Ocean research needs and priorities at a range of scales

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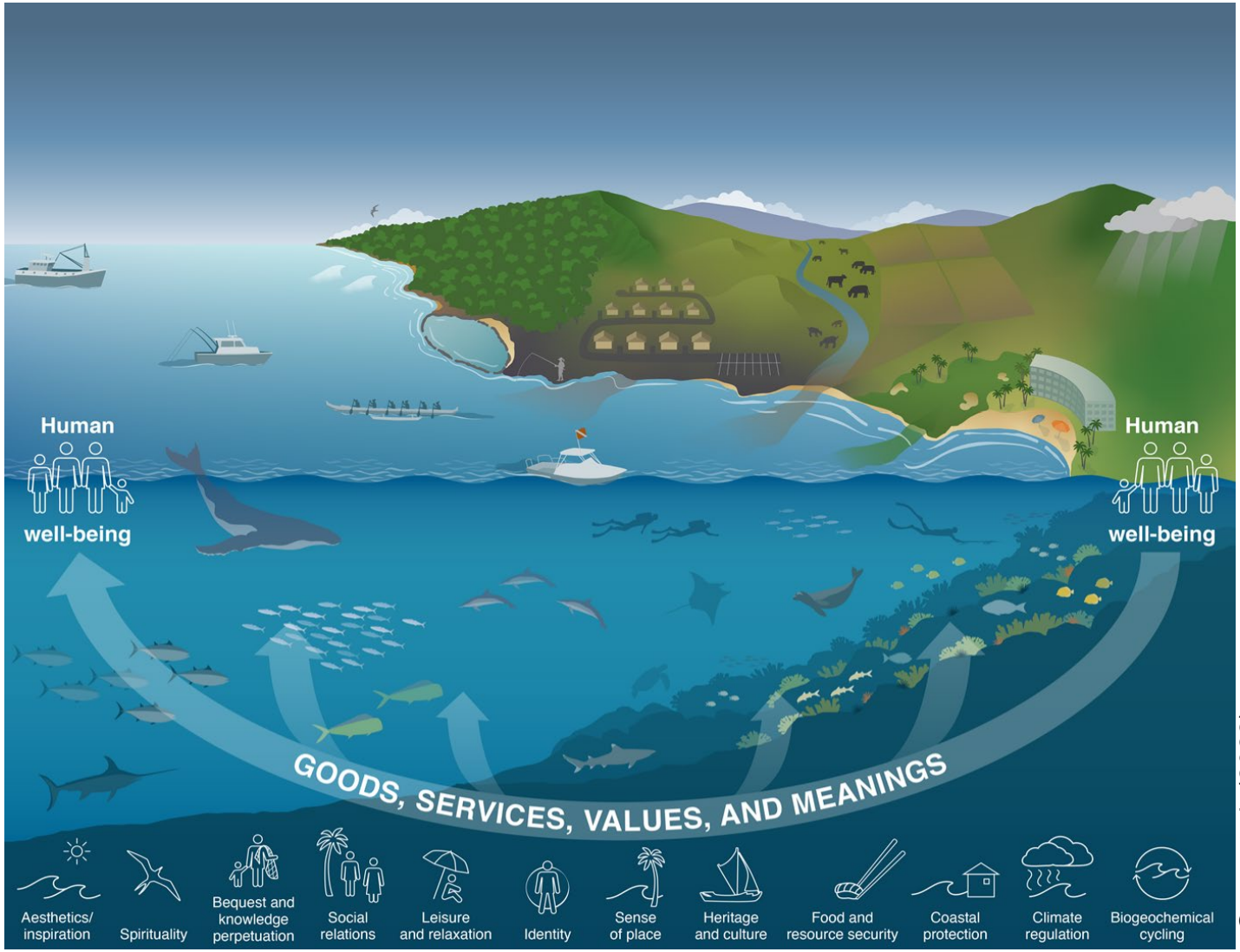
Improving social outcomes and climate resiliency



Gove et al. (2022)

Social Outcomes

Climate resilient communities, human well-being: economic, recreational, and other benefits

