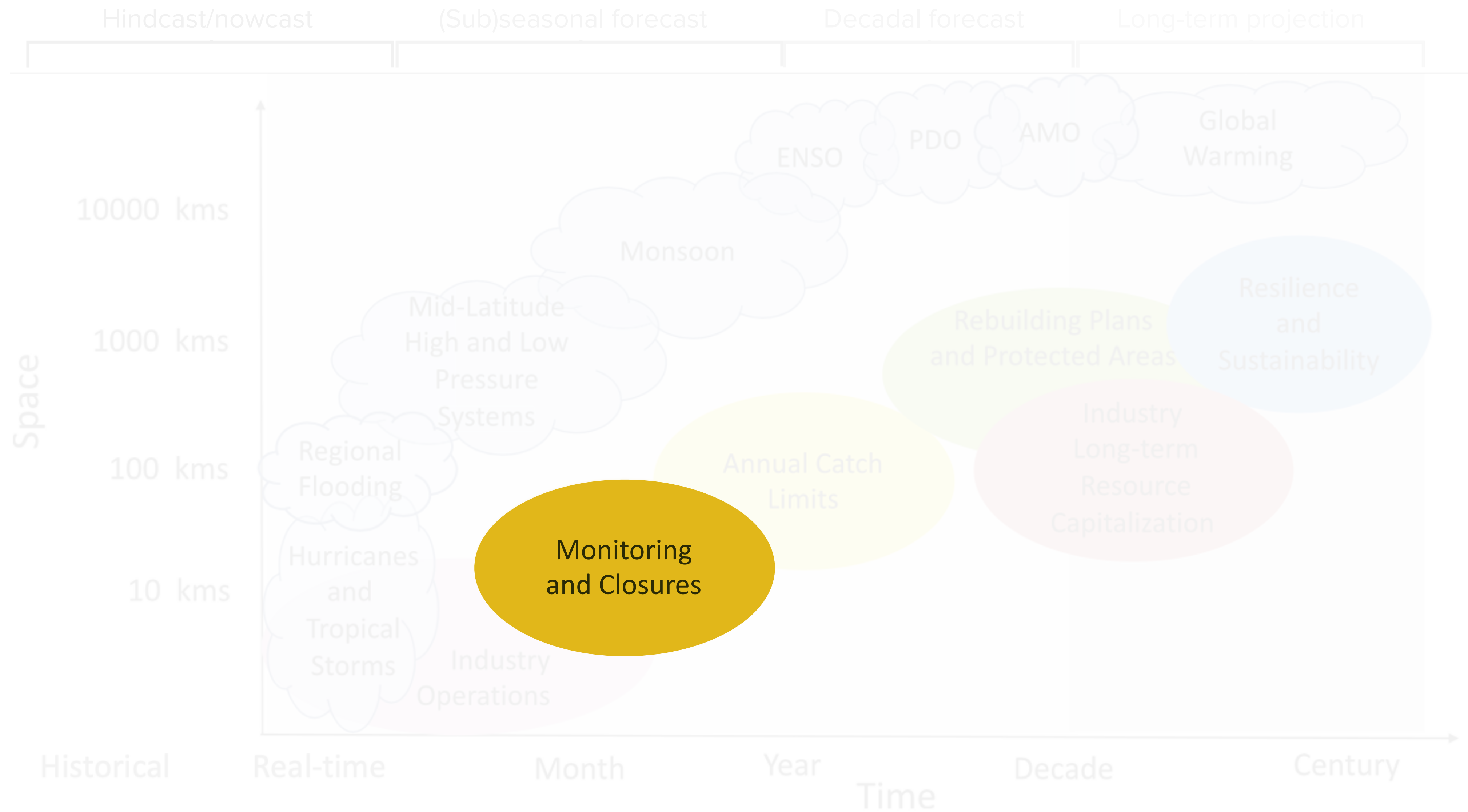
Spawning Stock

Annual Catch Limits

Forecast environmental drivers to improve stock assessments







Loggerhead Turtle Bycatch Risk

Loggerhead Conservation | Co

coastwatch.pfeg.noaa.gov/loggerheads/

HOME

DATA ACCESS

TOOLS & TRAINING

ABOUT

PROJECTS

QUICK LINKS

NOAA

COASTWATCH
WEST COAST REGIONAL NODE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

TOTAL

Background

Closure Rules

Conservation Area Status

Data Dashboard




Photo copyright: Ralph Pace • Contact for use outside NOAA

Supporting turtle conservation and sustainable fisheries with dynamic ocean management

Turtle Bycatch Overview

Loggerhead turtles from the endangered North Pacific population migrate to the waters off California and Mexico. Higher than normal sea temperatures during spring and summer can bring loggerheads close to the California coast, where they are more likely to be unintentionally captured by commercial fishing vessels. The

