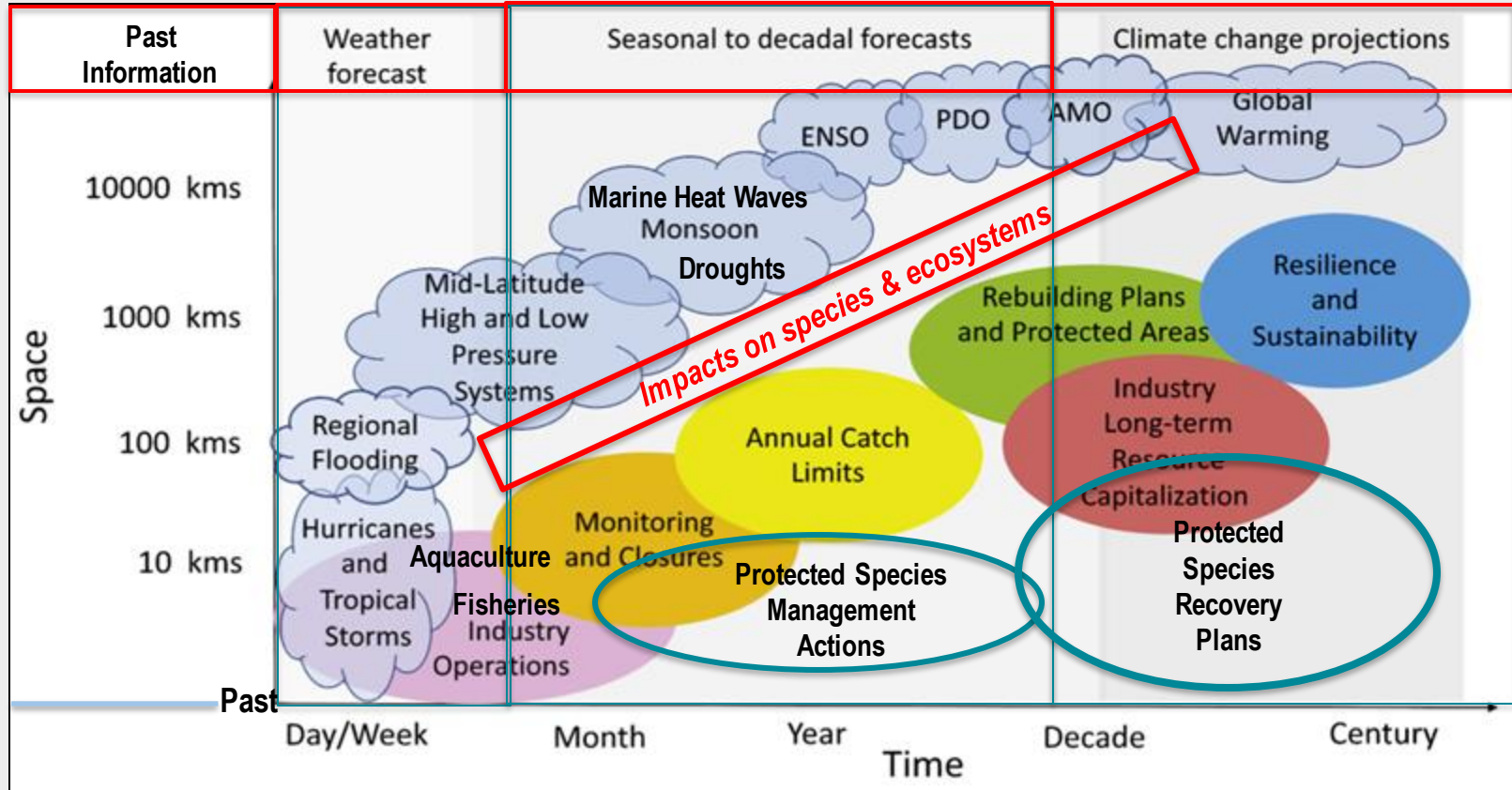




Modeling the impacts of climate change on fish and fisheries to inform long-term, medium-term and near term decision making

Anne Hollowed, NOAA Fisheries, Alaska Fisheries Science Center
Basin-scale Events to Coastal Impacts
May 2022

2019 Assessment: NMFS Climate Information Requirements



NOAA Climate Ecosystem and Fisheries Initiative (CEFI)

-
- *Cross-NOAA effort (NMFS, OAR, NOS, NWS, NESDIS)*
 - *Build a operational ocean modeling and decision support system*
 - *Provide state-of-the-art ocean forecasts and projections*
 - *Provide climate-informed ecosystem projections, risk assessments and management strategies*
 - *Reduce impacts and increase resilience of LMRs and communities.*

What will CEFI do?

