

**45<sup>th</sup> Meeting of the NOAA Science Advisory Board**  
**Washington, DC**  
**14 November – 15 November 2012**

Presentations for this meeting will be posted on the SAB website at:

<http://www.sab.noaa.gov/Meetings/meetings.html>

**SAB members in attendance:** Mr. Raymond Ban (Chair) Consultant, Ban and Associates Consulting LLC; Dr. Eric Barron, President, Florida State University; Dr. Heidi Cullen (by phone), CEO Climate Central; Dr. Peter Kareiva, Chief Scientist and Director of Science, The Nature Conservancy; Dr. Jean May- Brett, STEM Partnership Coordinator, Louisiana Department of Education; Dr. Jerry Schubel, Executive Director, Aquarium of the Pacific; Dr. Marshall Shepherd, Professor Dept. Geography & Atmospheric Sciences, University of Georgia; Dr. Kathleen Broadwater, Deputy Executive Director, Maryland Port Administration

NOAA senior management and Line Office representatives in attendance: Dr. Jane Lubchenco, Under Secretary of Commerce for Oceans and Atmosphere; Dr. Kathryn Sullivan, Assistant Secretary of Commerce for Oceans and Atmosphere; Dr. David Titley (by phone), Deputy Under Secretary of Commerce for Oceans and Atmosphere; Dr. Laura Furgione, Acting Assistant Administrator for Weather Services and Acting Director of the National Weather Service; Ms. Mary Kicza, Assistant Administrator, National Environmental Satellite, Data, and Information Service; Dr. David Hermreck, Senior Programs Advisor, National Environmental Satellite Data and Information Service; Dr. Holly Bamford, Deputy Assistant Administrator, National Ocean Service; Dr. Richard Merrick, Chief Science Advisor, National Marine Fisheries Service; Dr. Patricia Montanio, Assistant Administrator, Program, Planning and Integration; Dr. Robert Detrick, Assistant Administration, Oceanic and Atmospheric Research; RADM Michael Devany, Deputy Director, Office of Marine and Aviation Operations

Staff for the Science Advisory Board in attendance: Dr. Cynthia J. Decker, Executive Director; Mary Anne Whitcomb and Sanya S. Compton

**Wednesday, 14 November 2012**

**Welcoming Remarks and NOAA Update**

Dr. Jane Lubchenco, Under Secretary of Commerce for Oceans and Atmosphere

**Summary**

Jane Lubchenco began her presentation by thanking the SAB members for the work they do for NOAA. She mentioned she was looking forward to input from the SAB on the agenda topics for this meeting and thanked the Working Groups who participated in those efforts.

To begin the NOAA update Dr. Lubchenco highlighted recent leadership changes:

Rear Admiral Michael S. Devany - Director, Office of Marine & Aviation Operations & NOAA Corps

Rear Admiral David A. Score - Deputy Director for Operations & the NOAA Corps

Amanda Hallberg - Acting Director of Legislative Affairs

Maryjean Buhler - Chief Financial Officer

She also mentioned that NOAA is seeking a Director for the Climate Program Office. In the meantime Dr. Rick Rosen is serving as acting director.

In noting some of NOAA's recent accomplishments, Dr. Lubchenco first talked about NOAA's key role in Hurricane Sandy. She drew attention to Louis Uccellini's science presentation behind NOAA's forecasting of the storm that is scheduled for the next day. She stressed that NOAA played an important role in warning, response and recovery, surveying ports and coastline, damage assessment after the storm. Adding to the list of accomplishments, she noted the dedication of two new buildings, the Gulf of Mexico Disaster Response Center in Mobile, AL and the National Weather Climate Prediction Center in College Park, MD. She then highlighted three reports NOAA recently released or is finishing up. The draft National Climate Assessment will be released in January. Already released were the Fisheries of the U.S. 2011 report and the NOAA Habitat Blueprint.

