

**58th Meeting of the NOAA Science Advisory Board  
April 24-25, 2017**

Location: Doubletree Hilton  
8727 Colesville Road  
Silver Spring Md.

Presentations for this meeting have been posted on the Science Advisory Board (SAB) website:  
<http://www.sab.noaa.gov/SABMeetings.aspx>

**SAB members in attendance:**

Ms. P. Lynn Scarlett, Managing Director for Public Policy, The Nature Conservancy (Chair); Dr. Susan Avery, President Emeritus, Woods Hole Oceanographic Institution; Dr. Michael Donahue, Vice President, AECOM Corporation; Dr. Everette Joseph, Director, Atmospheric Science Research Center, University at Albany, State University of New York (SUNY); Dr. Eugenia Kalnay, Professor, University of Maryland; Ms. Jean May- Brett, STEM Partnership Coordinator, Louisiana Department of Education (ret.); Dr. Richard Moss, Senior Scientist, Joint Global Change Research Institute, Pacific Northwest National Laboratory; Dr. Denise Reed, Vice President for Strategic Research Initiatives, Water Institute of the Gulf; Dr. Stephen Polasky, Professor, University of Minnesota; and Mr. Robert S. Winokur, Consultant (ret. NOAA, Navy)

**NOAA senior management and Line Office representatives in attendance:**

Mr. Ben Friedman, Deputy Under Secretary for Operations; Mr. Craig McLean, Acting Chief Scientist and Assistant Administrator, NOAA Office of Oceanic and Atmospheric Research (OAR); Dr. Russell Callender, Assistant Administrator, NOAA National Ocean Service (NOS); Dr. Louis Uccellini, Assistant Administrator, NOAA National Weather Service (NWS); Dr. David Detlor, Deputy Director, Office of Science and Technology, NOAA National Marine Fisheries Service (NMFS); Mr. Mark Paese, Deputy Assistant Administrator, NOAA National Environmental Satellite and Data Information Service (NESDIS); and RADM David Score, Director, NOAA Office of Marine and Aircraft Operations (OMAO)

**Staff for the Science Advisory Board in attendance:**

Dr. Cynthia Decker, Executive Director and Designated Federal Officer, Ms. Elizabeth Akede and Ms. Mary Anne Whitcomb

**April 24, 2017**

**Opening Statement of the Chair and Self-Introductions by Science Advisory Board (SAB) Members**

Lynn Scarlett, The Nature Conservancy and Chair, NOAA SAB Chair

Lynn Scarlett welcomed everyone to the meeting. She noted the SAB would be conducting routine business at this meeting with no expert speakers as there has been in the past. There will be discussion of transition documents, short term work issues, and field trips to learn about what NOAA does. Both the transition and the communications are discussions about what the SAB does, why it does what it does, particularly the value proposition of the SAB and more broadly the value proposition of NOAA to the Nation and the public at large. Lynn Scarlett said there is a fad of always thinking that the value proposition should be articulated in terms of dollars but providing the message in terms of substantive benefits is also important.

### **SAB Consent Calendar**

Lynn Scarlett, The Nature Conservancy and Chair, NOAA SAB

- February 2017 SAB Meeting Minutes
- Working Group Status Reports

Jean May-Brett made a motion to accept the items on the consent calendar; Michael Donahue seconded the motion and it passed unanimously.

### **NOAA Update**

Ben Friedman, Deputy Under Secretary for Operations Performing the duties of the Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator

Ben Friedman thanked the SAB members for their work and NOAA leadership and all participants for attending. He began his remarks by stating that NOAA has one of the great missions in government but few people know about it or know of just one aspect. People don't know about the impact on economy, national security environment or the full scope of NOAA's work. NOAA is trying to tell a better story both internally and externally. There is a field trip in NOAA today to help the SAB learn more about what NOAA does, even if it is only a tiny fraction.

During this presentation the focus was on four areas - transition issues, current initiatives in NOAA, recent accomplishments, and upcoming events. Mr. Friedman said it has been an honor to be in the Acting Administrator role which will continue until there is a new Administrator and thanked NOAA leadership also working in acting roles - Craig McLean, Paul Doremus, Stephen Volz, and Sam Rauch. All of them are serving in dual career and political roles.

### **Administration Update**

Mr. Friedman reported there have been discussions on budget issues at the White House. There have been executive orders that have had an impact on NOAA including a temporary hiring

freeze now lifted; streamlining regulatory processes and reforming and modernizing government to gain efficiencies NOAA has working groups on these topics and is working closely with the Department and moving forward with these initiatives.

NOAA has been encouraged in its interactions with Wilbur Ross, the new Commerce Secretary who has been very supportive of NOAA. Secretary Ross is keenly interested in aquaculture “One issue in particular that the Secretary himself has reiterated is his desire “to eliminate the country's seafood trade deficit...by becoming more self-sufficient and perhaps even a net exporter of fish.” Currently the U.S. imports 91 percent of fish consumed while around the world 50% of fish come from aquaculture. and export. While the US is a major player in supporting aquaculture in other countries the country needs to do more with aquaculture for its own consumption and export. While aquaculture is complex due to the multiple agencies and regulatory processes, NOAA is moving forward on this issue through NMFS.

There are two new political appointees in NOAA, George Kelly, serving as Acting Deputy Chief of Staff and Dr. Erik Noble, serving as Senior Policy Advisor.

Within NOAA, due to acting roles, it difficult to move forward on policy and strategic positions so the agency is focusing on operating in a “business as usual” fashion. Dr. Friedman has established the following priorities at this time: Diversity and Inclusion and Improved Communication.

#### Diversity and Inclusion

Over the last year, there was movement to make major improvements. In October 2016 NOAA held its first Diversity and Inclusion summit to think creatively on how to improve efforts. NOAA created a Diversity and Inclusion Management and Advisory Council to focus on workforce diversity, workplace inclusion, including on-boarding processes and sustainability of efforts and measuring of progress.

#### Communications

NOAA struggles to explain the full scope of what NOAA does both internally and externally. NOAA started story maps as a way of telling a story through interactive media. Each month NOAA introduces a new story map for employees and for the public via the website. The first story map told the story of California's epic winter and how NOAA was on the front lines. NOAA also reinstated Postcards from the Field highlighting NOAA work outside Washington DC. Each month will introduce a new Postcard story.

