



CWG Review: NOAA Climate and Fisheries Initiative Implementation Plan

Joellen Russell

Co-chair, SAB's Climate Working Group
Professor, University of Arizona

Kirstin Dow

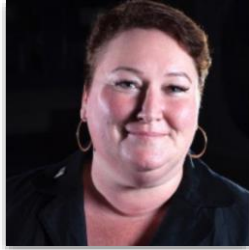
Co-chair, SAB's Climate Working Group
Professor, University of South Carolina

August 25, 2021



Members, Liaisons, and Guest Reviewers

Members



Co-Chair

Joellen Russell, PhD
University of Arizona



Co-Chair

Kirstin Dow, PhD
University of South
Carolina



Michael Anderson, PhD
CA Department of
Water Resources



Kwabena Asante,
PhD, PE
GEI Consultants



Cecilia Bitz, PhD
University of Washington



Rong Fu, PhD
University of
California –
Los Angeles



Le Jiang, PhD
I.M. Systems Group



Ali Omar, PhD
National Aeronautics and
Space Administration



A.R. "Ravi"
Ravishankara, PhD
Colorado State
University



Susan Wijffels, PhD
Woods Hole
Oceanographic
Institution

SAB Liaisons



SAB Liaison
Eugenia Kalnay, PhD
University of Maryland



SAB Liaison
Everette Joseph, PhD
National Center for
Atmospheric Research

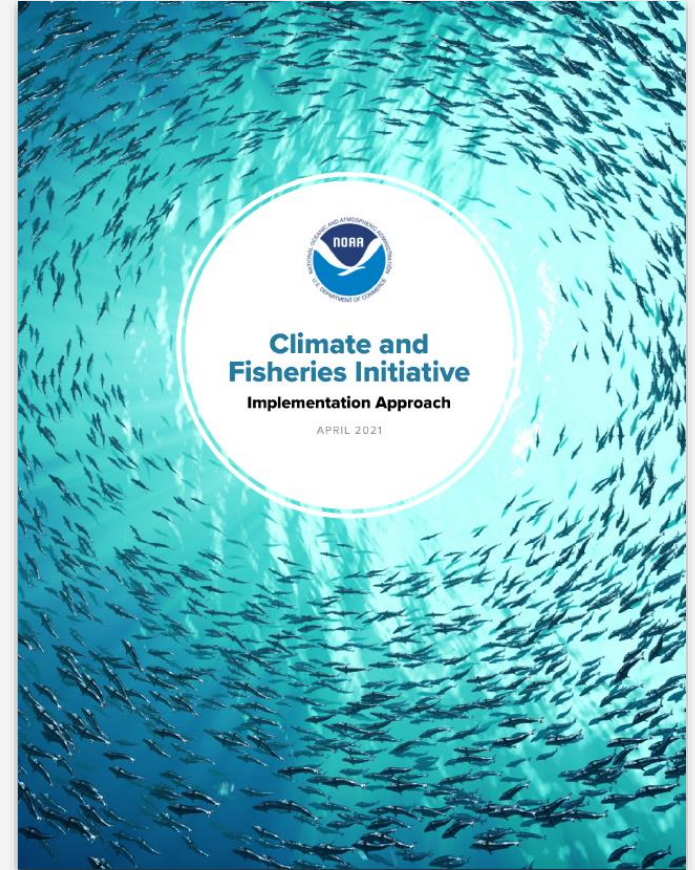
Guest Reviewer



ESMWG Co-Chair
Molly McCammon
Alaska Ocean Observing
System

The Request

Version 4.0 of the Implementation Approach was distributed on May 4th for review and comment to the Climate Working Group (CWG).



CFI Vision

NOAA and stakeholders have robust climate and ocean hindcasts, predictions, and projections, and the decision support needed to guide rapid responses and climate-informed management strategies that reduce risks and increase the resilience of marine/coastal resources and the many people that depend on them.