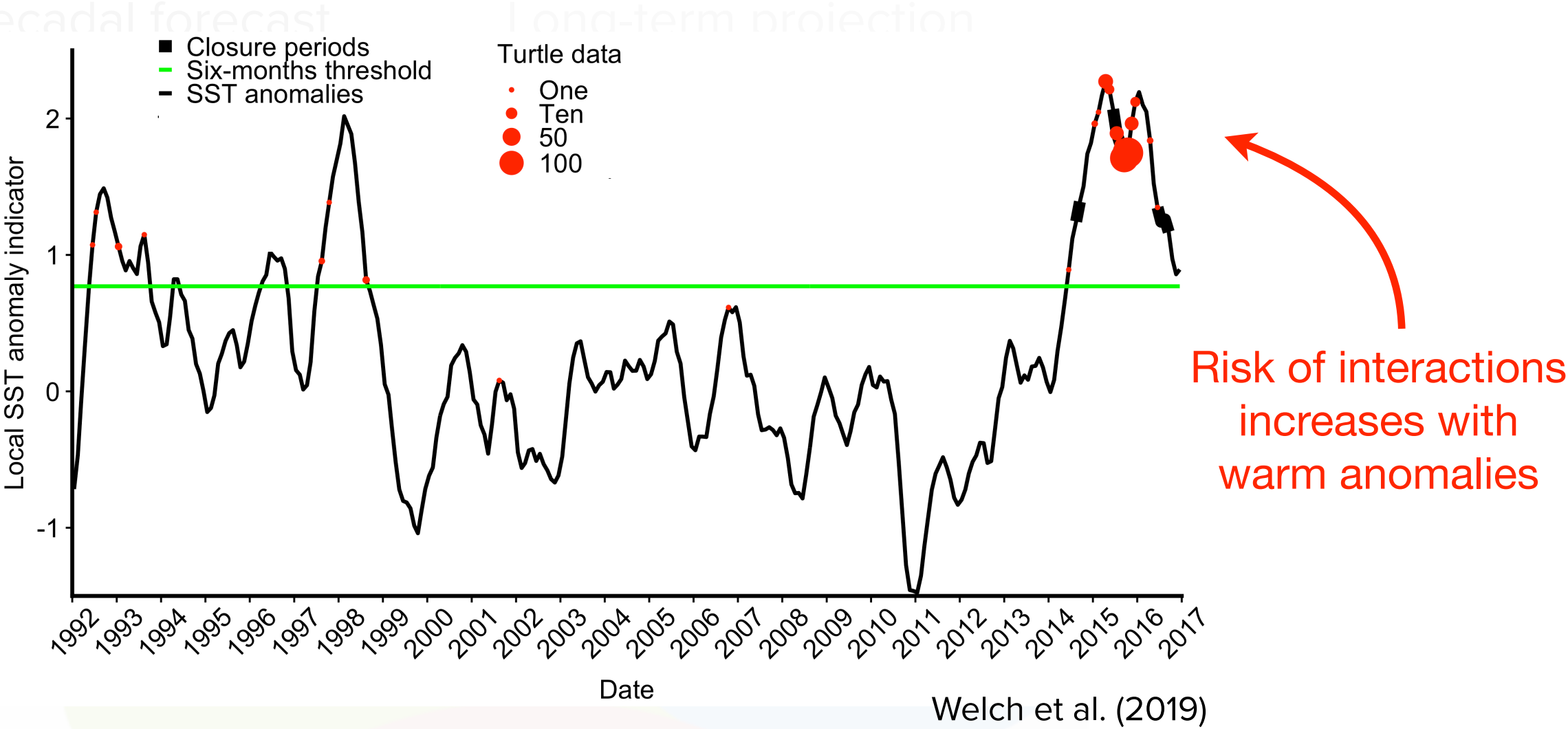
Conservation Area Status

In an effort to reduce loggerhead bycatch, the Pacific Loggerhead Conservation Area was established off the Southern California coast. The area is subject to closure to drift gillnet fishing when environmental conditions bring loggerheads into commercial fishing grounds. The [Closure Rules](#) page provides backgrounds to the

Historical Data Dashboard

View historical environmental observations for the Southern California coast and the closure status for the Pacific Loggerhead Conservation Area going back to 2003, when the Conservation Area was established. Observation such as sea surface temperature, large temperature deviations, and El Niño status are available.