#### Recent Accomplishments

President Trump signed into law HR 353, The Weather Forecasting Improvement Act, the first major weather legislation since 1992. The legislation promotes connections between the NWS

and emergency management communities. It is not enough to put out a forecast, need to be connected to emergency managers so forecasts have an impact. The legislation also advances watch and warning program, authorizes NESDIS to use commercial satellite programs, and authorizes the weather research program. In terms of impact on the SAB, it codifies the Environmental Information Services Working Group (EISWG), and calls for the group to provide the SAB advice for prioritizing weather research initiatives at NOAA to improve weather forecasting and advice on how to incorporate private industry and the research community to do that. It also charges EISWG with providing advice on how NOAA can improve communications at all levels of weather forecasting. The legislation also calls on SAB to designate an existing working group to be a tsunami science working group. NOAA will be working with SAB on legal and technical issues with respect to the Act

#### Ron Brown Homecoming

NOAA Ship *Ronald H. Brown* recently returned to its homeport of Charleston, South Carolina after a 1,347 day deployment. This is the longest continuous deployment of any U.S. public vessel in the last 150 years. The *Ronald H. Brown* traveled approximately 130,000 miles and surveyed 267,294 square nautical miles (an area larger than the states of Texas and Oklahoma combined), conducted 480 net tows, and 76 oceanographic buoy deployments. The ship served as the primary at-sea data collection for the El Niño Rapid Response project, and contributed to a better understanding of global weather patterns and improved forecasting of extreme precipitation events on the U.S. West Coast.

#### GOES-R

The launch of the Geostationary Operational Environmental Satellite (GOES) Series-R November 19, 2016 was one of the most closely followed events in NOAA history. GOES- R is now called GOES- 16 and the satellite provides improved resolution (*4x better*) and scan speed (*5x faster*) when compared to earlier satellites. During wildfires in March 2017, GOES-16 was able to see formation of fires from its 16 spectral channels, improved from five channels on earlier satellites, enabling emergency managers to detect fires in a more efficient way, GOES 16 still in a test phase, won't be fully deployed for a few months.

#### Upcoming Events

As the Atlantic Hurricane Season begins on June 1st, NOAA has a number of preparedness events planned beginning with the 2017 Hurricane Awareness Tour, which includes six stops along the eastern seaboard. At each stop, the local Weather Forecast Offices will host stakeholder and community engagement events, which will include the opportunity to talk with forecasters and tour some of the Hurricane Hunter aircraft with the pilots. All three of NOAA's 'Hurricane Hunter' aircraft will be on display at this event, which promises to be a great venue to showcase the importance of NOAA's work in hurricane forecasting and the utility and importance of NOAA's fleet of aircraft.

After spending more than two decades at MacDill Air Force Base, NOAA announced that the Hurricane Hunter Aircraft will relocate to Lakeland, FL. On June 2<sup>nd</sup>, NOAA will be opening its new Aircraft Operations Center in this location.

NOAA's Joint Polar Satellite System (JPSS)-1 satellite is scheduled to launch on September 21, 2017 from Vandenberg Air Force Base (AFB) in California. The JPSS is the Nation's new generation polar-orbiting operational environmental satellite system. Satellites in the JPSS constellation gather global measurements of atmospheric, terrestrial and oceanic conditions, including sea and land surface temperatures, vegetation, clouds, rainfall, etc. JPSS delivers key observations for the Nation's essential products and services, including forecasting severe weather like hurricanes, tornadoes and blizzards days in advance, and assessing environmental hazards such as droughts, forest fires, poor air quality and harmful coastal waters. JPSS will provide continuity of critical, global Earth observations, including our atmosphere, oceans and land through 2038.

### Discussion

Bob Winokur noted the emphasis of aquaculture and importance of Sea Grant in this endeavor but pointed out the 2018 budget proposes to eliminate funding for Sea Grant. Ben Friedman agreed Sea Grant is zeroed out in the President's budget but this budget goes to Congress which will determine the final funding amount.

Susan Avery liked the idea of story boards and wondered how to rewrite these with terms more understandable to general public. Ben Friedman agreed it was important to communicate science in ways people can understand.

Everette Joseph asked about diversity and inclusion; in the university they advocate in-house hiring and unbiased hiring and asked how NOAA is addressing hiring in science areas. Ben Friedman said NOAA works to hire students coming from universities in programs NOAA supports but it is difficult to hire them directly. There is a government-wide program called Pathways, which can be used for hiring directly out of college and graduate school; other agencies use this program and NOAA is looking into it. NOAA has programs with Cooperative Science Centers but doesn't have a great record in hiring from those programs; the agency wants to do better.

Craig McLean said NOAA recognizes it is not pushing the limits of the personnel rules; if there is a good candidate NOAA loses him/her because the hiring process takes too long. NOAA has treated Cooperative Science Centers as educational programs but not as science programs. He thinks these should be on an equal footing with the Cooperative Institutes. In renewing Cooperative Institutes, NOAA asks them to clarify and emphasize their relationships with the

Cooperative Science Centers. NASA has also identified different ways to recruit, including changing contract language on diversity of its workforce.

## **NOAA Science Update**

Craig McLean, Acting NOAA Chief Scientist

### Summary

Craig McLean started by following up on an operational achievement highlighted by Ben Friedman during the NOAA Update presentation. On the length and duration of the Ron Brown cruise; years ago, there was a policy that recommended that NOAA retire four class one global ships and replace them with only one global class one ship, the Ron Brown. The idea was that NOAA would charter with the university community and others to replace the ship work capacity lost with the retirement of the four ships. Funding for the program was lost, and the charter funding from Congress was not renewed. As a result, the one global class ship, the Ron Brown, was away from home port for three years and nine months. Advice from the SAB on how to better deal with ship time needs with an aging fleet is welcomed by NOAA. The Office of Marine and Aviation Operations (OMAO) is conducting and advocating for a new build-out plan for the ships, however, the needs of the NOAA line offices (LO) and universities for ships need to be better represented.

Mr. McLean then spoke about several other science topics.

### *Climate Adaptation and Mitigation Update*

The 2016 State of the Climate report was released on January 18<sup>th</sup>. The report found that 2016 was Earth's warmest year on record (since 1880), and noted that this was the third consecutive record-breaking year. NOAA's National Centers for Environmental Information (NCEI) releases this report every year. All NOAA labs contribute to the data used for the report.

### *Weather Ready Nation Update*

The Finite Volume Cubed (FV3) dynamical core development continues. The FV3 was able to effectively recalculate/re-model a series of Pacific Ocean storms as well as re-create all of the category four and five storms in the Atlantic during the year of Hurricane Katrina. This model will eventually be merged into the Global Forecast System operated by the National Weather Service (NWS). NOAA is on track to make this the operating core for the weather forecast modeling system for the global forecast system. This FV3 model is in research mode, it is not ready to be released yet.