CEFI will:

- *Build an operational ocean modeling and decision support system to*
 - *Provide NMFS and other decision-makers with state-of-the-art ocean forecasts, risk assessments and management options that*
- *Enable climate-informed LMR management.*

Integrated, nation-wide operational system that delivers:

- Ocean forecasts and projections
- Ecosystem projections
- Stock projections
- Risk Assessments
- Adaptation Options
- Strategy Evaluations
- Management capacity

CEFI Climate, Ocean, and Ecosystem Decision Support Systems

▶ Advancing Ocean, Ecosystem, and Climate Understanding

▶ Operational Ocean, Climate, and Ecosystem Prediction Systems

▶ Climate Ready Decision Making



SCIENCE AND DEVELOPMENT

Drives Innovation and Skill

OPERATIONS AND INFRASTRUCTURE

Drives Dissemination and Decision Support

EXTENSION AND ENGAGEMENT

Drives Service Delivery and Knowledge Transfer



National Community of Practice



Enhanced Observations



Targeted Research that Fuels Innovation



Enhanced Ocean Modeling Capabilities



Regional Ocean Modeling and Prediction



CFI Information Hub



Fisheries and Climate Decision Support System



Ecosystem Prediction



Increasing Capacity for Climate Ready Decisions



Rapid Response



Climate Smart Decision Support Tools



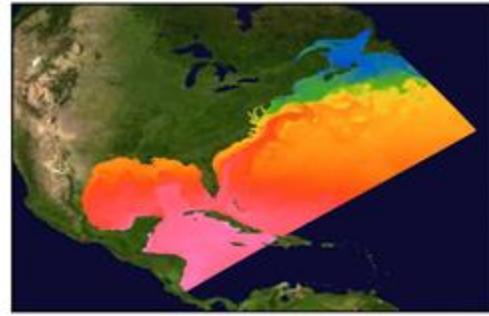
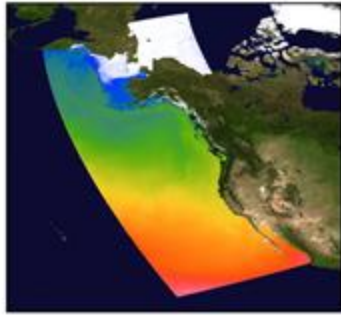
Improve Surveys and Research



