



# SCIENCE ADVISORY BOARD

20 May 2022

Dr. Richard W. Spinrad  
Under Secretary of Commerce for Oceans and  
Atmosphere & NOAA Administrator  
Herbert C. Hoover Building, Room 6811  
14th Street & Constitution Avenue, NW  
Washington, DC 20230

Dear Dr. Spinrad:

***Subject: Transmittal of the SAB Leadership in Coastal Resilience Report***

On behalf of the NOAA Science Advisory Board (SAB), I am pleased to transmit to you the *Leadership in Coastal Resilience Report*. The SAB was supported in the development of this report by members of the Climate Working Group and the Ecosystem Sciences and Management Working Group.

Coastal resilience was identified by the NOAA Science Advisory Board (SAB) as a Long-Term Priority, is named as Goal 5 within the Decadal Vision for America's Oceans, and is a pillar of NOAA's Blue Economy. Threats to the economies, ecological integrity, and residents of coastal areas occur at weather to climate time scales, e.g., through extreme weather events, sea/lake level changes. The coasts of the United States - on the ocean and the Great Lakes - comprise a trillion-dollar property market; provide intermodal transportation hubs for global trade; and support ecosystems, harbors, and facilities essential to fisheries production, including a growing interest in aquaculture. Coastal areas are essential to the Blue Economy, and changes at the coast can have cascading impacts to the broader national economy and national security readiness.

In this report, the SAB identified three areas where NOAA's leadership can foster demonstrable change in coastal resilience: Continued Discovery, Networks of Knowledge Delivery, and Making a Difference on the Ground. Nine recommendations were developed under these three areas and are summarized here:

**Recommendation 1, Nature-Based Approaches to Risk Reduction:**

Conduct research in partnership with others to increase the understanding of tradeoffs between the performance of natural and nature-based coastal habitats in mitigating current and future flood risk and the provision of other ecological functions.

**Recommendation 2, Supporting Adaptation of Important Coastal Species:**

Identify and address gaps in scientific understanding that limit the ability of NOAA and its partner agencies to anticipate and effectively respond through mitigation, adaptation, restoration, or other management measures to climatologically induced threats to important coastal fisheries and other marine species.

**Recommendation 3, Socio-economic Inquiry:**

Conduct and support social science research to increase the understanding of how people (individually and collectively) understand, react to, and are affected by changing coastal conditions (both chronic and acute) including human interactions with coastal ecosystems, consideration of interactions among economic consequences, and social and cultural changes that the loss of (or restoration of) coastal resilience can affect or engender.

**Recommendation 4, Enhance Observing Systems:**

Further refine the development and deployment of land/water and space-based observing networks that are directly useful to local entities to track and forecast a variety of coastal ocean conditions over time.

**Recommendation 5, Integrated Coastal Resilience Modeling:**

Establish an Integrated Coastal Resilience Modeling framework that uses existing and enhanced observing systems to provide coastal decision-makers with key insights into the cumulative effects of future physical, chemical, and ecological change at subseasonal, seasonal, and multi-decadal time scales.

**Recommendation 6, Predicting Human-Natural System Feedbacks:**

Build on socio-economic research and modeling of biogeophysical change to develop tools that encompass feedbacks between human and natural systems to support exploration of future social, economic, and environmental conditions on saltwater and freshwater coasts at a variety of scales.

**Recommendation 7, From Stakeholder Engagement to Co-production and Co-design:**

Build new partnerships to engage in the co-production and co-design of knowledge and action to generate new knowledge, capacities, networks, and actions that are more inclusive, relevant, and impactful.

**Recommendation 8, Facilitating Social Learning:**

Develop, evaluate, and refine interactive approaches that enable a variety of coastal audiences to access and interpret outputs from the Integrated Coastal Resilience Modeling framework and human-natural systems modeling and understand the varied potential consequences of action/inaction on their interests, including timelines for change and adaptation and costs and benefits to people and businesses.

**Recommendation 9, Support for Implementation:**

Enhance and expand the network capacity and efficacy of NOAA and partner engagements at local and community scales to help communities and community decision-makers identify and implement solutions that build coastal resilience.

Each of these recommendations are supported with findings and expected outcomes.

The SAB greatly appreciates the opportunity to provide this advice to NOAA. We look forward to engagement with NOAA on this topic in the coming years.

Very Respectfully,

A handwritten signature in blue ink that reads "John R. Kreider". The signature is fluid and cursive, with the first name "John" being the most prominent.

John R. Kreider  
SAB Chair

Cc: Karen Hyun  
Michael Weiss  
Cisco Werner  
Nicole LeBoeuf  
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Emma Kelley  
Denise Reed  
Jon Allan  
Kirstin Dow  
Molly McCammon  
Sage Riddick  
Cynthia Decker  
Courtney Edwards  
Andrew Peck

Attachment: SAB Report on Leadership in Coastal Resilience