Dr. Lubchenco presented a retrospective analysis, looking back at the accomplishments made over the last four years. The integrating framework is the Next Generation Strategic Plan (NGSP) with four goals: 1.) Climate Science, Services, Adaption; 2.) Weather Ready Nation; 3.) Healthy Oceans; 4.) Resilient Coastal Communities. This plan has served as a template for charting what has been done and is used to set future directions. NOAA is a science agency and its history goes back to 1807. Recently, NOAA has made a special effort to strengthen science; first though the science integrity policy and next by going from 10 to 19 senior science positions. The Chief Scientist position has been reestablished where it no longer requires congressional approval and NOAA as tripled the number of American Association for the Advancement of Science (AAAs) fellows. NOAA also hosted a science workshop focusing on use-inspired science that is relevant to the real world. Finally, Dr. Lubchenco complimented the SAB for its ongoing Research and Development Portfolio Review.

NOAA's scientific leadership has been focused on five areas that Dr. Lubchenco highlighted: Ocean acidification, Global change research, Climate adaptation, Arctic research and Ecosystem-based management.

NOAA has also made good progress on environmental stewardship. First was the creation of the National Ocean Policy and then the hard work to make the concept behind this policy operational. Second was the significant progress made towards ending overfishing by mandating catch limits, catch shares (programs that award fisherman for thinking long term, five new programs), and recreational fishing (focus on the US Exclusive Economic Zone). The third success was progress with high-seas illegal, unreported and unregulated (IUU) fishing with a

focus on enforcement. Through all of these efforts, success is noted with the rebuilding of 27 fish stocks.

NOAA's services have been shown to be of great importance. Provision of information on weather is of vital importance, particularly recently where the US has seen a very large number of extreme events. The challenge is providing forecasts and information in an understandable way so that people know what to do. There must be an increase in entraining social science in this.

Satellite data is critical to this enterprise. The National Polar-orbiting Operational Environmental Satellite System (NPOESS) is seeing some great management improvements. More work is still needed to stabilize this program but huge amount of work that should be recognized. The Joint Polar-orbiting Satellite System (JPSS) is one result of this hard work.

On education, NOAA recently made some new awards, bringing science to the students. The old weather citizen science project is a new project working with the National Archives to fill in a missing piece of past Arctic weather by digitizing log books.

Deep Water Horizon was one of the unexpected disasters where NOAA is exceptionally proud of what roll it played. The Proceedings of the National Academy of Science (PNAS) has a series of papers coming out in December highlighting how science was used in disaster response.

Response to the Japanese Tsunami, another unexpected disaster, is another example of where NOAA has excelled. Through forecasts and modeling for air and ocean plumes, NOAA has been a leader on marine debris washed in as part of the aftermath.

Dr. Lubchenco also offered a look ahead for the next four years. Use-inspired research is at the core of what NOAA does. It is not just doing science but also using science to provide service and stewardship. There is more NOAA would like to do than what it can do and this will be the focus of future discussions. NOAA will be engaging the SAB help in defining that agenda.

She again thanked the SAB members for all of their work. Tough times are ahead in terms of budget and politics and the SAB's advice will be needed to help the agency get through these times.

## **Review Report on the Cooperative Institute for North Atlantic Research (CINAR)**

Heidi Cullen, Climate Central, SAB Member and Chair, CINAR Review Panel

### Summary

Heidi Cullen, Chair of the Review Panel, provided the background and results of the review of the Cooperative Institute for North Atlantic Research (CINAR). CINAR followed the Cooperative Institute for Climate and Ocean Research (CICOR), the previous Cooperative Institute at Woods Hole Oceanographic Institution (WHOI) and there are several institutions that are part of it. WHOI is the lead institution along with partners University of Maryland, Rutgers University, University of Maine and the Gulf of Maine Research Institute. CINAR is focused on six themes: 1) Ecosystem Forecasting; 2) Ecosystem Monitoring; 3) Ecosystem Management; 4)

Protection and Restoration of Resources; 5) Sustained Ocean Observations and Climate Research; and 6) Education and Outreach. The first five themes were identified by NOAA while the sixth theme was added by CINAR to emphasize the importance of incorporating training, education, and outreach efforts into CINAR activities.

The overall assessment of the review team is that CINAR is conducting high quality research and education and outreach across all of its themes. CINAR is working closely across NOAA, particularly OAR and NMFS. While in capable hands, the CINAR business plan will need to be responsive to challenging fiscal times. There was a deep sense of gratitude for being able to do the research but frustration over wanting to be more creative and thinking of new research themes.