Coordinated Science and Advice



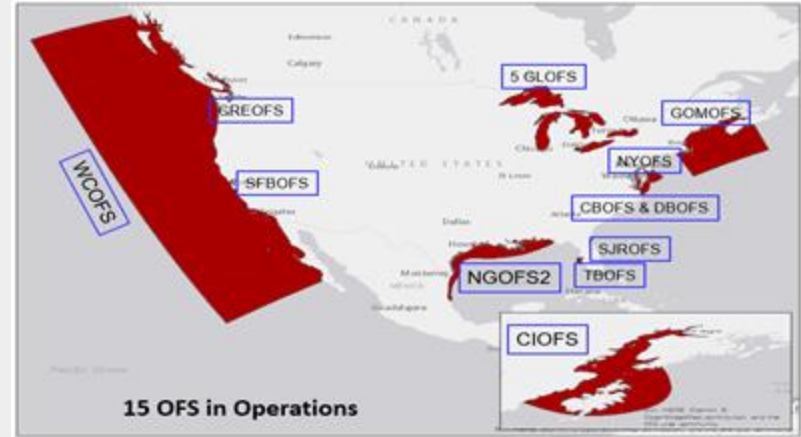
Enhanced Ocean Modeling Capabilities



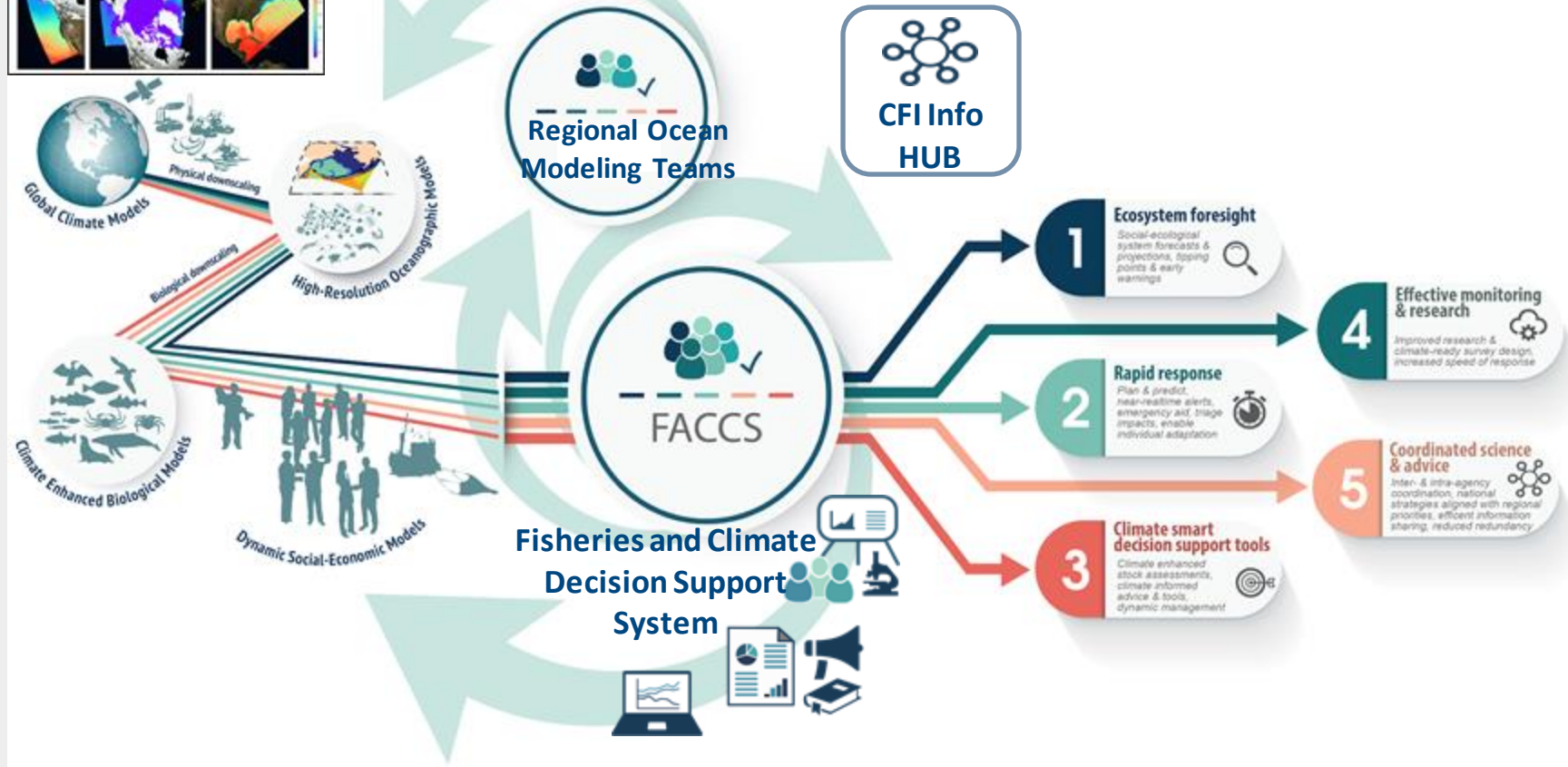
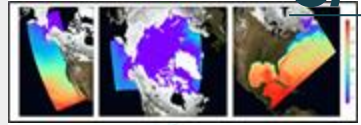
1980-04-16 sea surface temperature (°C) 

sea ice (%) 

- Builds on NOAA ocean forecast (NOS) and Prediction Systems (OAR/GFDL)
- Regional Ocean Modeling Teams customize products for NMFS uses
- Holistic ocean/BGC predictions, expandable to earth system as needed
- NOAA HPC powers predictions spanning the range of ocean futures
- Robust dissemination through CFI Information Hub & national data stds



CFI Ocean Modeling and Decision Support System



Opportunities and Questions

- Alaska Climate Integrated Modeling project currently includes salmon – includes impacts on run size, growth, and community resilience.
- CEFI grids cover part of basin, can they still be used for physical, chemical, and primary production projections for west coast, Gulf of Alaska, Bering Sea and Arctic?
- CEFI will provide methods (GOA CLIM already has Canadian and West Coast collaborators and Pis). Key issues are to identify a common suite of models – IBMs, Atlantis, size spectrum models, EwE, climate enhanced single and multispecies models. Can we agree that SDMs should inform the above or continue to include as stand alone (e.g., Bioclimatic Envelope Models)?