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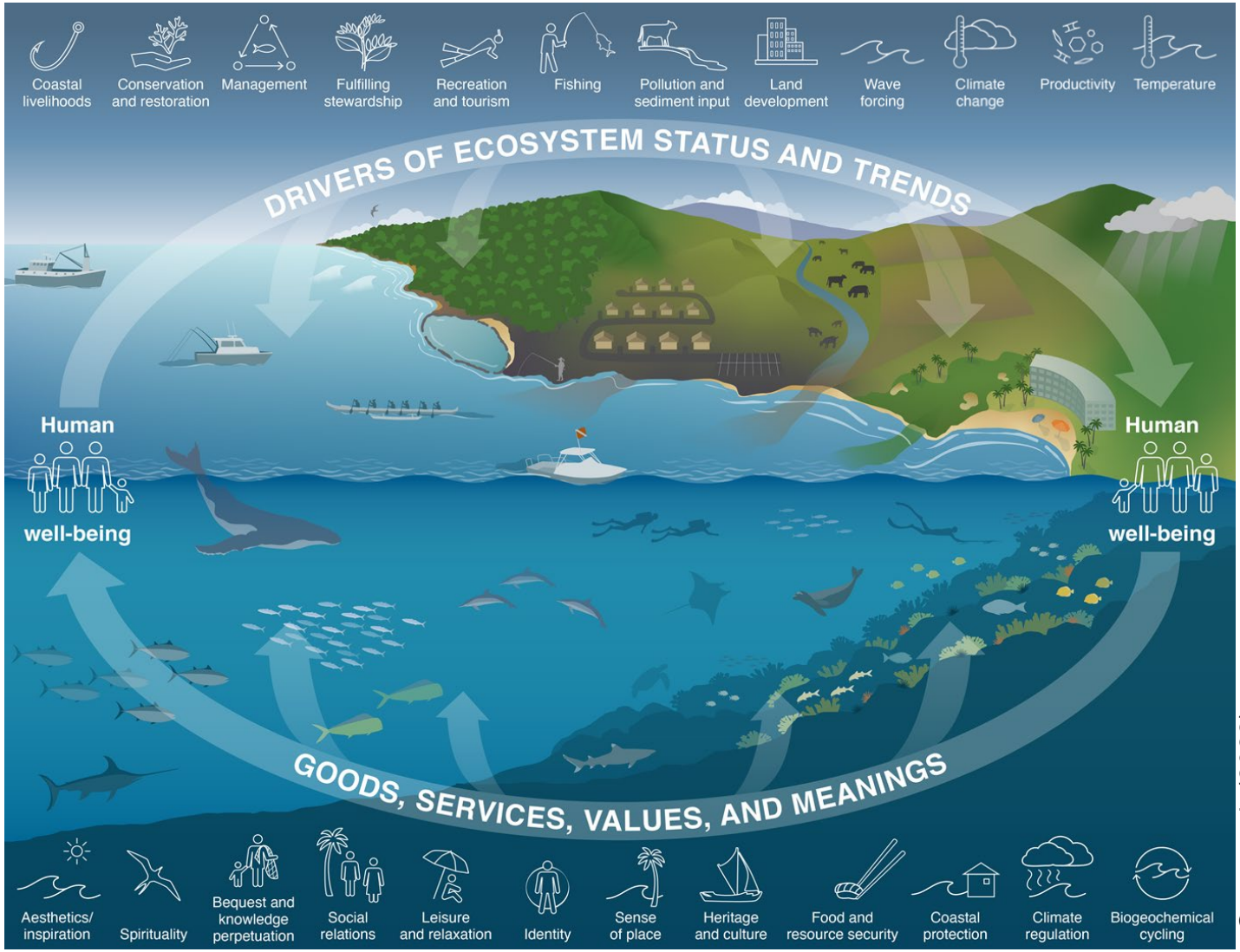

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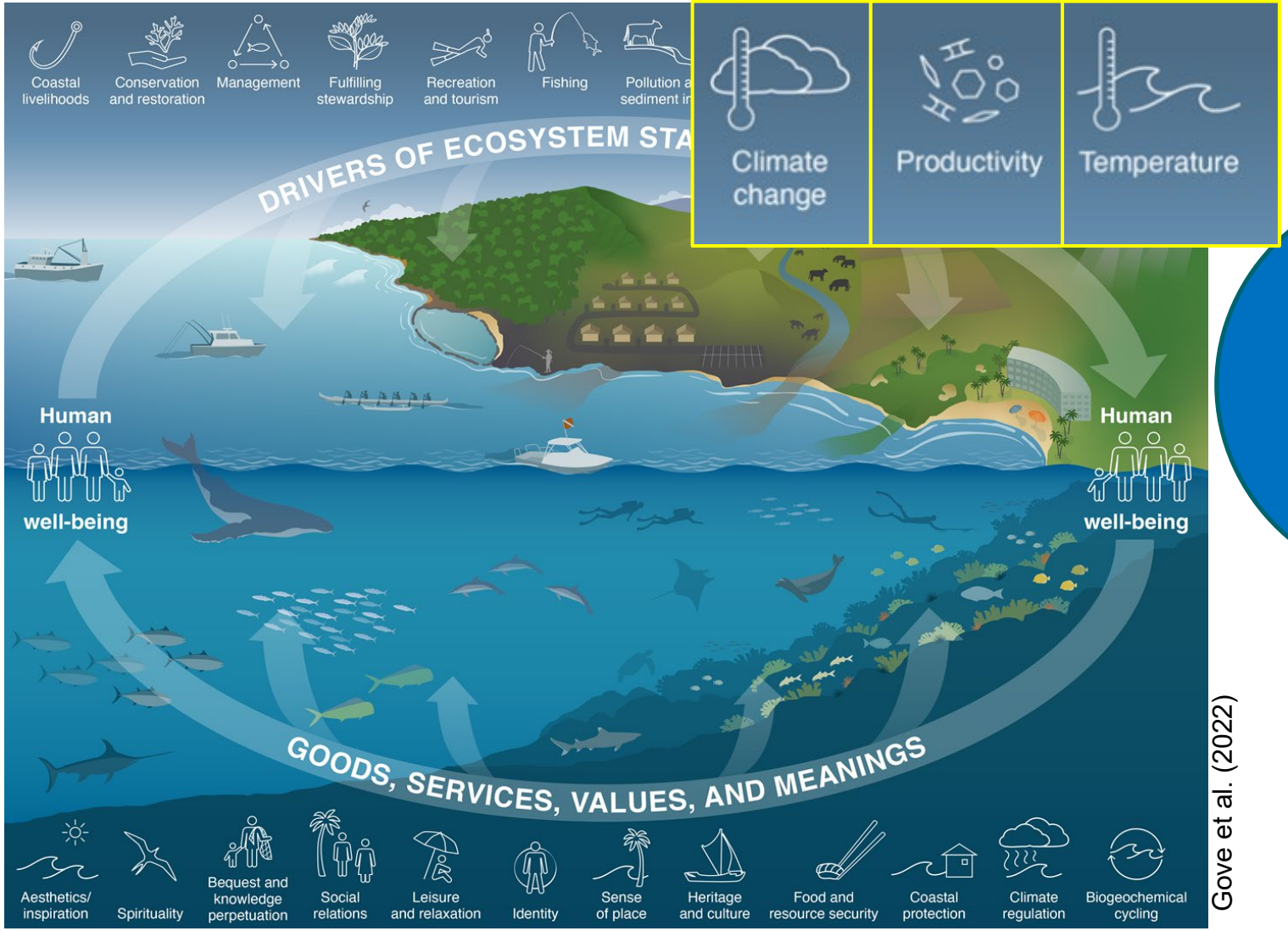