The findings and recommendations were made in the categories of CINAR's strategic planning, science, education and outreach and science management. In Strategic Planning, the recommendations were for CINAR to 1) identify critical research gaps and prioritize research areas to be pursued with additional funding, 2) create additional opportunities for sustaining and creating partnerships, 3) refine its capability to respond to crisis events. In Science, the primary recommendation was that CINAR should integrate its ecosystem research from fundamental observations and modeling through to applications and outreach. For Education and Outreach, CINAR was urged to: 1) continue working with Sea Grant to coordinate outreach activities and 2) do more in reach to keep partners and scientists informed about CINAR activities. Finally, in the area of Science Management, 1) NOAA should provide more discretionary funding for CINAR partners to meet and collaborate and the partners should seek more funds to do this, 2) NOAA should ensure Task I (administration) funding all arrives at the same time each year, 3) CINAR and NOAA should develop a catalogue of CINAR-related research that is carried out by other agencies or within NOAA by other mechanisms.

In summary the panel assigned CINAR an overall rating of Outstanding. The Cooperative Institute (CI) community is clearly beneficial to NOAA but, given the limitations of the CI framework, there exists an opportunity to reassess the official review guidelines to ensure realistic expectations by everyone of CI accomplishments.

## Discussion

Don Anderson, the Director of CINAR, thanked the review panel for hard work and advice. He noted both gratitude and frustration, although he is overall pleased to work with NOAA. The CI is concerned that it has not been able to act upon all of the expertise it has to offer to NOAA but has only been able to react to sponsor needs. NOAA is unique in its creation of CIs. A topic for future is how NOAA can best utilize them. The expectations for implementation fell short due to funding constraints. He suggested that partner institutions can contribute money to use in a discretionary way. An example of this would be work with NMFS on innovation and transition. When times are difficult, CIs can leverage work already funded by other sources.

Judy Dienst said the review process was educational to all employees in CINAR and they have already started to work on the recommendations

Eric Barron said all of the points of frustration are about funding. In CIs, NOAA deliberately tries to foster collaborative efforts through the proposal process. He expressed concern at the institutional leadership's inability to plan collaboratively when the institutions are not that far away from each other. Heidi Cullen clarified that they need to talk more on a strategic planning level. Dr. Anderson said they have frequent conference calls and meetings with the leaders of all five institutions. The proposal they wrote to compete for a CI contained a constrained plan based on money. They get funding for specific projects without being able to decide upon the priority of the projects. CIs could help NOAA with planning if they were brought in to the discussion early. That doesn't require additional money just a reallocation and then NOAA could get cutting edge advice. Dr. Cullen added that CIs are sensitive to funding issues but would like to provide input to NOAA strategic planning.

Dr. Barron said it wouldn't hurt to be more specific on these issues. The message is not clear. The CI as an attractor or connector to NOAA in an advanced way is a missing element.

Richard Merrick said this is the CI with which he has the most experience. He didn't hear discussed how effective CINAR is in transitioning research to operations. One example is the Habitat Mapping Camera System (HABCAM). . WHOI has a unique partnership with University of Massachusetts to use funding to enhance stock assessment education. NOAA benefits from getting both research and education from this effort. NMFS is very happy with way CINAR is operating.

Dr. Anderson said the education and stock assessment program recruits graduate students at the University of Massachusetts to be fellows in this program at WHOI. He agreed it is a great opportunity to combine research and education.

Ray Ban said as he read the review the science is strong but there is no capacity for strategic planning. The review points out that the leadership is not getting together enough. It seems like the report communicated some deficiencies and Mr. Ban wondered how CINAR achieved an Outstanding rating.

Dr. Cullen responded that CINAR was very successful at responding to NOAA and its needs, but being that responsive does not allow for CINAR to be more strategic. She agreed more clarification is required in the language

Dr. Anderson said this point on strategic planning was something noted on CINAR's end. They wrote a proposal for \$7M but didn't get enough funding to implement the full vision. He is not sure another proposal for a large amount would get funded. There is currently no funding for research or post-doctoral positions to target particular areas. CINAR said they can do more but they don't have the funds. The CI has done workshops on two topics and identified next directions with NOAA. Perhaps the workshops constitute strategic planning.