Temperature Observations To Avoid Loggerheads (TOTAL) tool



Monitoring
and Closures

Loggerhead Turtle Bycatch Risk

Loggerhead Conservation | Co

coastwatch.pfeg.noaa.gov/loggerheads/

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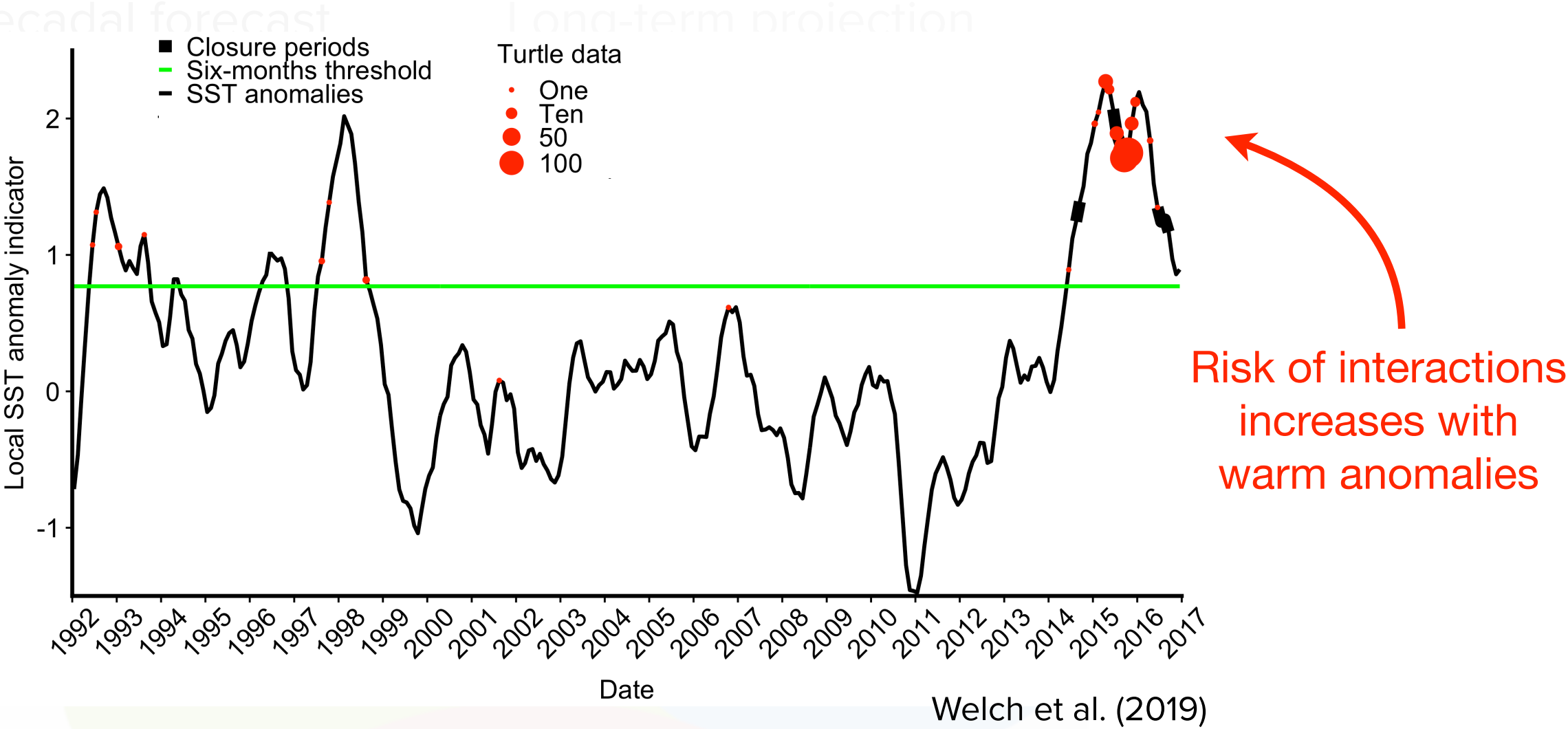
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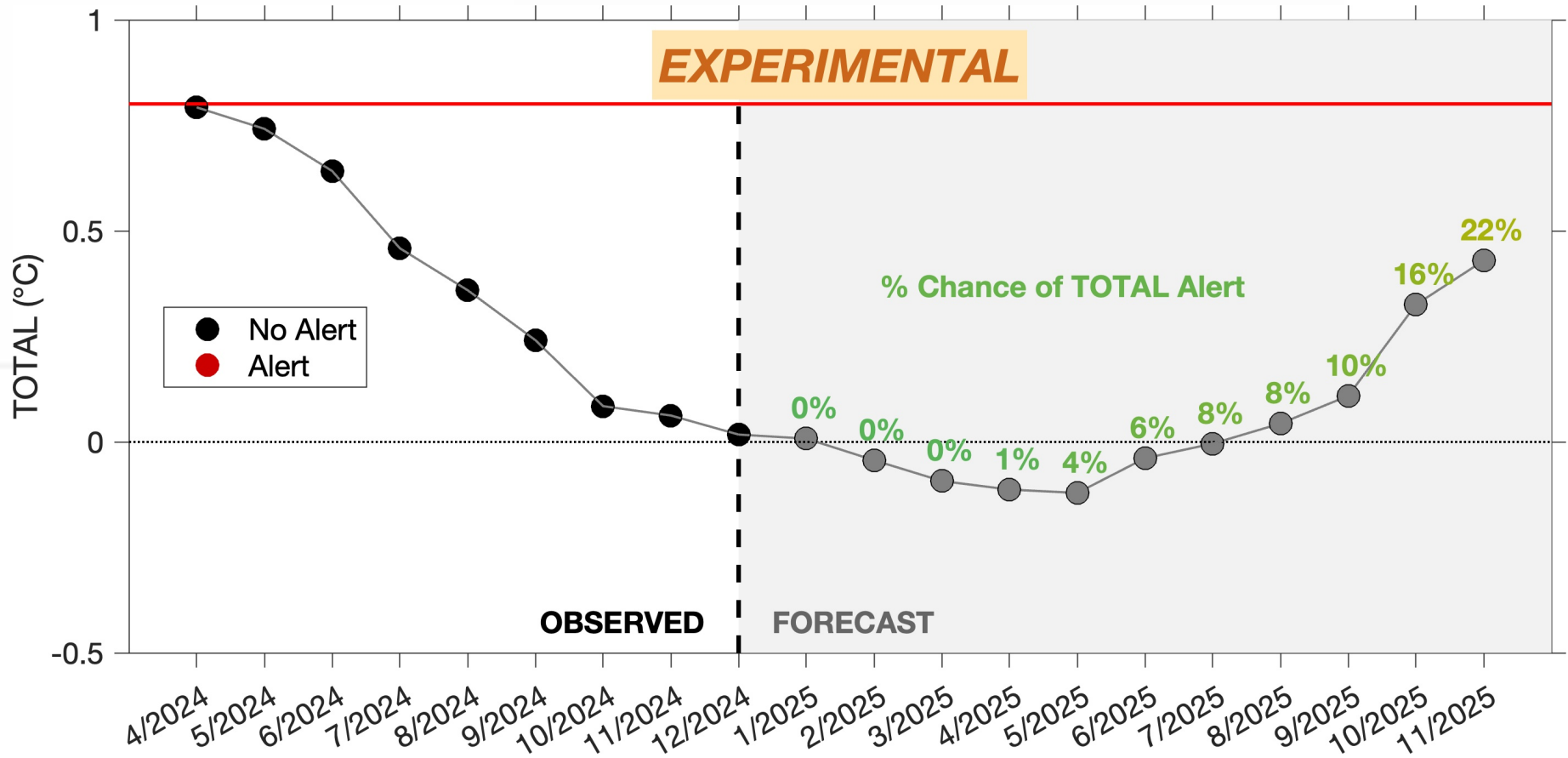
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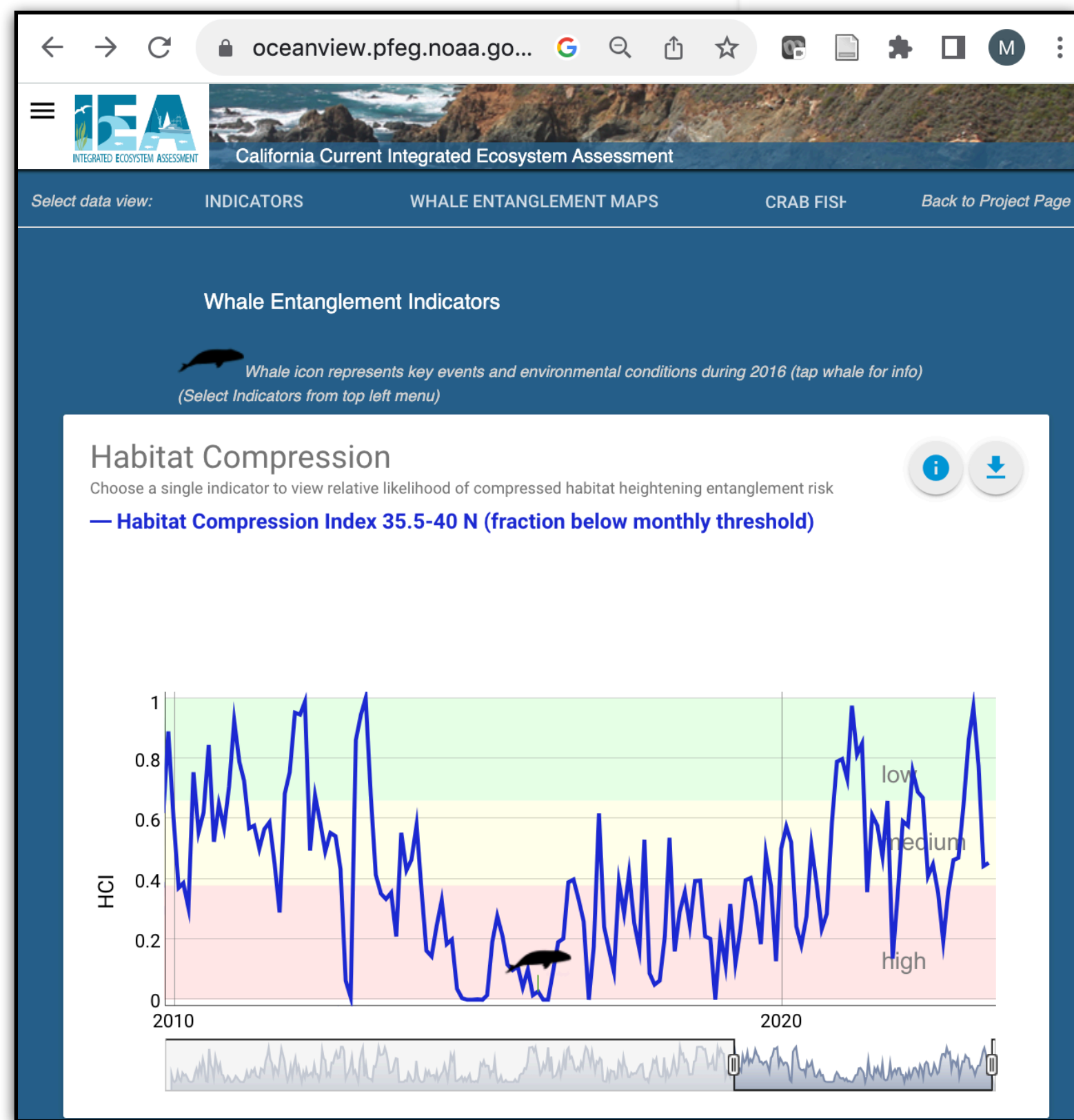