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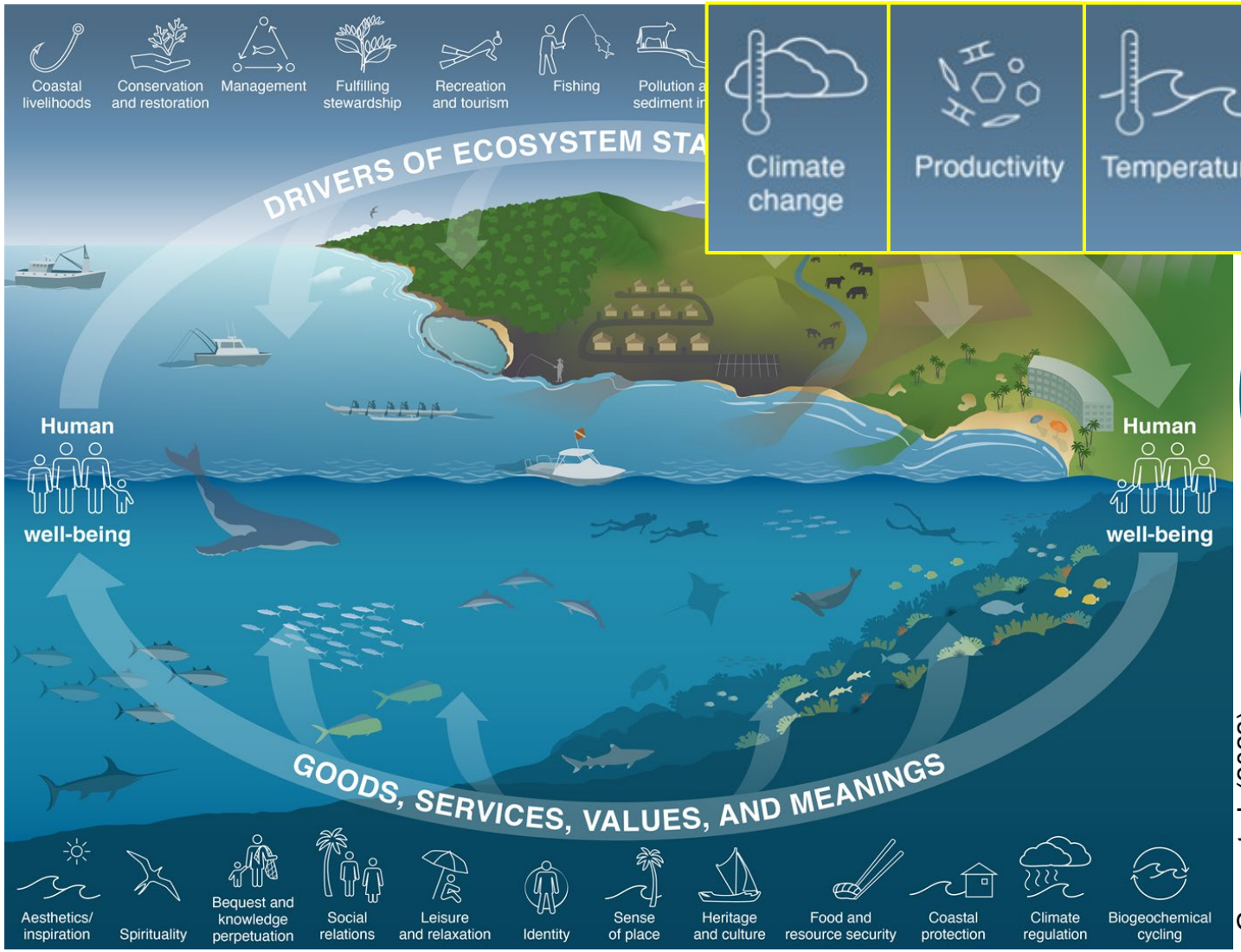
Climate and Ocean Modeling

Simulations of physical oceanographic conditions (hindcasts, nowcasts, predictions and projections)



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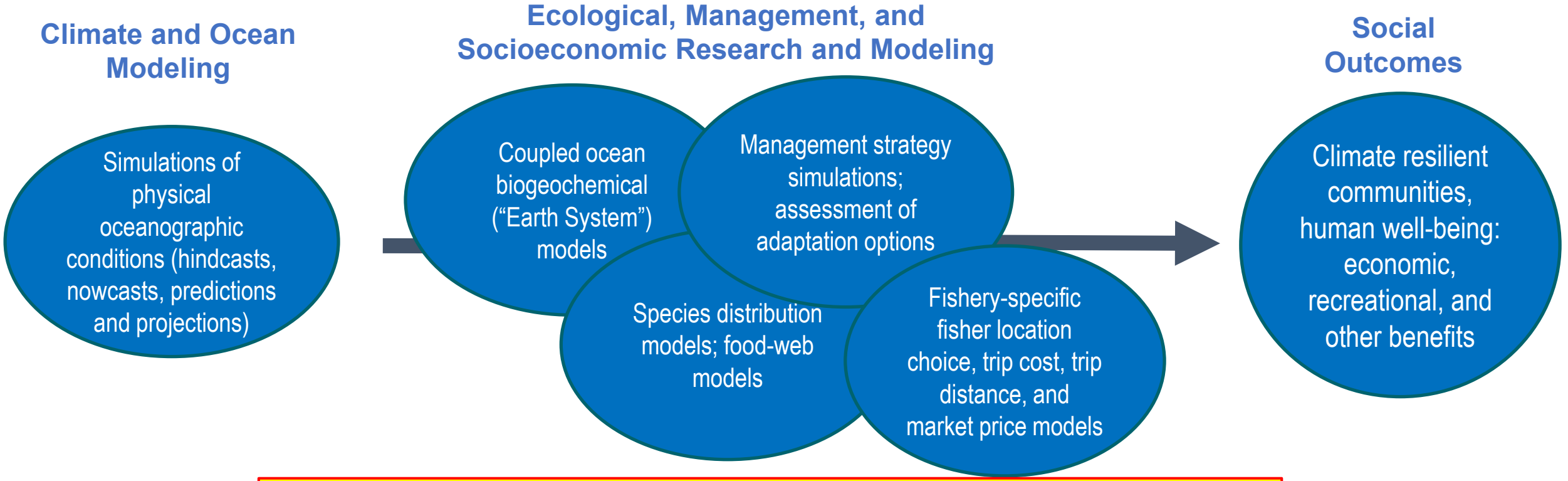