Dr. Barron said what Dr. Anderson said is different from what is in the report. The finding was that they don't have funds to meet the CI goals. What the director said is the vision is bigger than the funding to achieve it and would be bigger than most CIs have. There should be a part of report that shows CIs leveraging funds for NOAA. Mr. Ban agreed, saying the report should state that, within the funding realities, the CI is doing a wonderful job but there is more it could be doing.

Holly Bamford said NOAA can move on the timing of funding and the leveraging of funding across the NOAA line offices to meet NOAA needs. She likes the idea of looking at funding from other agencies and asked what the ratio was for each science theme. CINAR did not have that information available for all institutions. For WHOI NOAA provides about half of the money. One example, the HABCAM was funded by the National Science Foundation (NSF) and other agencies. Of the \$10M investment, NOAA put in 10% at the end.

Mr. Ban asked the Board members whether they should go ahead and accept the report. Philip Hoffman said there is plenty of time for the SAB to defer action and discuss later in terms of funding the CI. Mr. Ban said the issue is language in the report. Dr. Barron said he has no doubt the evaluation by the committee is appropriate but two changes should be made. Language should be included about CINAR being a catalyst and there should also be revised wording on strategic planning.

Dr. Barron made a motion to provisionally accept the report provided the changes to wording on vision and catalyst is made.

Mr. Ban said there is an Outstanding rating but the language in the report does not reflect that. The report needs to articulate where the science and outreach is and how it is led and managed. Beyond that there should be a comment that there is reduced funding that is beyond the CI's control. As a result there are the programmatic issues and the CI should work on more effectively and efficiently to add value. The changed language should be reviewed by the SAB before the report is accepted.

The motion was withdrawn by Dr. Barron and Jean May-Brett seconded the withdrawal.

Jerry Schubel said the concerns raised are legitimate but changes can be made overnight and the SAB could act tomorrow. Dr. Cullen agreed to make the changes. She said she would contact the review panel members and submit a revised draft of the report tomorrow for SAB consideration.

#### ***Thursday, November 15, 2012 - CINAR Review Update***

Heidi Cullen provided an update on changes to the report based on comments from meeting yesterday. These changes were agreed upon by the CINAR review team.

There was an edit to the paragraph in the Summary section and in the Strategic Plan section. Under the Strategic Plan section language was added clarifying that strategic planning is done and integrated across the institutions. Finally, wording was added in findings #3 and #4 in the report on the research done in CINAR, science management, and on the strategic plan.

An email from Eric Barron, not present at the meeting, agreed with the changes made. Dr. Barron has a continued concern on recommendation #1 on science management. Mr. Ban asked if there were any further thoughts on this issue from the Board members present.

A motion was made by Jerry Schubel to accept the report seconded by Jean May-Brett and the report was passed unanimously.

Dr. Schubel said that it was a good practice to finish the report in the same meeting. Any additional points, such as those raised by Dr. Barron, can be handled in the transmittal letter.

Ray thanked Heidi and the CINAR team for the report and revisions.

Action 7: The Science Advisory Board accepted the final report from the review team of the Cooperative Institute for North Atlantic Research (CINAR) after revisions made per SAB comments. The SAB will transmit the CINAR review report to the NOAA Administrator.

Action 8: CINAR will provide a response to NOAA on the review report by letter within one year.