Monitoring
and Closures

Forecast temperatures to
inform potential closures

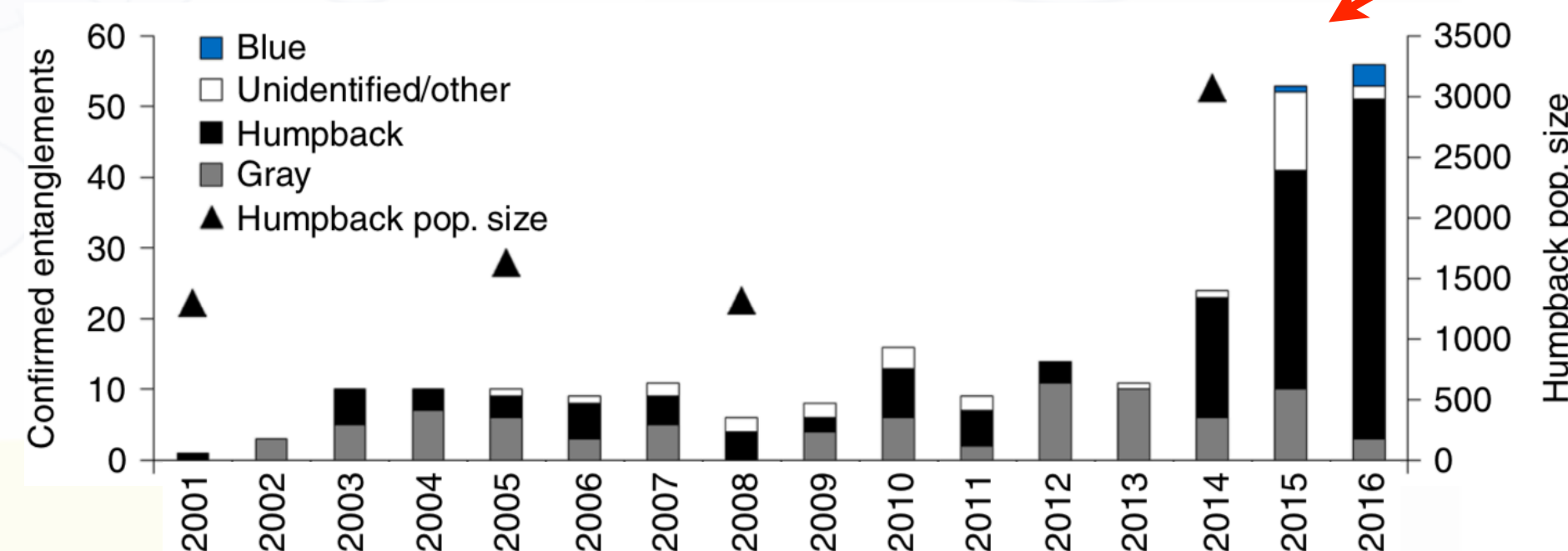
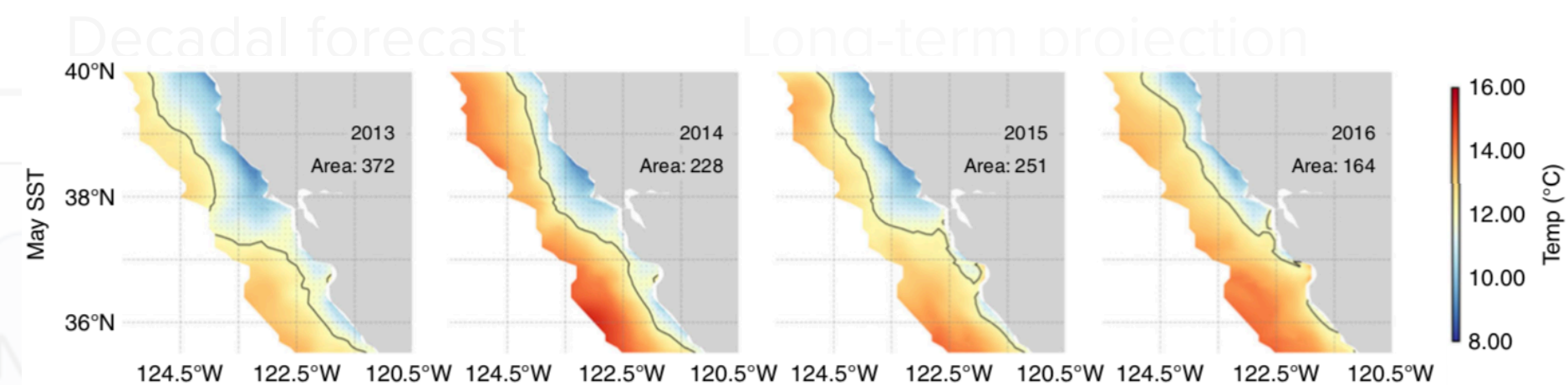


Whale Entanglement Risk



(Sub)seasonal forecast

Habitat Compression Index (HCI)



Santora et al. (2020), Schroeder et al. (2022)