Major challenge: There remains a mismatch between the scales (and properties) for which we have confident climate and ocean predictions and the scales (and properties) relevant to human communities.

Scales of current climate information do not match needs

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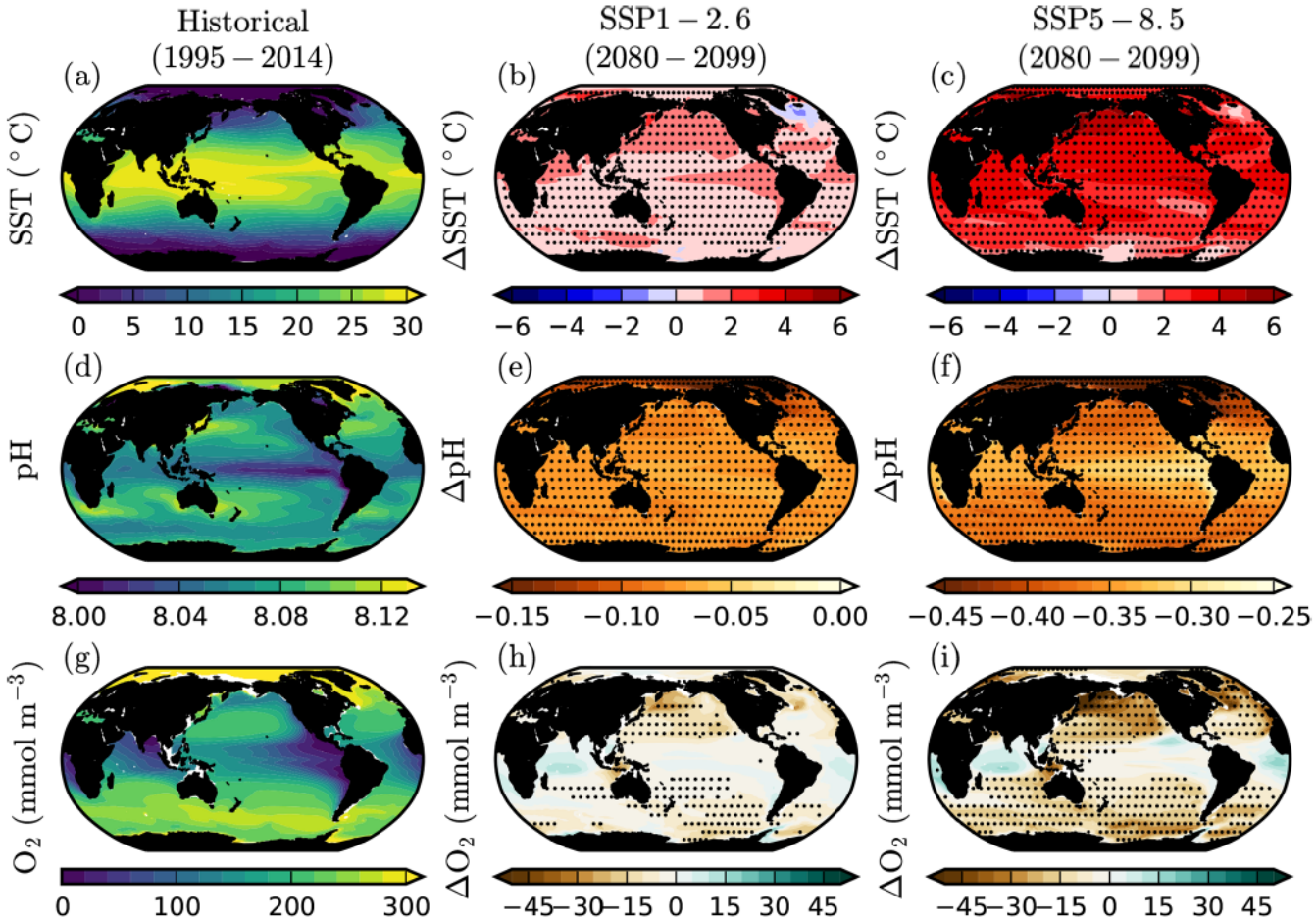

Kwiatkowski et al. (2020)