The Warn-on-Forecast in hazardous weather testbed is where forecasters, researchers, and modelers are working collaboratively to test storm-scale, convention ensemble models. This project is housed in Oklahoma. This is the first year that NWS forecasters and researchers have been able to test, in real-time, the Warn-on-Forecast outputs.

The National Blend of Models is part of the NWS Advanced Weather Interactive Processing System (AWIPS). NOAA is in the third version of blended models; this version supports the

impact-based decision support services of the NWS. This latest upgrade will add hourly temporal resolution to 36 hours, 7-10 additional high resolution model inputs, and extended domains for the CONUS and Alaska

The Weather Ready Nation (WRN) Ambassadors program reached a milestone - the program recently added its 5000<sup>th</sup> Ambassador. This program helps implement impact-based decision support services by making ambassadors weather literate and weather understanding.

NOAA continues to improve the efficiency, accuracy, consistency, and accessibility of hydrologic forecast guidance generated by the National Water Model (NWM). The next version of the system is set to be operational in early May with upgrades extending the short-range model runs (15hr to 18hr) and additional medium range model runs (1 per day to 4 per day).

### *Healthy Oceans Update*

In the 1970s the Sea Grant program was a pioneer in aquaculture and ocean-related energy. Today, European and Asian aquaculture industries have benefits from the investments made by the United States through its Sea Grant program. The National Sea Grant office released two calls for proposals related to aquaculture totaling close to 15 million dollars. Also, the Rhode Island Sea Grant program led the development of the Rhode Island Shellfish Initiative with the state. The plan provides comprehensive policy guidance regarding management and protection measures for shellfish, such as quahogs and oysters, located in state marine waters.

The National Marine Fisheries Service (NMFS) is using social, demographic and fisheries data to develop community social vulnerability indicators for locations along the entire U.S. coast so that 3800 coastal communities can be informed of not only the ecological or climatological future but the social future of their communities. These coastal communities now have a tool for describing and evaluating how vulnerable their communities are to sea level rise, shifting fishery populations, and changes in ocean chemistry. NMFS takes the climate forecasts, generated by the National Climate Assessment which delivers a product that indicates how water temperature and biological grain might change over time and then it looks at the effects of this on a fish stock, and the impacts of these factors on the communities that are dependent on the harvest of the fish stock and the components of the ecosystems beneath them.

NOAA Fisheries' operationalized a new camera that provides the first representative survey of snapper and grouper stock abundance in the untrawlable habitat of all Pacific Islands Region fisheries. This first-ever annual deep bottom fish survey was a cooperative research effort that involved the local fishing community, including contracting 67 research-fishing days from commercial fishers and 15 sea days aboard a NOAA research vessel in Hawaii from the spring to the fall of 2016. NOAA Fisheries can now ground-truth or enhance the fishery-dependent stock assessments which have subjected fishing communities to increasingly restrictive management measures.

The NOAA Ocean Exploration program started in 2001. The program acquired a T-AGOS vessel as the dedicated ship for oceans exploration used by a public agency. Today, there are various organizations working to create a national ocean exploration program. The Economist's Ocean

film series choose to feature the NOAA ship Okeanos Explorer and Ocean Exploration Program examining the cutting edge science used by NOAA to tackle the challenges facing the world's oceans.

#### *Resilient Coastal Communities and Economies Update*

The National Geodetic Survey (NGS) is responsible for defining latitude, longitude, height, scale, gravity, and orientation throughout the United States. A small business innovation research (SBIR) project collaboration with partner Aurora Flight Science, National Ocean Service (NOS) and the Unmanned Aircraft Systems (UAS) Program began the first operational survey on the Aurora Centaur Optionally Piloted Aircraft for the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) project through the NGS. This survey has the potential to increase surveying efficiency, reduce costs, and improve data quality. The project is estimated to provide more than \$4.8 billion in socioeconomic benefits to the United States through improved floodplain mapping, coastal resource management, construction, agriculture, and emergency evacuation planning.

#### *Organizational Excellence*

The Presidential Early Career Awards for Scientists and Engineers (PECASE) are the highest honor bestowed by the U.S. Government on outstanding scientists and engineers who are beginning their independent careers. In January the White House Office of Science and Technology Policy (OSTP) announced the 2014 winners. This year, NOAA had three PECASE winners.

- **Dr. Mandy Karnauskas** (NMFS, Southeast Fisheries Science Center) — For improving the science supporting fisheries management and policy in the United States and beyond and for building marine ecosystem literacy within the fishing industry and in developing countries.
- **Dr. Anne Perring** (OAR, NOAA Cooperative Institute for Research in Environmental Sciences) — For pioneering work in the development and application of new atmospheric measurement techniques for the study of black carbon and bioaerosols, and for outreach activities in the community.
- **Dr. Corey Potvin** (OAR, National Severe Storms Laboratory) — For innovative contributions to observational analysis of thunderstorms, assimilation of observed storms into numerical prediction models, groundbreaking research to predict localized thunderstorm-related threats such as tornadoes, and community outreach.

Dr. Daniel T. Lindsey will receive the NOAA David Johnson Award for his innovative contributions to the exploitation of satellite imagery, from super rapid-scan imaging to the visualization of simulated cloud and moisture imagery of high impact environmental phenomena ranging from severe local storms to tropical cyclones. His near real-time demonstrations of the capabilities of the new generation of geostationary satellites is paving the way for the transition of highly valued applications into the forecaster operational environment.

Scientists from NOAA Fisheries' Northeast Science Center have been recognized by the American Fisheries Society for their work on measuring dam impacts. Their work is being used



to protect endangered U.S. Atlantic salmon, and is being adapted for use in river herring and American shad management.

Hosted by Waleed Abdalati, Director of the Cooperative Institute for Research in Environmental Sciences, University of Colorado; the Crowd & The Cloud is a four-part television series focused on the power of Citizen Science. The first episode begins with the story of the Community Collaborative Rain, Hail and Snow (CoCoRaHS) Network and its connections to the National Weather Service. The first episode begins with the story of the CoCoRaHS Network and its connections to the National Weather Service.

### Discussion

Steve Polasky asked about the value of information that NOAA has; is NOAA capable of going from the science to application to the societal impacts of the science. Mr. McLean answered that NOAA is not where it should be with going from science to application to impacting society. This is something that the SAB can help NOAA improve on.