Risk of interactions increases with compressed habitat

Monitoring and Closures

Month

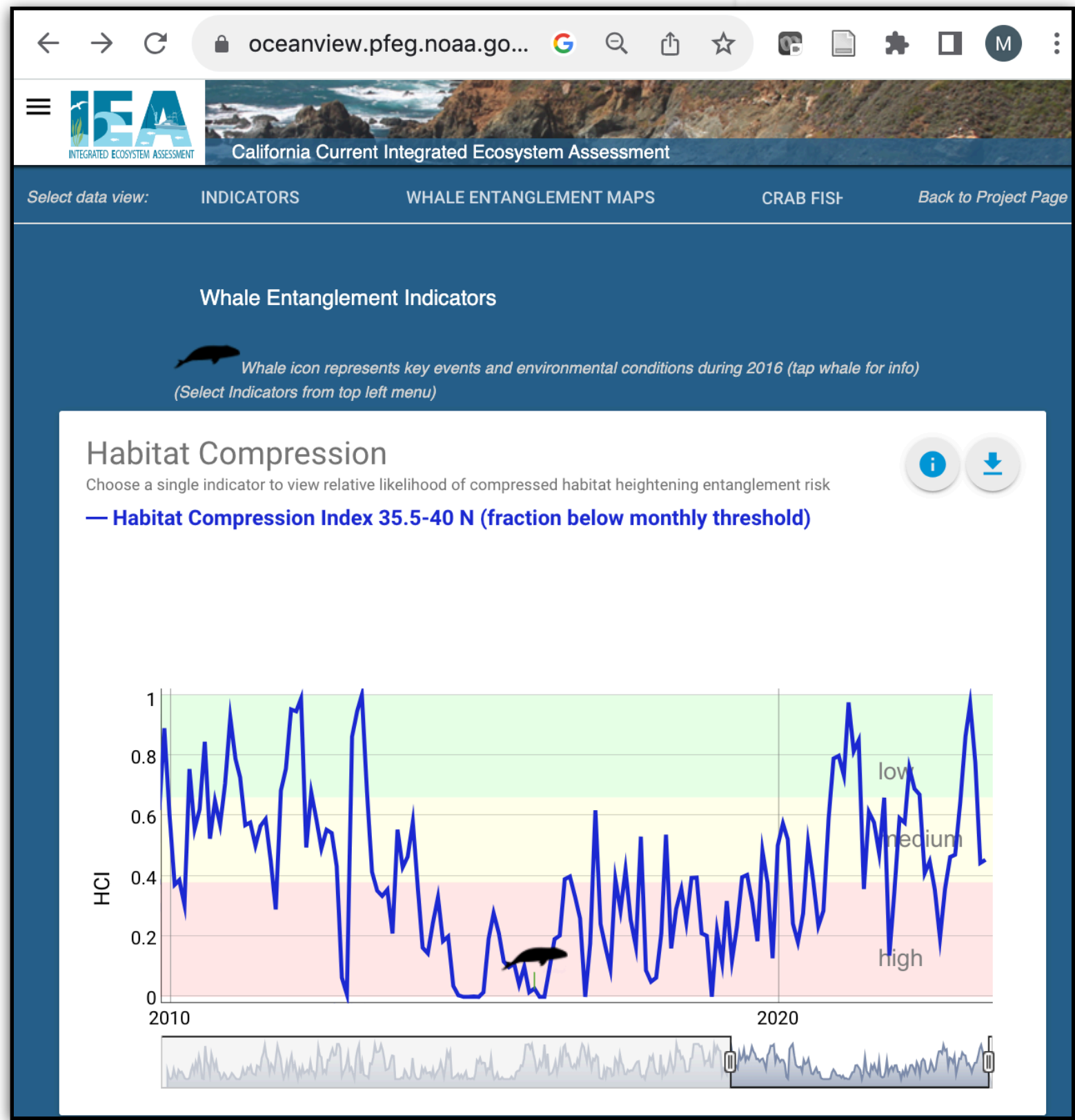
