

NOAA
SCIENCE
ADVISORY
BOARD

Developing Resilience in the Face of Rapidly Changing Marine Environments

November 30, 2022

ESMWG Committee Members & Liaisons

- **Co-chairs:** Dr. Jan Newton, Ms. Molly McCammon, and Dr. Lisa Wainger
- **Members:** Dr. Erik Chapman, Dr. Lynette Cardoch, Mr. Manuel Mejia, Dr. Robert Twilley, Dr. Kenneth Rose, Dr. Manuel Valdes-Pizzini, and Dr. John Vavrinec
- **SAB Liaisons:** Mr. Jon W. Allan and Dr. Steve Weisberg
- **NOAA Liaisons:** Dr. Johnathan Pennock, Dr. Cisco Werner, Dr. Paul DiGiacomo, and Mr. John Armor

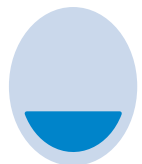


Report Background

- Developed at NOAA's request to provide advice regarding how NOAA's practices will need to evolve over the next decade to keep up with, and anticipate, possible future ocean states and the impact on ocean resources
- Builds upon an original NMFS study proposal (Rapidly Changing Marine Environment) in 2019
- While NOAA is not able to address every ecological forecasting need in marine and Great Lakes ecosystems, this report evaluates a subset of modeling issues that are largely under the control of NOAA

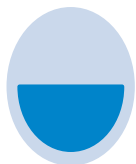


Report Process



May 2021

Cisco
Werner
presented
topic to
Working
Group



July 2021

Hosted panel
on Marine
Ecological
Forecasting/
Prediction



Jan 2022

Developed
themes and
timeline for
report



Feb - Nov 2022

Information
synthesized
and the report
written. Final
report delivered
to SAB at Fall
2022 SAB
meeting



Report Structure

- Executive Summary
- Introduction
- Chapter 1: Scales relevant to biology: Timescales and Multi-stressor Impacts
- Chapter 2: Promoting resilience by incorporating people in forecasting, risk assessment, and policy to respond to rapid change
- Chapter 3: Collaborative science, Co-design & Co-production in a Rapidly Changing Marine Environment
- Conclusions

Report posted to [SAB Website](#)



Ch 1: Scales relevant to biology: Timescales & Multi-stressor Impacts

- Evaluate how models could more thoroughly integrate biological processes. Pay particular attention to the cumulative impacts of multiple stressors at different time scales, and specifically in the context of a rapidly changing ecosystem.
- Provide innovative ways to stimulate fundamental ecosystem understanding and associated model development.
- Focus on enabling models that are fit for purpose, but also that contain enough detail to be useful: highlight need for increased model skill assessment.



Ch 2: Promoting resilience by incorporating people in forecasting, risk assessment, and policy to respond to rapid change

- Create better understanding of how humans respond to change by facilitating the collection of relevant data on human behavior using emerging observational tools
- Establish strategic and investigative priorities for integrative modeling investments based on effectiveness versus relative ease
- Use traditional and emerging social science data collection methods to model human behavior and inform marine and coastal program design
- Create (internal and external) capacity and institutional pathways to develop, use and apply social science methods as critical components of adaptive management



Ch 3: Collaborative science, Co-design & Co-production in a Rapidly Changing Marine Environment

- Expand and integrate the engagement tool box and cultivate a one-NOAA culture and community around rightsholder and stakeholder engagement and co-production
- Make a stronger commitment as a science agency to elevating and training engagement personnel within the agency workforce, and to hiring people with a deep understanding of co-production



Summary

- What has worked in the past for ecosystem models may not for rapidly changing marine environments, going forward into the future
- We strongly advise that the time to act is now, so that the nation can be better prepared
- We urge attention to this topic, evaluating how the linked tools of modeling, observations, and data analysis can provide insights and result in optimized tools for tomorrow



DISCUSSION