Susan Avery commended the GOES R visualizations and capabilities; what are the next-steps for transforming the triage wildfire data base with higher capabilities to visualize storms. How is a decision tree set up now that more information is available on how this is done, especially in conjunction with the work being done by the Department of Interior (DOI) and the U.S. Department of Agriculture (USDA)? Ben Friedman said that this feature has been in development for a long time. There is a revamping of plans on how to use the data and adapt to new ways to do things.

Lynn Scarlett said she chaired the Wildfire Council Leadership group during her time at the Department of Interior (DOI). There is a long standing effort to understand the conditions of lands and to understand pattern of fire incidents and places at risk and that in turn with fire related ecosystems. There's been a push, the last 30 years, to let fires burn but now a lot more urban interface makes it harder to do. There is already a tool called the LANDFIRE (LF) Data Access Tool (LFDAT) that allows users to interact with the LF Data Distribution Site (DDS) and download LF data all from ArcMap. This tool can be used in addition to other information sources and decisions that are already being used to better inform the process used for fire forecasts.

Louis Uccellini said that the fire example is the best one of what the data can be used for. The testbeds were put in place 2-3 years before the GOES-16 launch. The group practiced with other data as well; however, this is the first that engineers and scientists were working together in real time. The main point is latency; data can be gotten every 30 seconds now. Now the forecasters at fires are getting these data so much faster and are able to inform the first responders sooner. Greg Mann was the project manager who foresaw this and made sure that it was covered in advance before the satellite came online.

Eugenia Kalnay mentioned that in Japan, students are making data assimilation easier and has been doing 30 second data simulations very successfully. Is the US doing the same thing? Louis Uccellini said that the US is working on this.

### **Discussion of Short-Term Topics for the SAB**

#### **Mr. Ben Friedman, Acting Under Secretary of Commerce for Oceans and Atmosphere and Acting NOAA Administrator**

Ben Friedman said he does not know when new political administration will come. While it may be a few months or more it does not make sense for the SAB to be idle in that time and identified some topics for advice from the SAB. The purpose of this discussion was for the SAB to identify some short-term actions on which it could work prior to the appointment of the next NOAA Administrator.

Lynn Scarlett said over the past two years the SAB amplified its impact with the strategic discussions but finds itself now in more passive mode.

Mr. Friedman agreed and said he would like to see the SAB spend some time on a few issues in the next 2-3 months. He suggested some possible topics for the SAB to consider.

1. How can NOAA do a better job of showing its economic impact to the country? National Marine Fisheries Service, Sea Grant and National Marine Sanctuaries programs do a good job in this area. NOAA does less of this type of analysis with climate products and services and weather enterprise as a whole. Perhaps the SAB can select one or two services to discuss economic impact.
2. The next-generation big data project. How can NOAA make its data most useful to the country?
3. Enhancing, optimizing and harmonizing the delivery of environmental services across the NOAA enterprise. It is a One NOAA issue focusing on the cross harmonization of initiatives, data, and products among different NOAA line offices.
4. Citizen science and ecological/ecosystem data collection. How can NOAA connect with groups interested in what it NOAA does and utilize the data produced by the different groups?
5. Diversity and Inclusiveness. This topic may not be a scientific topic; however, it affects the entire NOAA enterprise. How can NOAA better handle diversity inclusion?
6. The need for current empirical studies (new data collection and analysis) to better understand the societal benefits of NOAA products and services. Tying what NOAA does to societal and community benefits.
7. The need for additional social science staffing in Line Offices to build the specialized knowledge base needed to ensure the appropriate use of social sciences across NOAA's diverse mission service areas. How can NOAA use social science in an attempt to have weather ready nation? How can NOAA better use social science; what is needed to do this?

Bob Winokur said that the environmental information services topic is one that the Environmental Information Services Working Group (EISWG) worked on but did not do well. It is an important element that EISWG could work on.

Louis Uccellini said the Weather Bill touches on social sciences and its application to not just communication but also product design, and connecting the use of products to real world; this is something that could be looked at.

Ms. Scarlett said the SAB will need to think about the suggested topics and noted that some of the topics mentioned cluster under a theme—big data and how to make it useful; this also relates to One NOAA and enhancing environmental services. There is a need to think about data and analytical streams and how these streams result in goods and services that meet the nation's needs. Similarly, citizen science is part of the same question: in the realm of big data, how can an organization utilize citizen science. NOAA has a tremendous amount of investment in data, analysis, and translating it to provide meaning to problems facing the nation. How does all of this avoid risks, costs, and inform what NOAA does to contribute to economic welfare?

Ms. Scarlett asked for volunteers to look at the list of topics presented by Ben and think back to previous discussions with strategy speakers and come up with one or two recommended ideas for the SAB to work on that seem relevant to NOAA's mission and the possible priorities of the new administration.

Stephen Polasky agreed that topics such as data collection and data use are related and liked the idea of looking back at the work done by the SAB over the last two years. On social science maybe the group can pick out specific things to focus on.

Jean May-Brett said she did not want to lose track of diversity and inclusion issues and asked what the impact would be of loss of grant funding to working with Minority Serving Institutions.

Denise Reed said the SAB work plan was discussed at the November 2016 meeting and February 2017 teleconference meeting. A number of the topics Ben mentioned were included in the prototype work plan so the group needs to look at those as well; citizen science was one, but there are others.

Everette Joseph asked how the SAB can utilize the working groups in these endeavors; guidance on this would be helpful.

Cynthia Decker suggested that the SAB work with Working Groups. For example, the Ecosystem Sciences and Management Working Group (ESMWG) have selected citizen science as a topic to address.

**Action 1:** The SAB identified a subcommittee to recommend topics to the SAB for short-term action. The subcommittee will draft these and provide to the SAB at a teleconference meeting to be scheduled in early summer.

Responsible Entity: SAB

Points of Contact: Stephen Polasky, Eugenia Kalnay Denise Reed, and Bob Winokur

Due Date: SAB Summer Teleconference meetings

### **Discussion of Transition Materials from the SAB for new NOAA leadership team**

Lynn Scarlett, The Nature Conservancy and Chair, NOAA SAB

#### Summary

Lynn Scarlett said that SAB members have received this draft transition document for review; transition materials were discussed at the November 2016 and February 2017 meetings. There was a discussion that the SAB should include the summary of the strategy sessions but people were too busy to work on this summary. As an alternative, it was discussed that NOAA has a standard SAB 101 presentation that the group agreed should be edited and used as the transition document. NOAA staff edited the SAB 101 document adding some updates including discussion of the strategy session. Ms. Scarlett asked for comments and if anything significant is missing. Highlights of document include: a descriptive first section, a section on governance; a value-added section and information on task forces and standing working groups of the SAB. There is also a section on the forward-looking advice to capture the strategy session and a listing of speakers. Finally there is a summary of what NOAA is beginning to do to draw from that body of work.