Year

Time

Decade

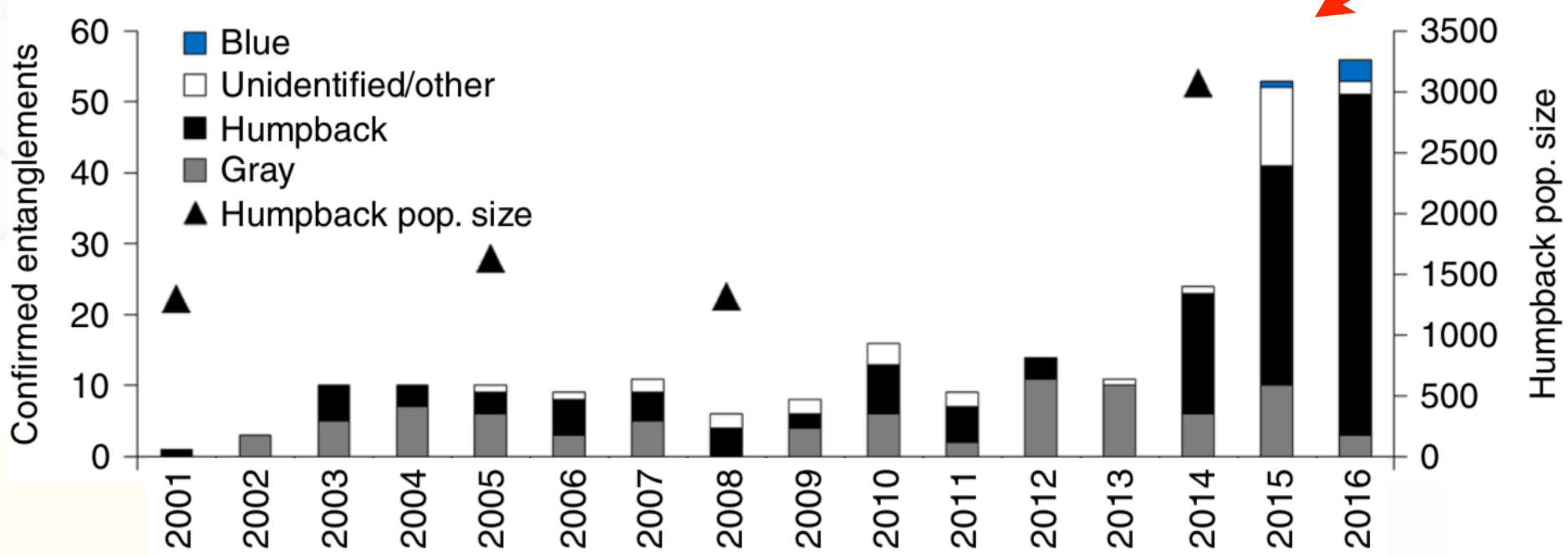
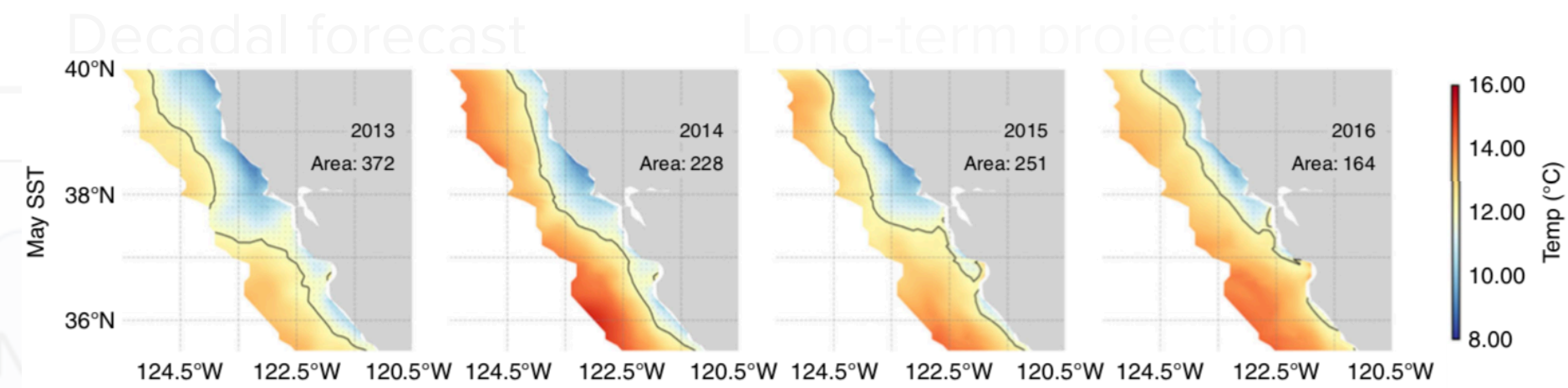
Century