Social Outcomes

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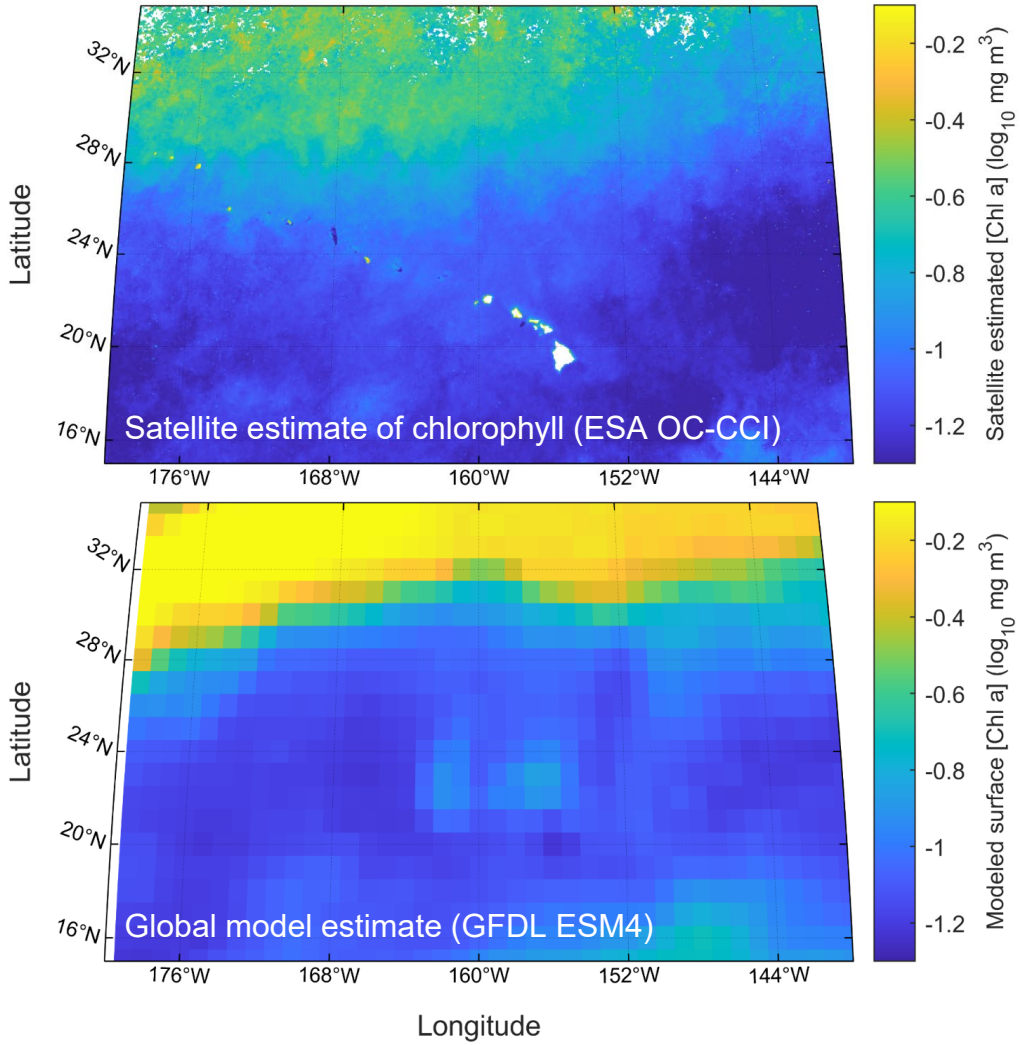

Social Outcomes

Climate resilient communities, human well-being: economic, recreational, and other benefits

Reliable estimates of future forcing are required

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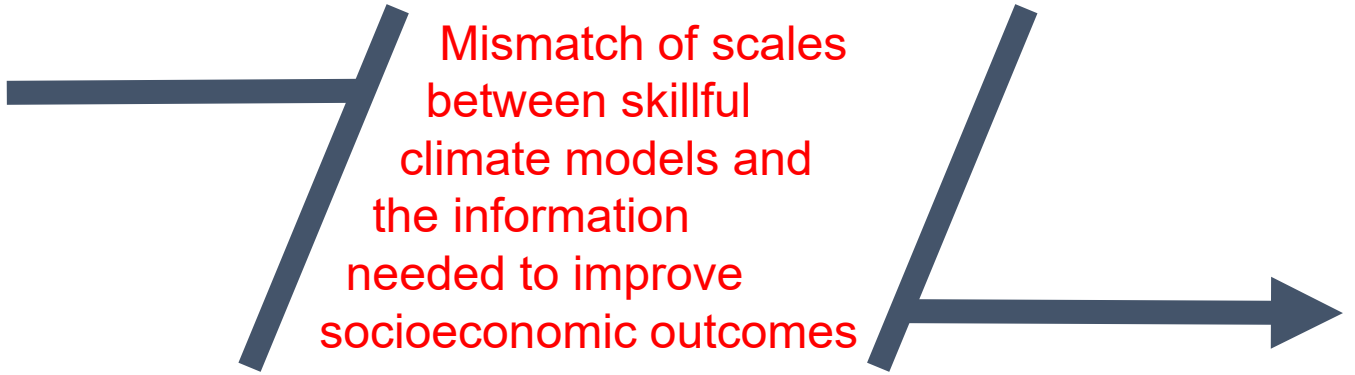