Lynn Scarlett said she would like the group to provide more detail on the value-added section. The SAB has made contributions through reviews of the Cooperative Institutes (CIs), work on clarifying role of Working Groups, reviewing the Working Group reports for robustness, and in the strategy sessions.

#### Discussion

Richard Moss said the document was a good effort and sets a good tone; also agreed the value-added section needs expanded wording. As members of the SAB the members all draw on networks and backgrounds beyond NOAA to help connect NOAA to outside entities and organizations.

Craig McLean said there is a balance - the SAB has very impressive people and NOAA wants to stimulate them to provide useful advice. The SAB is pushing NOAA to think differently and to identify different ways to get the mission done. The presentation by Dr. John Kelly II of IBM led to NOAA working with large Cooperative Research and Development Agreement (CRADA) partners for computational work. The reviews of the CIs have benefitted from the prestige of this body. How can NOAA be thinking of more creative ways to do our science mission?

Denise Reed said the lessons learned came out well in the document but the value-added and importance sections should be merged. The idea of efficient and timely advice rather than guidance, strategically using working groups and sun setting them as needed, is important. It should be made clear that the SAB members are volunteers with an efficient connection to the larger science community to provide both short-term and long-term advice, particularly useful in crises like Deep Water Horizon. Dialogue with NOAA while understanding the NOAA issues and independent reports and advice formally sent to Administrator capture some of the SAB's value.

Lynn Scarlett liked the addition of efficient timely advice, quick thoughts on emergent issues, and dialogue itself was rich. The document does need to state that management is not the SAB role.

Susan Avery suggested that advice on the issue of technology and technology disruption that creates surprises and opportunities should also be included under value-added. Research to operations is not mentioned but is important as this is an emphasis in NOAA.

Bob Winokur said in the value-added section he had issues with the last sentence which stated that the SAB validates requirements, identifies gaps in programs and takes messages to others. He is not sure the SAB has been done that in a formal way and this wording may overstate what the SAB has done. The SAB has not looked at funding so this is not a good statement. Funding as the government goes forward is a critical issue; will the SAB be looking at budget cuts such as the loss of Sea Grant if that happens? Dialogue has influenced programs in many areas even if there is no formal report to point to.

Lynn Scarlett agreed that the language on validating requirements needs to be revised; should not use the word validate as it is the deliberation that has been given preference over written reports by the Administrator. The process of gap identification by employees would be a different exercise. With the external orientation of the SAB, the strategy session work and topics covered are a broad way of examining gaps and needs. The SAB would observe that the world looks like this thus NOAA has these programs; and the world is changing and how relevant is that to NOAA. Not in a program management sense but in a larger sense; while the language needs to be changed, that is what the SAB has been doing. It is not clear that the role of the SAB to engage in the examination of funding. Funding is a political area and involves priority setting not in the SAB role. Mr. Winokur agreed and said the issue is about the wording of the document.

Louis Uccellini discussed the detailed guidance provided in the Weather Forecast Improvement Act including requiring prioritization of research, NWS and OAR interactions and other topics. Susan Avery said she appreciated the comments but found the language in the bill shocking because of its implications. Everette Joseph said funding will be an issue for the work required

under the bill; this is an authorization bill, not an appropriation bill. Louis Uccellini said the bill provides a legal basis to work at every level including down to local governments and has a lot of implications for what the National Weather Service does. Louis Uccellini agreed that NOAA will need money to carry out these activities. Lynn Scarlett said the SAB needs to hear more about the Act and its implications.

Lynn Scarlett said she will rewrite of the value added section to reflect some of the work the SAB has done and combine it with the importance section. The finished document should be useful for the new Administration to understand the types of issues SAB has done and to determine what the SAB could do in the future.

Craig McLean said NOAA could provide a complementary memo on what the SAB has done—ways NOAA has profited from the SAB. Lynn Scarlett said this could be a complimentary piece but will not be included in the SAB document.

Bob Winokur said he sees four roles for the SAB: providing advice on trends; serving as a sounding board for NOAA leadership; reviewing NOAA’s strategic plans, and providing reports and recommendations.

Denise said the issue papers were discussion stimulators, different from formal advice and recommendations, both valuable but different things.

**Action 2:** Lynn Scarlett will edit the “importance” and value added sections of the SAB transition document and will send the revised document to the SAB for review.

Point of Contact: Lynn Scarlett

Due Date: May 31, 2017

### **Discussion of Process to Review SAB Standing Working Groups**

Lynn Scarlett, The Nature Conservancy and Chair, NOAA SAB

Craig McLean, Acting NOAA Chief Scientist

Lynn Scarlett noted the standing Working Groups have expertise to research topics and are of assistance to the SAB. The procedures that govern them are in the Concept of Operations and there is now a requirement for a review of SAB working groups every two years. The purpose of this session is to review the draft process for these reviews and provide comments on it to NOAA. Cynthia Decker added that the original idea was that the review would be done in tandem with the renewal of the SAB charter. This is underway so the document also contains a timeline for the next review.

Michael Donahue said process is logical but asked if the timeline could be compressed to less than 6 months and also asked if NOAA could be given a time for final action. Craig McLean said he would agree on a timely turnaround from NOAA.

Lynn Scarlett was wary of asking NOAA for a specific date for approval; perhaps the SAB could ask NOAA to report at the following SAB meeting that they have received the reviews and can also ask NOAA to provide a date for action.

Bob Winokur said on reviews after 2017, the document mentions that there is an annual SAB work plan. He noted the SAB has not yet developed the work plan. Lynn Scarlett answered that SAB had started on the work plan but wanted to wait on the plan until there is an Administrator so the SAB will be working on an interim work plan. Bob Winokur asked who owns the standing working groups. Cynthia Decker said when NOAA received clearance on the Concept of Operations the legal guidance was that the subcommittees also belong to the agency so NOAA has the final say. Craig McLean said there are very talented people on the SAB and as long as there is a spirit of collaboration with NOAA leadership, there would not be a problem.

David Fluharty, Co-Chair of the Ecosystem Sciences and Management Working Group, agreed that schedule should be compressed as steps in the review process are not difficult. He also noted that many reports have been completed since 2013 and supports adding them to the SAB 101 document.