The Review Team

- **Dr. Joellen Russell:** Professor and Thomas R. Brown Distinguished Chair of Integrative Sciences, University of Arizona, (Co-chair of the CWG)
- **Dr. Kirstin Dow:** Carolina Trustees Professor, University of South Carolina, (Co-chair of the CWG)
- **Dr. Susan Wijffels:** Senior Scientist, Woods Hole Oceanographic Institution
- **Ms. Molly McCammon:** Senior Advisor, Alaska Ocean Observing System (Co-Chair of the ESMWG)

Opening Comments

- As the ocean and Great Lakes experience rapid change, environmental factors will increasingly drive extremes in the physical system, likely resulting in unexpected variability in fish stocks, other living marine resources, and whole ecosystems.
- Coastal communities are integral to the blue economy; however, they are facing a growing number of complex, climate-related impacts, and the unpredictable and intensifying nature of these events is threatening ecosystems and the economies that rely on them.
- As a result, the need for reliable and timely information about how climate change is impacting our coastal communities has never been greater.
- As noted in the Implementation Approach, NOAA currently lacks the nationally-integrated observing, modeling, and decision-support system needed to deliver the climate information required to meet NOAA's Living Marine Resource (LMR) mandates in the face of these rapid changes and the challenges they present.
- The NOAA CFI Implementation Approach demonstrates that NOAA is preparing to make critical strides to fill key gaps that exist in its current ocean modeling and decision-support systems.

Recommendations

1.0 - Accelerate implementation of an integrated modeling system

Recommendation: In order to accelerate and expedite the development of the necessary and important new products for a NOAA-wide integrated modeling system, the CFI should designate responsible parties within NOAA for each of the critical enhancements, the required components across the NOAA line offices, and to stress the necessity of coordination between them.

Actions:

- 1.1 Carefully identify responsibility, coordination, and resources required to accelerate the transition to an integrated modeling system.
- 1.2 Create a timeline, as part of the full implementation plan, that takes into account the research required, model development, and transition.



Recommendations

2.0 - Stakeholder engagement in products and process

Recommendation: The CFI should elaborate on approaches to working with more diverse groups of interested and affected stakeholders, in order to ensure that models inform management products providing usable information for decision-making. One possibility for helping with this includes the newly-developed NOAA Service Delivery Model.

Actions:

2.1 Utilize social science expertise when developing monitoring systems, incorporating stakeholders in co-production / collaborative design for data synthesis, model, product, and tool development, and establish clear, formal mechanisms for reporting stakeholder needs back to research and development.

2.2 Advance the research on how projections will impact diverse communities and sectors. This will include addressing multi-stressor interactions, refining vulnerability indices, developing projections of community impacts and adaptation strategies, and evaluating policy impacts on communities.

Recommendations

Continued: 2.0 - Stakeholder engagement in products and process

Recommendation: The CFI should elaborate on approaches to working with more diverse groups of interested and affected stakeholders, in order to ensure that models inform management products providing usable information for decision-making. One possibility for helping with this includes the newly-developed NOAA Service Delivery Model.

Actions (Continued):

2.3 Develop research and tools for decision making under uncertainty that will support the identification of policies that create benefits even under adverse conditions.

2.4 Clarify goals and approaches to evaluating the accessibility and useability of products for a broader, diverse set of stakeholders and Climate Information Hub.

Recommendations

3.0 Trust in products and process

Recommendation: As the CFI process proceeds, NOAA should continue its exemplary practices in assuring scientific integrity and consider how to further enhance trust as it engages with diverse stakeholders who are making decisions in a dynamic scientific environment under deep uncertainty.

Actions:

3.1 Ensure the multiple facets of trust are considered when developing and disseminating new guidance and information products.

3.2 Develop and publish a formal process for consideration and feedback on stakeholder needs to demonstrate agency responsiveness to public needs.

3.3 Develop metrics to assess trust.

Recommendations

4.0 - Upgrading the ocean observing system

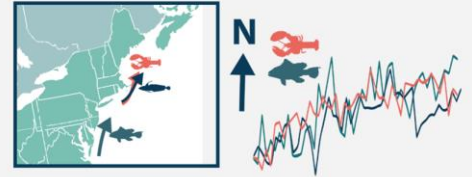
Recommendation: The CFI should engage across NOAA to upgrade the ocean observing system to fill crucial gaps such as physical observations on the shelf and nearshore, and biogeochemical observations in shelf, nearshore, and offshore waters. These data are central to enabling the attribution and predictive capability called for by the CFI.