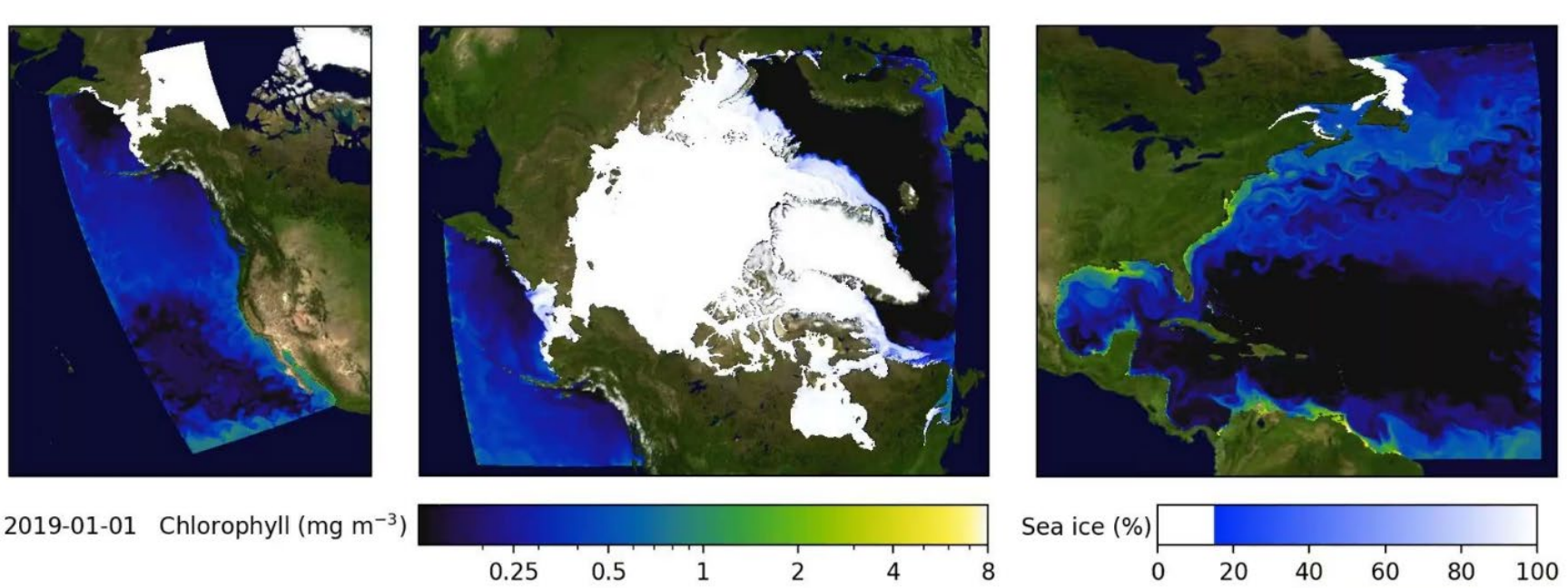
Social Outcomes

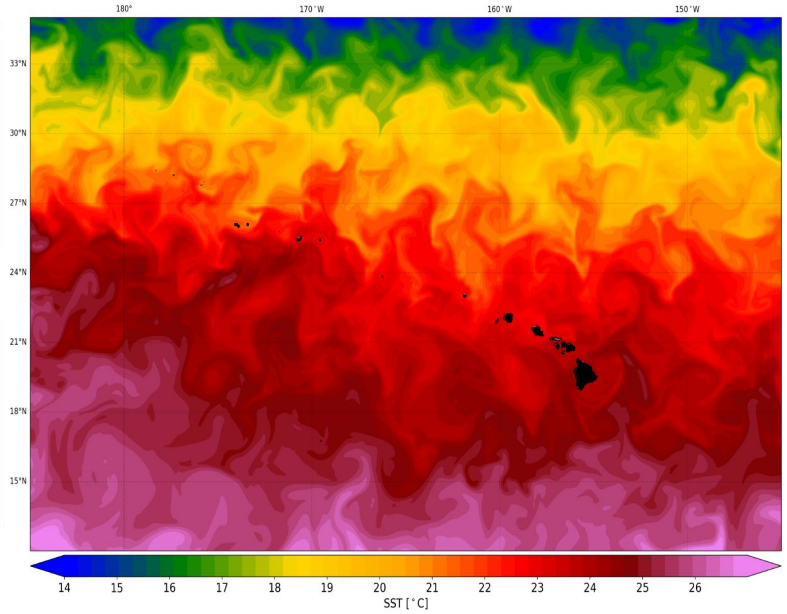
Climate resilient communities, human well-being: economic, recreational, and other benefits

What seems to be working well: Coordinated support provided to NOAA lines offices and to academic partners is addressing this issue.

Example: The OAR- and Fisheries-led "Climate, Ecosystems, and Fisheries Initiative" (CEFI) is pioneering a nationally coordinated effort to downscale to appropriate scales and effort to provide climate-informed advice for marine resource management and community adaptation.