Ron Birk, representing the Environmental Information Services Working Group, said the group does not have co-chairs yet. On the overall topic of discussion on value chain, members are interested in contributing.

Craig said what we have dealt with already today even between Administrations, in the science we discussed and said thank you. He said they have gotten a lot from a lean agenda without a NOAA Administrator.

**Action 3:** The SAB approved the process for reviewing SAB subcommittees but asked for revisions in the timeline to result in a shorter completion date.

Point of Contact: Cynthia Decker

Due Date: Results of the reviews will be sent to the SAB before the August 31 teleconference meeting.

**April 25, 2017**

**Introduction**

Susan Avery, President Emeritus, Woods Hole Oceanographic Institution and Acting Chair, SAB

Lynn Scarlett was unavailable to Chair the meeting and Susan Avery agreed to act as Chair for the day. Susan Avery welcomed everyone to the second day of the meeting.

### **Draft Report on Indigenous and Local Ecological Knowledge and NOAA from the Ecosystem Sciences and Management Working Group (ESMWG)**

Jo-Ann Leong, University of Hawaii and former Co-Chair, ESMWG

#### Summary

Jo-Ann Leong discussed the background and rationale for the study of Indigenous and Local Ecological Knowledge (ILEK) that was done by the Ecosystem Sciences and Management Working (ESMWG). This came about as the result of a request from the National Marine Fisheries Service (NMFS) and the National Ocean Service (NOS). The Terms of Reference for the study were developed with final approval by the SAB. The goal of the report was to assess NOAA's current efforts in ILEK. The approach for the report was to hear from experts on the topic from outside and in NOAA and to survey NOAA staff who work with ILEK. The ESMWG conducted telephone interviews with over 80 respondents in NOAA; additionally members interviewed 15 NOAA staffers identified as having responsibilities that might engage ILEK holders. A literature review was also completed to identify best practices in the field.

The report included a number of recommendations for NOAA as an organization including: the creation of NOAA-wide policies on ILEK and opportunities for training for NOAA staff working with ILEK holders and ILEK experts. Recommendations were made for funding ILEK research and engagement including: dedicated funding for the access and integration of ILEK into NOAA resource management; creation and funding of an intern program targeted at indigenous students of ILEK; creation of a strategic team with NOAA members from each region skilled in ILEK, ILEK stakeholders and outside experts to help NOAA staff; and development of protocols to incorporate co-management with indigenous and local communities to encourage participation in ILEK programs. Recommendations for NOAA researchers and managers included: creation of a best practices handbook for ILEK; development of a website for information and idea exchange; exposure to existing tools and development of new tools for the integration of quantitative scientific data with quantitative and qualitative ILEK information. Recommendations for engagement efforts by NOAA regional offices included: holding ILEK workshops through regional programs and hosting a list of ILEK practitioners within the communities as well as a list of NOAA staff with a history of interacting with the practitioners.



## Discussion

Susan Avery thanked Jo-Ann Leong for the presentation and codifying ILEK in ways the SAB can discuss. Eugenia Kalnay said there is important knowledge people acquired related to food; a number of metabolic diseases didn't exist 100 years before Western food was introduced. Is there any way to save this important information of foods of indigenous peoples? Jo-Ann Leong said while not part of this study there are many studies in ethnobotany and from NIH on this topic.

Michael Donahue asked whether the guiding principles recommended could be translated into amendments to the NOAA handbook. Jo-Ann Leong answered that the NOAA handbook mentioned in the report provides procedures for tribal consultation; the report recommends developing a new handbook that is broader and includes ILEK assessment and integration.

Stephen Polasky said studies have found that it took six years to gain trust from native populations and modern science and ILEK people don't see eye to eye. How does NOAA actually bring in ILEK in a serious way? Jo-Ann Leong said NOAA is doing some of this but the recommendation is to manage this in a uniform way across NOAA including developing NOAA-wide policies. Stephen Polasky said having support to do ILEK makes sense but it is difficult to take in this knowledge in a serious way so is there wisdom in terms of doing it well rather than in an *ad hoc* way?. Jo-Ann Leong said NOAA needs to move forward on this including the development of criteria for assessment and integration of ILEK into their knowledge base including partnerships with the Departments of Agriculture and Interior who have the same issues and some experience in these processes.

Susan Avery said the validation of traditional knowledge with modern science metrics is difficult. One way to do this is with engagement; an example is how the Okeanos Explorer designs expeditions.

Ben Friedman thanked Jo-Ann Leong on behalf of NOAA. NOAA is all about data collection focused from modern sources but this is data collection we should also be focused on. NMFS works with traditional knowledge from fishermen and NOS work with community traditional knowledge in the development of marine sanctuaries. However there are other fields where the agency can expand this work in ILEK. While there is not additional funding, NOAA could focus on the handbook, development of processes and procedures, and possibly the awarding of a few internships. Ben Friedman has focused on better communication and relationship building in all aspects of NOAA programs; even technological problems could benefit from traditional knowledge.

Jean May Brett thanked Jo-Ann Leong for the report and said Denise Reed has been in a video on ILEK and climate refugees based on a study funded by Sea Grant. Jean May-Brett also

noted that in the review of the Cooperative Institute for Mesoscale Meteorological Studies there was a recommendation for outreach to native populations including internships so perhaps Cooperative Institutes could help with ILEK.

David Detlor said the NMFS has a human dimensions program called “Voices from the Fisheries” on oral histories and would like to add Jerry Kaluhiwa’s and other recordings to that data base.

A motion was made by Jean May-Brett to approve the report and transmit it to NOAA, seconded by Michael Donahue and passed unanimously.

**Action 4:** The SAB approved the report, “Indigenous and Local Ecological Knowledge and NOAA” and will transmit the report to NOAA.

Point of Contact: Lynn Scarlett

Due Date: May 31, 2017

### **Proposal for Creation of a High Performance Computing Standing Working Group**

Frank Indiviglio, NOAA Office of the Chief Information Officer and Geophysical Fluid Dynamics Laboratory

#### Summary

Mr. Frank Indiviglio presented the need for a standing working group on High Performance Computing (HPC) to the SAB. The working group will provide advice on the current and future directions of HPC technologies.

There are challenges in improving NOAA sciences under the current HPC industry. To ensure that NOAA is adequately preparing and planning for exascale architectures, the HPC program would like to seek advice from the SAB and a specialized subcommittee comprised of academic, industry, and government experts to help NOAA build on its HPC program’s existing roadmap and strategy.