Whale Entanglement Risk



Monitoring and Closures

Habitat Compression Index (HCI)

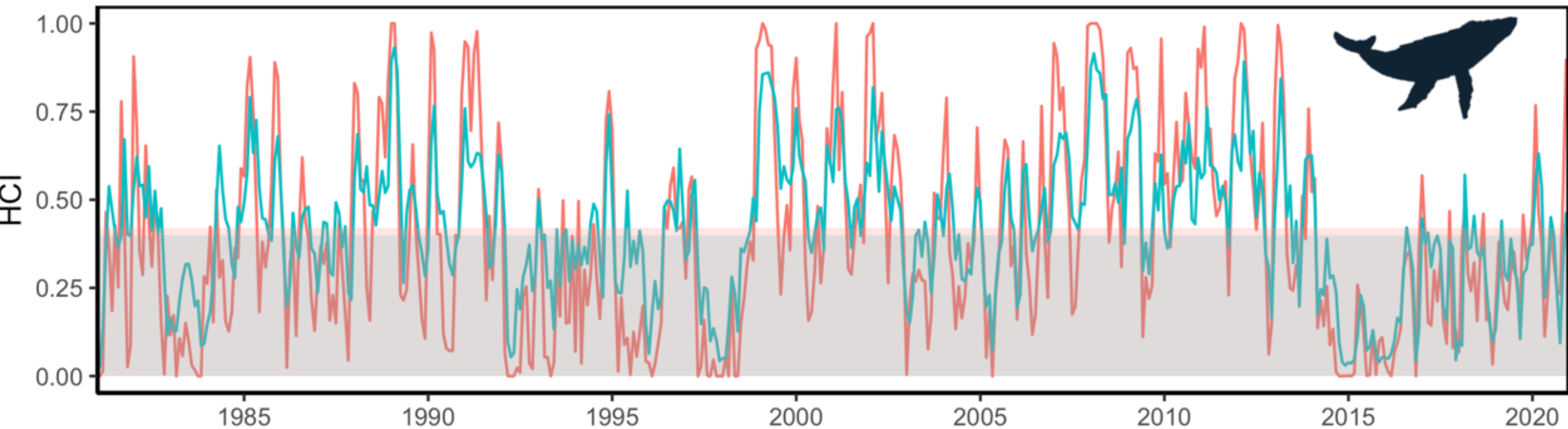


Santora et al. (2020), Schroeder et al. (2022)

Risk of interactions increases with compressed habitat

Forecast habitat compression to inform potential closures

Habitat Compression Index (1-month forecast)



Brodie et al. (2023) (2017)

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