### **Final Report from the SAB Satellite Task Force**

Mr. Robert Winokur, Oceanography of the Navy and Chair, Satellite Task Force

#### Summary

Purpose of this presentation was to present a summary of the findings and recommendations of the Satellite Task Force (SATTF). Mr. Robert Winokur presented an outline of the changes made since the draft report was presented to the SAB at the July meeting. He also provided a brief overview of the charge and members of the SATTF. Mr. Winokur cautioned that the NOAA budget for planned space systems appears to be unsustainable. NOAA has taken steps to prepare a future satellite system architecture but additional effort in taking a whole-systems approach and continued commitment is required to complete the design. Mr. Winokur also presented some background on NOAA and NASA operational systems, NOAA's relationships, system costs, the challenges and the development of SATTF. Finally, Mr. Winokur presented the eight primary recommendations of the SATTF. 1.) NOAA leadership should create a stable funding and management environment to support satellite activities. 2.) NOAA should establish a prioritized list of threshold space-based observational requirements that maintains high impact capabilities. This list should be constructed by defining and aligning NOAA core functions with national space policy and agency guidance. NOAA should also coordinate with all their stakeholders, with respect to prioritization of requirements and architectural tradeoffs and update the prioritization process database regularly. 3.) NOAA should create a Chief Systems Engineering function within NESDIS to address end-to-end linkages to include goals, architectures, concepts of operation, individual system development and integrated systems. 4.) By building on the recently completed study and analysis of alternatives, NOAA should develop a cost-capped implementation plan for a NOAA Enterprise Ground System. 5.) NOAA should develop an integrated master schedule addressing the entire satellite system architecture, including identification of the critical path(s). 6.) NOAA should develop a tailored overarching risk-management plan consistent with alternative architectural decisions to ensure a sustainable future satellite program. 7.) NOAA should create a plan and a process for developing innovative and contingency options to mitigate gaps and potential reductions in capability and capacity. 8.) Given the ten year timeline required to develop new satellite systems, NOAA should conduct an

analysis of alternatives, starting in FY2013, considering cost, performance, risk and resiliency, and assessing trade space vs. requirements.

### Discussion

Dr. Eric Barron questioned the level of the NOAA satellite program's unsustainability. If one were to duplicate what we have with a small satellite program, what would the cost be? Mr. Winokur said small satellite costs could be equally unsustainable but the SATTf didn't specifically cost it out. It's hard to say because launch vehicles have changed and the cost hasn't been reduced. For the first question, Mr. Winokur described the current system as a cross between increasing satellite costs and a decreasing budget. If it is a fixed-price contract like the Navy satellite program, it could be a good deal.

Marshall Shepherd mentioned a meeting on small satellites during their deliberations where they could find out more about costs. Mr. Winokur agreed there are alternatives to using small satellites but mentioned the conversation referenced by Dr. Shepherd didn't focus on the types of complex satellites used by NOAA.

Dr. Kathryn Sullivan thanked Mr. Winokur and his team for the work they have done. The work done by the SATTf was a good catalyst for lot of positive responses to the preliminary report. Ms. Mary Kicza agreed, mentioning that NESDIS had held a ground-systems workshop that was a direct support to the SATTf and has actions underway on common enterprise services.

Raymond Ban read Dr. Susan Avery's comments that she provided prior to the meeting. NOAA needs to look at other reports as well as this fairly positive response before making a decision. Mr. Winokur said there was an independent review team (IRT) doing a concurrent study. He also noted one could look at this report as being positive but it did point out critical deficiencies. Dr. Sullivan said there have been management problems with satellite programs in the past. The 2011-12 review of NOAA by the Government Accountability Office (GAO) and others strengthened the Joint Polar Satellite System (JPSS) and Geostationary Operational Environmental Satellites (GOES) programs putting them on a firm footing.

Dr. Jane Lubchenco would like to speak to Dr. Avery because the GAO and IRT reports were not bad and NOAA is addressing the problems. Dr. Shepherd said Dr. Avery's comments characterize a perception issue and he does not view the report as being inconsistent with where NOAA is now.

Dr. Lubchenco pointed to a line on page 16 of the report stating NOAA should create a stable funding environment. She said she does not have control over the budget. Mr. Winokur clarified that the report was emphasizing that every level of NOAA management should be supportive of a way forward and, to the extent possible, try to stabilize the funding. Dr. Lubchenco feels a sentence or two of clarification is needed in the report.

Dr. Shepherd motioned to accept the report with revisions. The motion was seconded by Dr. Eric Barron and passed with one abstention by Ms. Jean May-Brett.

Action 1: The Science Advisory Board (SAB) accepted the report from its Satellites Task Force (SATTF) pending a revision to recommendation 1 language about seeking stable funding for the satellite programs. The SAB will transmit this final version to NOAA.

Action 2: NOAA will provide a response to the Science Advisory Board on the recommendations from the SATTF report within one year.