Actions:

4.1 Work across NOAA, and amongst stakeholders/partners, to assess the adequacy of the observing system, including the observing system design and cost, particularly on the slopes, shelves and nearshore, to support ocean predictions and projections at the spatial and temporal scales required to support management and decision-making for fisheries and other living marine resources.

Climate Enhanced Habitat and Species Distribution Maps

The FACSS will provide information on past, current, and expected future changes in the distribution of habitats and species for use in survey designs, stock assessments, allocation, and other management decisions.



Climate Enhanced Population Forecasts and Projections

The FACSS will provide information on past, current, and projected future population levels of key target species under expected future ocean conditions for use in management advice and



Recommendations

Continued: 4.0 - Upgrading the ocean observing system

Recommendation: The CFI should engage across NOAA to upgrade the ocean observing system to fill crucial gaps such as physical observations on the shelf and nearshore, and biogeochemical observations in shelf, nearshore, and offshore waters. These data are central to enabling the attribution and predictive capability called for by the CFI.

Actions (Continued):

4.2 Use this assessment to guide key investments to target major gaps, possibly exploiting more robust satellite coverage and autonomous technologies, such as gliders and profiling floats, to scale up the spatial and temporal coverage over what is delivered by the present ship and buoy-based system.

4.3 Ensure that the present and new observational data streams are made available as quality-controlled, real time feeds for the operational ocean analyses and models.

4.4 Perform periodic assessments of the efficacy of the observing networks in supporting analyses and predictions for the CFI application areas.

Recommendations

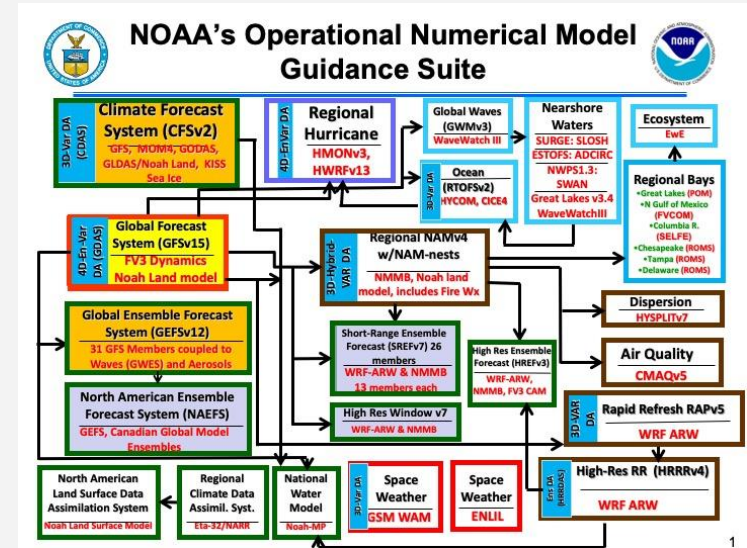
5.0 - Multi-stressor predictions at multiple scales

Recommendation: NOAA's CFI should extend to include steps towards development of climate-informed, multi-stressor predictions at multiple temporal and spatial scales that meet the needs of One NOAA managers and stakeholders.

Actions:

5.1 Accelerate development of coupled physical-chemical-biological models that can detect and forecast ecological impacts and changes at multiple time scales and over space and time.

5.2 Enable more substantial collaborative modeling (Figure 2) between technical experts, managers, and stakeholders including the development of interactive tools for decision-ready support. This will need to be founded on a solid basis where scientists and modelers collaborate to produce effective and realistic models and analysis tools, and where stakeholders and decision makers are involved so targeted products are usable.



Recommendations

Continued: 5.0 - Multi-stressor predictions at multiple scales

Recommendation: NOAA's CFI should extend to include steps towards development of climate-informed, multi-stressor predictions at multiple temporal and spatial scales that meet the needs of One NOAA managers and stakeholders.

Actions (Continued):

5.3 Incorporate the input and perspectives from social scientists, economists, modelers, oceanographers, biologists, computer scientists, product developers and communication experts to model development and vision.

5.4 Ensure that all relevant NOAA line offices are jointly involved in planning these efforts.



Questions?

Joellen Russell

Co-chair, SAB's Climate Working Group
Professor, University of Arizona

Kirstin Dow

Co-chair, SAB's Climate Working Group
Professor, University of South Carolina

August 25, 2021