

## **THE NOAA SCIENCE ADVISORY BOARD: HISTORY AND RECENT WORK**

The NOAA Science Advisory Board was established out of a partnership between academia and the NOAA community. Enacted by a Decision Memorandum in 1997, the Science Advisory Board is the only Federal Advisory Committee with responsibility to advise the Administrator on long- and short-range strategies for research, education and the application of science to resource management. [Quote from Charter on goals of Board]

The Science Advisory Board is composed of approximately fifteen scientists, engineers, resource managers, and educators. The diverse membership of the board assures expertise reflecting the full breadth of NOAA's responsibilities, as well as the ethnic and gender diversity of the United States. Members were appointed by the Administrator to serve a term of three years with possibility of one renewal term. A list of current SAB members can be found on the SAB website: <http://sab.noaa.gov/SABMembers.aspx>

Board members meet in person approximately three times a year but may also have virtual meetings. At these meetings, the Board assists in the identification and maintenance of complete and accurate understanding of scientific and technological issues critical to NOAA's missions. The Board observes how strategic planning and the budget relate to science priorities. Additionally, the Board reviews Cooperative Institutes, science programs and practices within the line offices. The Board also helps to stimulate and improve partnerships with universities and cooperative and joint institutes. To date, the Board has created Task Forces and Standing Working Groups that have provided advice to NOAA on a variety of science and other issues.

Additionally, the Science Advisory Board has articulated clear criteria for evaluating NOAA's science priorities and programs. According to these themes NOAA Science must be credible, reliable and respected. NOAA science should be conducted and completed in timeframes and operational scales that are useful to managers, decision-makers, and society, and directly linked to policy decision-making. NOAA should assist its state and local government partners to build capacity to address scientific and technical questions related to coastal and ocean governance. Moreover, understanding complex environmental systems requires the integration of the social and economic sciences within the biological and physical sciences. Successful integration occurs in problem formulation at the beginning rather than at the end of the research – development – technology transfer pipeline.

Protecting and restoring our environment for the benefit of current and future generations requires far-reaching public education initiatives, public support and public involvement. Additionally, NOAA needs to expand involvement of people not historically involved or represented in its science programs. NOAA should be proactive to achieve greater diversity in its science programs, projects, and activities. The systems, policies and practices should encourage diversity and support all employees as they work to reach organizational and professional goals.

## **IMPORTANCE OF THE SAB**

The Board reports directly to the Under Secretary. The Executive Director works directly with the Chief Scientist and the Under Secretary to identify issues.

NOAA Assistant Administrators and Strategic Council Chairs look to the SAB for high-level advice; they attend the meetings and provide feedback on reports and recommendations.

## **VALUE ADDED BY THE SAB**

The Board works to provide strategic guidance on trends, issues and new areas of cutting-edge research that may impact NOAA mission in the future and provides advice from external experts, i.e. not the “usual suspects.” The SAB validates requirements and needs; identifies gaps in programs, expertise, funding; and takes those messages to others.

## **TASK FORCES AND STANDING WORKING GROUPS**

Since 2003, the SAB has used ten ad-hoc task forces to investigate a special issue or topic and complete a report; after the report was submitted to the SAB the groups were dissolved. The ad-hoc groups and timeframes are:

Research Review Team (2004)

Hurricane Intensity Research (2006)

External Ecosystem Task Team (2006)

Extension, Outreach and Education (2008)

WG to Examine Advisory Options for Improving Communications among NOAA’s Partners (Partnerships) (2008)

Fire Weather Research (2008)

Social Science (2009)

Oceans and Health (2010)

Satellite Task Force (2012)

Research and Development Portfolio Review Task Force (2013)

The SAB also uses permanent standing working groups to provide advice to NOAA. The current standing working groups and NOAA line offices supported, include:

Climate (OAR)

Data Archive and Access Requirements (NESDIS)

Ecosystem Sciences and Management (NMFS, OAR and NOS)

Environmental Information Services (NWS, OAR, NESDIS) and

Restoration Science Program Advisory Working Group (NOS)

More detail on standing working groups and working group members can be found on the SAB website: <http://sab.noaa.gov/WorkingGroups.aspx>

Reports from both the *ad hoc* task forces and standing working groups that were sent to NOAA are posted on the SAB website: <http://sab.noaa.gov/ReportLibrary.aspx>