#### Discussion

Eugenia Kalnay expressed her support for the proposed working group. The main issue right now, from a computational point of view, is data assimilation. NOAA has done a great job with implementing new models but cannot guarantee the data assimilations that is required by new models and increased observations because it takes a lot to input/output (I/O). Dr. Kalnay

suggested that NOAA learn from what other meteorological operational centers are doing. She said Canada is a good example because it has changed the data assimilation in a straightforward and logical way. Another suggestion is to do what the European centers do - gather experts and have open discussion with them about papers to solve problem. Frank Indiviglio said that the I/O is an important component that he didn't focus on even though it is equally as important as the computing.

Dr. Kalnay asked what is expected of Moore's Law (the observation that the number of transistors in a dense integrated circuit doubles approximately every two years). Mr. Indiviglio responded that some people believe that Moore's Law on performance will end around 2021. The performance curve is gone so people are now looking at fine-grained (a type of parallel) computing.

Louis Uccellini stated that I/O is important. Parallel with the topic of discussion, there was an executive order (EO) issued under the Obama Administration creating a [National Strategic Computing Initiative \(NSCI\)](#). The National Science Foundation (NSF) and the Department of Energy (DOE) are two of the three lead agencies of the NSCI, and there are five deployment agencies. NOAA is one of the deployment agencies mentioned in the NSCI. In the development and planning of the EO, NOAA emphasized research, operations, and research to operations and the challenges related to each of the emphasized components. One of the known operational challenges is understanding what is meant by a "back-up" computer when in the exascale arena and how to ensure reliability for the user community.

Dr. Uccellini also noted that NOAA interacts with other agencies through the Office of the Federal Coordinator for Meteorology (OFCM). Within the OFCM, NOAA interacts with both NSF and DOE and other agencies through the Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR) and the Federal Committee for Meteorological Services and Supporting Research (FCMSSR), which is chaired currently by Ben Friedman, the Deputy Under Secretary for Operations Performing the duties of Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator. Both DOE and NSF have decided to use earth system science modeling as a test case for the road to exascale computing making the discussion that's happening now very important.

Craig McLean said that having the HPC Working Group within the SAB is an expression of NOAA's needs and confidence in the talent that is accessible to and through the SAB. He felt that the presentation was clear but highlighted aspects of Moore's Law that the agency is departing from; both the technical feasibility (chips and materials being produced) and the ability to buy computing capacity. By 2022, there will need to be a biological component in the ocean-atmosphere models. In order to include a biological component, 30X computing will be required, which NOAA currently isn't able to meet in such a narrow timeframe. To address this problem,

NOAA need a variety of solutions and this proposed working group will help identify those. He also added that as the committee looks at the draft terms of reference (TOR), to the SAB should consider whether the document says the subcommittee produces a HPC planning and strategic roadmap or if NOAA produces the roadmap with the advice of the subcommittee; this is a change that should be reflected in the TOR.

Bob Winokur agreed with Mr. McLean's comments. He added that the group may benefit from having more than one face-to-face meeting during its first year. During the first year, the group needs to be focused; having more than one meeting will help the group understand what they are being asked to do, what they would like to produce, and help them to stay engaged as the technology continues to advance.

Jean May-Brett asked for clarification of the terms working group, subcommittee and committee in the draft TOR document. Cynthia Decker said that technically any group under the SAB is a subcommittee under the Federal Advisory Committee Act (FACA) regulations. There are two types of subcommittees, standing working groups and task forces. This proposed subcommittee is a standing working group; the updated TOR will clarify the terms.

Susan Avery asked what the full scope of the proposed working group is. The presentation touched on computational modeling, I/O, and weather-climate and ecosystems. During the discussion, Louis Uccellini talked about testbeds adding to the layer of what the group may be doing. Also, the complexity of NOAA's research, operations and research to operations needs was brought up. With all of these things mentioned, what is the full scope of the proposed working group? She also added that HPC and going to exascale computing is laudable but there is also the quantum computing that will supersede Moore's Law. She noted that many science agencies have some sort of earth system component and appear to have the same needs so she wondered why the country didn't just invest in one facility. Frank Indiviglio responded by saying that the scope of the HPCWG focuses more on weather and climate because this is what is traditionally in NOAA's research portfolio. This can be expanded because different line offices (LO) in NOAA, such as Fisheries are using HPC differently and fine-grained HPC will allow this to happen. This will be built into the HPCWG's scope. He also addressed the observation that multiple agencies are having the same conversations about HPC. As Mr. McLean mentioned earlier, the different agencies are interacting already and the NSCI is helping to coordinate activities and conversations.

Louis Uccellini addressed two points made by Susan Avery about earth system science and whether the different agencies dealing with HPC can get together. He said that there is a drive to earth system science and it gets down to water issues and ecological aspects as well. With respect to agencies getting together, operational communities have sacrificed performance for reliability in the past. The operational agencies are trying to work together to under the National

Earth System Predictive Capability (ESPC) to develop a unified earth system science approach with a multi-model ensemble modeling approach to streamline efforts across agencies.

Brian Gross, Deputy Director, NOAA Office of the Chief Information Officer High Performance Computing and Communications, said that the NSC development and deployment agencies, the Intelligence Advanced Research Projects Agency (IARPA), and National Institute of Standards and Technology (NIST) are looking at advanced technologies such as quantum computing. Also, the NSCI agencies meet bi-weekly to discuss the earth system science aspect. There will be a “birds of a feather” session at the next supercomputing conference to discuss activities similar to this and to promote the earth system science aspect within the computational community.

Susan Avery said according to the SAB Concept of Operations, once a need for a subcommittee is identified, NOAA identifies program liaisons and experts who work with the SAB Chair to identify an appropriate SAB member(s) to act as the advocate(s) for the proposal. The resulting group of individuals from NOAA and the SAB is called the organizing committee. After agreement on the general concept for the subcommittee, the SAB member(s) presents it to the full SAB at a regularly-scheduled meeting, together with draft terms of reference. Depending on the nature and scope of the issue to be addressed, the SAB determines whether the proposed subcommittee should be a Task Force (ad hoc subcommittee) or Standing Working Group. The ConOps states that an organizing committee should be formed. She wanted to know if one was one formed for this proposed subcommittee. Everette Joseph said that both he and Eugenia Kalnay met with Frank Indiviglio on this proposal. Susan Avery said it would be helpful to have more structure to the TOR, including how often the proposed subcommittee will meet. From the discussion, NOAA would like a standing working group; this should be reflected in the more detail in the TOR.