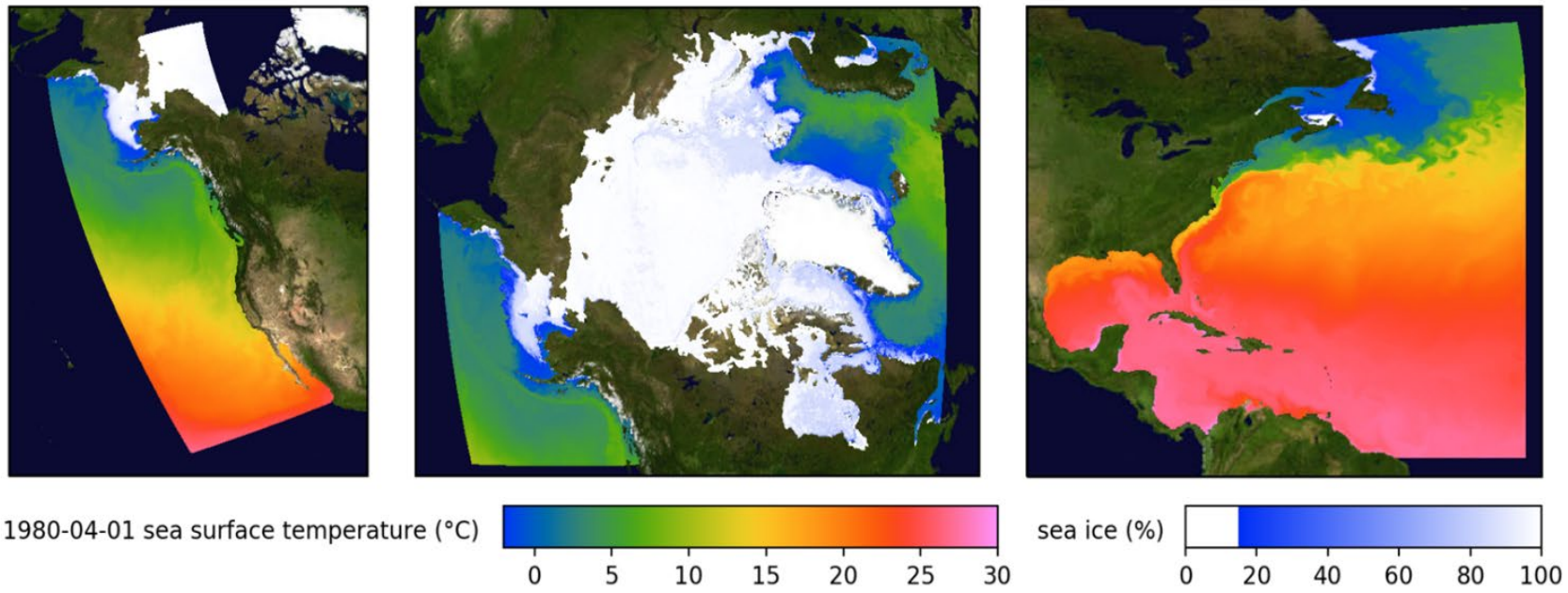
CEFI to provide climate-informed advice at operational scales

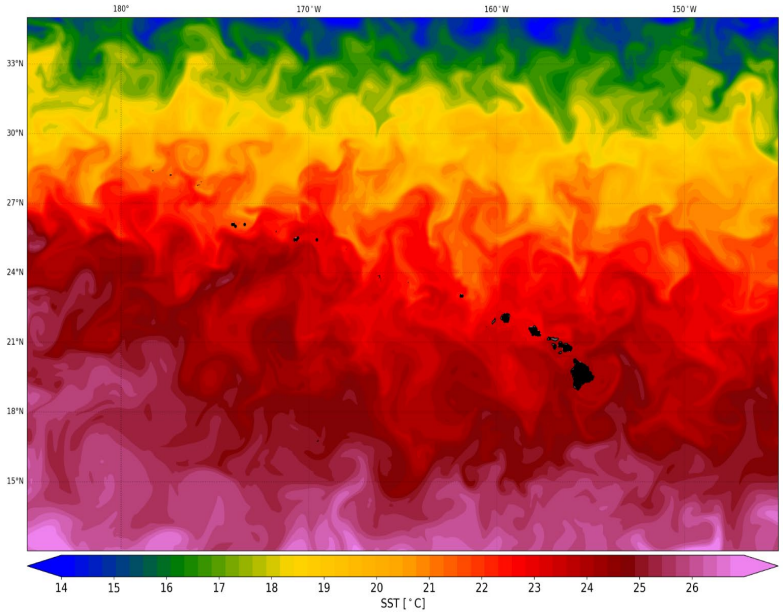




Horizontal resolution of the model is expected to be about 2-4 km in the Central North Pacific.

CEFI to provide climate-informed advice at operational scales





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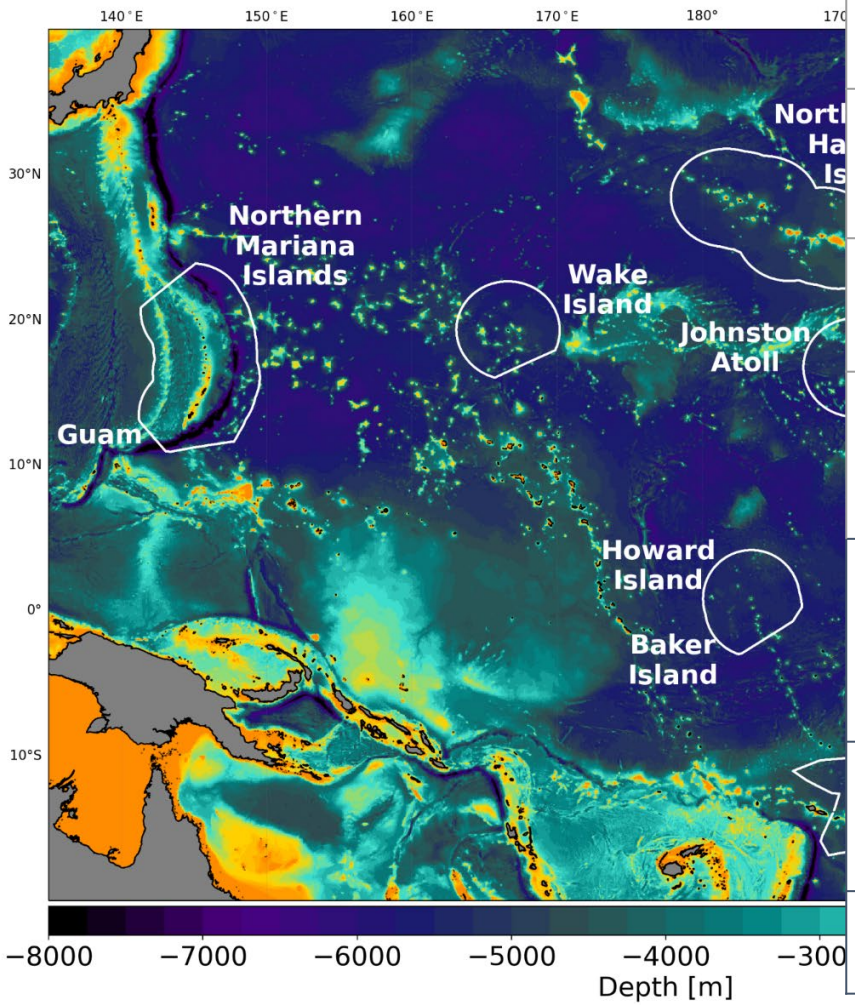
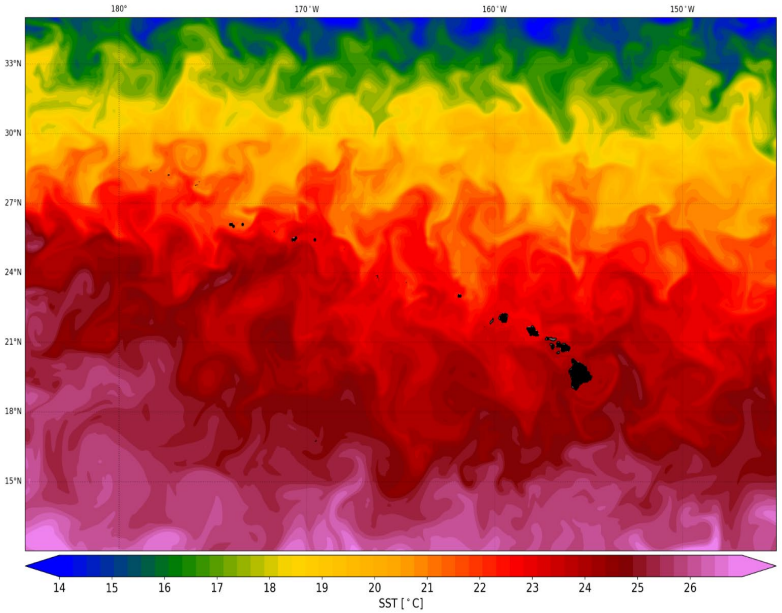