## **FORWARD-LOOKING ADVICE**

In the last two years the NOAA Administrator tasked the SAB with thinking through some of the bigger picture issues that NOAA may encounter in the not-too-distant future (a 5-7 year “look ahead”). Five themes were identified by an SAB subcommittee:

1. Improving integrated observing systems: What are NOAA’s observing capabilities now, how can they be better integrated and what are the promising new technologies on the horizon that might increase NOAA’s ability to carry out its mission?
2. Ecosystem science and management: What advantages are there for NOAA taking a more integrated and holistic ecosystems approach that goes beyond the traditional fisheries approach, and how might the agency develop such a systems approach?
3. Impact of ecosystem services on human well-being: How should NOAA develop the scientific capability to translate ecosystem science and management into impacts on human well-being through the valuation of ecosystem services?
4. Improving integrated decision-making and system resilience: What kinds of information are most needed to better prepare for and adapt to changes in environmental conditions and potential disturbances and how should NOAA use information in decision-making?
5. Communicating success: How might NOAA best utilize the information developed in its programs to demonstrate the value of NOAA science for society?

As part of the SAB strategy synthesis effort, the SAB and NOAA invited a number of speakers for discussions at its meetings and prepared issue papers that incorporated some of the emerging topics for NOAA to consider.

Speakers, organizational affiliations and topics presented included:

- Simon Levin, Princeton Univ.; Ecosystem science and ecosystem services
- Granger Morgan, Carnegie Mellon Univ.; Risk analysis and risk communication, uncertainty
- Veerabhadran Ramanathan, SIO, UC San Diego; Atmospheric observations and sensing
- William Gail, Global Weather Corp.; Defining and communicating success (weather and environmental info)
- Nancy Knowlton, Smithsonian Institution; Communications (ocean and ecosystems)
- Richard Baraniuk, Rice University; Systems data processing, Compressive sensing
- Rowan Douglas Willis Group; Intersection of environmental information and insurance/financial sector
- Marcia McNutt, AAAS; Frontiers of science, new capacities

- Katherine von Stackelberg, Harvard; Risk-based tools to support environmental decision-making
- Jon White, RADM, USN (Ret.), President and CEO, Consortium for Ocean Leadership; Michael Thompson, Interim President, University Corporation for Atmospheric Research
- Pavan Sukhdev, GIST Advisory; Ecosystem services, green economy and international finance
- Norm Augustine, Retired DoD and Lockheed Martin; President's Council of Advisors on Science and Technology; Trends in US science enterprise
- John Kelly III, Senior Vice President, IBM Research and Solutions Portfolio; cognitive computing, IBM Watson

Issue Papers and SAB Authors:

- Science of Risk Communication- Peter Kareiva
- Exascale Computing in NOAA for Predicting Weather and Simulating Climate Change- Eugenia Kalnay
- Potential Impacts of 'Omics and Other Emerging Genetic Technologies on NOAA's Mission- David Lodge, Susan Avery, Jeremy Jackson and David Fluharty, Co-Chair Ecosystem Sciences and Management Working Group
- Data Science- Dawn Wright
- Compressive Sensing- Everette Joseph and Susan Avery

Based on the trends identified by speakers and the issue papers completed, NOAA is working on the following actions:

- Through an MOU with the National Science Foundation, NOAA identified projects for supplemental funding to leverage projects that are already funded through NSF but provide results that are useful for NOAA's mission. The majority are weather-related projects.
- The NOAA Social Science Committee continues to be an avenue for integrating social science across the Agency. Recent work includes developing a baseline inventory of the social science work that is going on across the agency.
- NOAA reviewed the Implementation Plan for the OMB/CEQ/OSTP Memorandum "Incorporating Ecosystem Services into Federal decision making. The final version has not been released by OMB.
- In response to recommendations from the Ecosystem Sciences and Management Working Group report on ecosystem services valuation, the Office of the Chief Economist is developing guidance on Ecosystem Services Valuation. The Terms of Reference for an Ecosystem Services Valuation Community of Practice are also under development.
- The Office of the Chief Economist is working to incorporate issues outlined in the Risk Communication and Behavior Report.
- Presentations on strategic topics by guest speakers -- innovation leaders -- have stimulated awareness and engagement in NWS over a range of NOAA-related S&T

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areas. The NWS has indicated it would like to see the SAB strategic speaker program continue.

- Several of the speakers have discussed innovations in IT and computing developments; NWS is supporting more formal SAB engagement in the area.
- NWS leadership has been in touch with IBM after John Kelly's presentation for more discussions of future weather capabilities.