**Action 5:** Based on comments from the SAB and working with SAB members Everette Joseph and Eugenia Kalnay, the Office of the Chief Information Officer will revise the Terms of Reference for the proposed High Performance Computing Subcommittee and develop a list of proposed members. These materials will be sent to SAB members before the Summer Teleconference meeting for review and discussion prior to a NOAA decision.

Responsible Entity: OCIO/SAB

Points of Contact: Frank Indiviglio and Brian Gross/ SAB Members

Due Date: SAB Summer Teleconference meeting.

### **Public Comment Period**

There were no public comments.

## **Discussion of SAB Next Steps**

Susan Avery, President Emeritus, Woods Hole Oceanographic Institution and Acting Chair,  
NOAA SAB

Ben Friedman, Acting Under Secretary of Commerce for Oceans and Atmosphere and Acting  
NOAA Administrator

### Summary

Susan Avery sat in as the Acting SAB chair during this session of the agenda at the request of the SAB Chair Lynn Scarlett. Dr. Avery initiated discuss of a list of the topics from the November 2016 SAB meeting and a list of topics mentioned by Mr. Ben Friedman , during the discussion of short-term topics for the SAB on the first day of the meeting. The purpose of this discussion was to facilitate discussion decision on the SAB's next steps.

The list of topics from the November 2016 SAB meeting include: (1) Economic implications of climate products and services; (2) Exascale computing in NOAA's future; (3) Next-generation Big Data Project; (4) Value and complexity of the New Blue Economy; (5) Enhancing, optimizing and harmonizing the delivery of environmental services across the NOAA enterprise; (6) Synthesis of lessons learned from large ecosystem integrated research for restoration (e.g. Everglades, Prince William Sound); and (7) Citizen science and ecological/ecosystem data collection.

The list of topics mentioned during the discussion at this meeting of short-term topics for the SAB include: (1) NOAA's economic impact to the country; (2) Next-generation Big Data project; (3) Enhancing, optimizing and harmonizing the delivery of environmental services across the NOAA enterprise; (4) Citizen science and ecological/ecosystem data collection; (5) Diversity Inclusion; (6) Current empirical studies (new data collection and analysis) to better understand the societal benefits of NOAA products and services; and (7) social science within the NOAA Line Offices (LOs).

### Discussion

Everette Joseph asked whether the new Weather Act should be a component of environmental services which is part of topic (5) of the November 2016 list and topic (3) of the short-term topics discussed on day one of the April 2017 SAB meeting. Susan Avery disagreed with placing the new Act with one of the identified topics; the Weather Act is a separate topic for the SAB to examine and discuss.

Stephen Polasky said that he, Bob Winokur, Denise Reed, and Eugenia Kalnay, the four SAB members working to recommend a short list of topics for the SAB to consider for their short term

work plan, will utilize the list of topics presented and the lessons that came out of the SAB “blue-sky thinking” documents (from 2014-2015) to develop their recommendation of topics. Ben Friedman suggested the SAB have a teleconference before the August meeting to agree on the recommendation of topics and to provide input on the updated terms of reference for the High Performance Computing Working Group (HPCWG).

Bob Winokur brought the discussion back to the Weather Act. The Weather Act was not part of the list presented but wondered how the SAB can address the Act. Craig McLean suggested the SAB look at the science aspects of the Act. Mr. McLean stated that both he and Everette Joseph attended the National Academies of Sciences Board of Atmospheric Sciences and Climate (BASC) meeting where there were discussions about the layering of weather portfolios among federal agencies and it would be helpful to get advice on a path forward to possibly streamline the portfolios of the many organizations.

Everette Joseph stated that he wanted to understand the nuances of the implications of the Act on the National Weather Services (NWS) and the Office of Oceanic and Atmospheric (OAR) and discuss the role of the SAB. How does the Act change the SAB’s relationship with the Environmental Information Services Working Group (EISWG)? Craig McLean stated that NWS is the operations side of weather and OAR is the research side of weather; OAR provides the data NWS uses for its operations. Both Everette Joseph and Susan Avery suggested that the discussion of the Weather Act be an agenda item at a separate meeting. Dr. Avery suggested having both OAR and NWS present on the implications of the act on their work.

Paul Doremus said that both lists of topics presented have several items that center on the broadening of data and information sources and bringing large scale scientific perspectives to the data and information. The NOAA Marine Fisheries Advisory Committee (MAFAC) made recommendations in a recent report on the use of data to extend data to focus on data management, dissemination and integration. He suggested the SAB take a look at the MAFAC recommendations. Susan Avery agreed with what Dr. Doremus suggested and included data robustness, reproducibility, and integrity particularly for long time scales of change also be considered when thinking about a possible topic related to data and information. Craig McLean mentioned data availability and how the federal government handles issues related to data availability. Does the federal government have to be responsible for the analysis of the data it releases or should they only provide the data for others to use and analyze?

Bob Winokur suggested that the topic of exascale computing be a function of the HPCWG work plan and not something for the SAB to focus on. The enhancing, optimizing and harmonizing the delivery of environmental services across the NOAA enterprise topic was one that the EISWG originally wanted to focus on in the past. With the EISWG’s role more clearly defined in the

Weather Act, is this topic something that the group can work on? Mr. Winokur added that the topics chosen by the SAB should be important to any administration.

Ronald Birk, a member of the EISWG, made an appeal to the SAB on behalf of the members of the EISWG. The EISWG doesn't have co-chairs and cannot call a meeting; guidance from the SAB to the EISWG on how to go forward is needed. Susan Avery said that this issue will go on a list of things for the SAB to address.

Craig McLean said that there is an executive order in place on government organization and efficiency. The executive order invites input from citizens, the various government agencies, and the community at large; this will be a focused effort of the administration to look at efficiencies in government. As an advisory body for NOAA sciences, is there some visionary thinking that the SAB can provide to NOAA. Are there alignments lacking in the sciences because of the behavior of government agencies? What are the opportunities on the science side for optimizing resources?

Everette Joseph agreed that when addressing the executive order the SAB should pay attention to where efficiencies impact the science that's being conducted. On the decadal survey proposal, the weather enterprise was asked to come up with a ten year plan for advancing the enterprise at the BASC meeting. Another possible agenda item for a future SAB meeting can be to have the BASC come and give a presentation on the proposal. The SAB can use it discuss ways that NOAA can benefit from the survey.

The meeting was adjourned at noon.