Year	Pacific Islands
FY24	Model/configuration development
FY25	Initial hindcast
FY26	Hindcast update, seasonal predictions, initial climate change projections
FY27	Hindcast update, expanded projections, retrospective decadal predictions
FY28	Hindcast update, seasonal outlooks reliably delivered
FY29	All products reliably delivered



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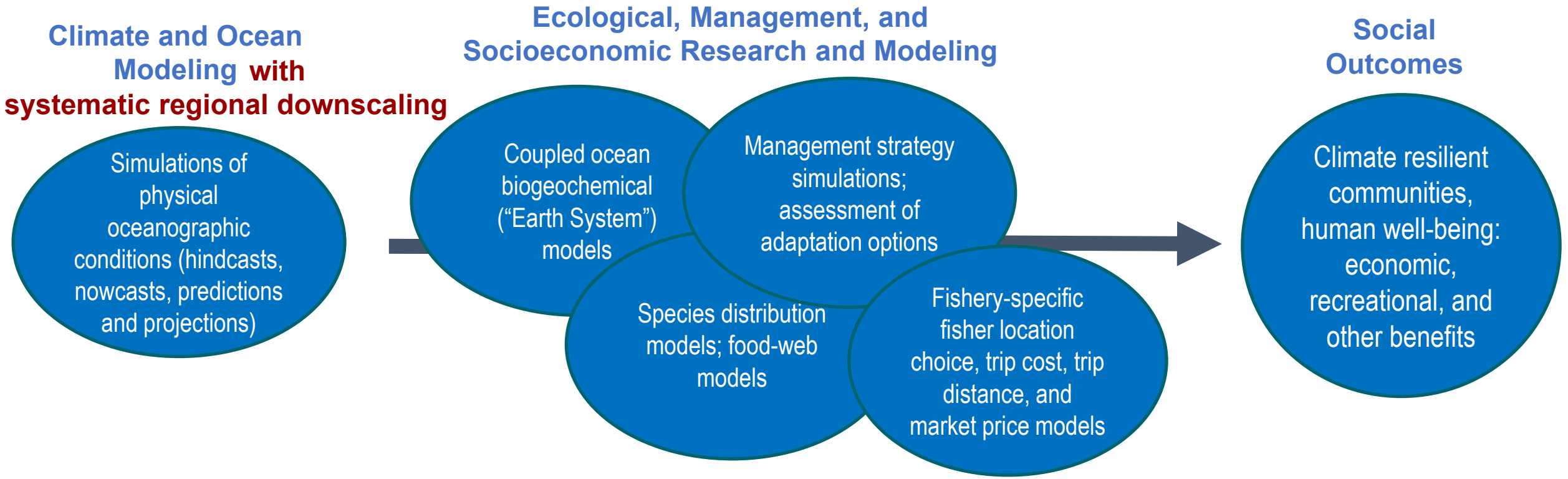
Scientific capacity is increasing… but that may not be enough



<u>Two substantial concerns</u>:

1) Observational infrastructure and data management
2) Slow pace of change in governance

Some substantial concerns (at least at the front of my mind)

1) Observational infrastructure and data management

We're transitioning from:

"We can't simulate processes at that scale"

to

"Yes, we can model that, but we don't have observations to assess model accuracy."

We need a reliable backbone of core, multidisciplinary observations that are available to modelers (perhaps in near real time).

Can we harness the current patchwork of coastal observations (across agencies and sectors) to better assess performance of these new models?

2) Slow pace of change in governance

Say scientific understanding continues to progress, and we have increased confidence in future ecosystem responses to climate change…

At what pace will ocean governance respond? Management bodies seem resistant to adopt changes in practices until the status quo approaches have failed.

We need simultaneous investments towards evolving our ocean governance practices so that those bodies have the capacity, flexibility, and willingness to enact effective change when scientific evidence at appropriate scales is in hand.