### **Presentation of Final Report of the Review of the Ocean Exploration Program by the Ocean Exploration Advisory Group**

Dr. Jerry Schubel, Aquarium of the Pacific, and SAB Liaison to the OEAWG

Mr. Jesse Ausubel, The Rockefeller University and OER Review Panel Co-Chair

#### Summary

Jerry Schubel thanked the Ocean Exploration Advisory Working Group (OEAWG) for working on the report. Co-Chairs of the review panel, Mr. Jesse Ausubel, and VADM Paul Gaffney, had briefed the board in July with a presentation of the draft report but the full OEAWG had not reviewed and approved the final review report at that time. The purpose of this presentation was to present the final report to the SAB for consideration. Mr. Ausubel acknowledged the members of the working group and Craig McLean, OAR Deputy Assistant Administrator, for their help

Mr. Ausubel summarized the findings and recommendations of the review panel. There were ten of the latter: 1) Set Strategic Goals & Priorities, 2) Affirm NOAA Leadership Support, 3) Create & Operate National Forum, 4) Consider New Management Models, 5) Resume Higher Level of Targeted Expeditions, 6) Consider Alternatives to Okeanos Explorer, 7) Update Technology Strategy, 8) Speed Completion of Extended Continental Shelf Mapping, 9) Improve Branding, 10 Implement Ocean Exploration Advisory Board.

#### Discussion

Ms. Jean May-Brett mentioned that there are some exciting education opportunities in preparing the Science, Technology, Engineering and Math (STEM) workforce in the 21<sup>st</sup> century. Education opportunities include science and engineering practices for students and teachers in STEM education, and the STEM education programs that can come out of this.

Dr. Robert Ballard, co-chair of the OEAWG, thanked the review panel for doing a great job in conducting the review. He reinforced the funding realities, noting that the levels recommended by President's Panel on Ocean Exploration have not been achieved. He further noted that better partnership is needed with the United States Geological Survey (USGS), University-National Oceanographic Laboratory System (UNOLS) and other countries such as Turkey and in the Caribbean. NOAA OE program can stimulate other players to get involved.

Dr. Lubchenco thanked the group for a hard-hitting, helpful report that is a credit to the program and committee that prepared it.

Ray Ban read Dr. Susan Avery's comments that she submitted to the SAB prior to the meeting. She felt the report covered the main recommendations; however, she is concerned about the establishment of the Ocean Exploration Advisory Board as a small, separate Federal Advisory Committee Act (FACA) committee. Dawn Wright also had concerns about the small FACA committee but agreed it was a great report.

Dr. Eric Barron complimented the review team for making recommendations on considering giving up the ship as part of the program.

Dr. Schubel said that the transmittal letter that accompanies the report should recognize the second recommendation that NOAA Leadership must publicly and repeatedly emphasize the importance of ocean exploration to the nation and to NOAA's own mission. He also noted the letter should not change recommendation 8, which encourages OER to finish its share of Extended Continental Shelf delineation effort, but should state the panel recognizes the OAR OER Program is not leading the outer continental shelf mapping on paper but is *de facto*.

Dr. Schubel also pointed out that the President's Panel on Ocean Exploration called for regular national Ocean Exploration Forums. He stated that the Long Beach Aquarium of the Pacific will be hosting an ocean exploration exhibit next year. The Aquarium would like to host a public ocean exploration forum in July. He hoped the SAB would consider endorsing this.

Mr. Ausubel said Dr. Schubel's offer is very kind and agreed that OEAWG can help provide the content for exhibitions in aquaria. The Rodenberry Foundation president is very enthusiastic about ocean exploration and has tentatively agreed to provide support for the exhibition and forum.

Dr. Marshall Shepherd asked if the private sector was represented on the panel. Mr. Ausubel replied no and that the composition of the panel was the responsibility of the OEAWG and the OER Program. The panel members did discuss private sector interests, including substantive discussion on resource questions, particularly offshore oil and gas. He noted that OER program needs to keep proper independence but having relationships with companies would be helpful.

Dr. Tim Arcano, in thinking about private industry, said there were USGS and Bureau of Ocean Energy Management (BOEM) representatives on the review panel. He thanked the team for giving thoughtful challenges to the program. OER is now in the process of developing position papers in response to the recommendations. Dr. Arcano reminded the SAB that the OEAWG will sunset on December 31, 2012 as the OEAB is established.

Dr. Barron made a motion to approve the report from the OER Review Panel; Marshall Shepherd seconded the motion. It was unanimously approved.

Action 3: The Science Advisory Board accepted the final report from its Ocean Exploration Advisory Working Group on the review of the NOAA Ocean Exploration and Research (OER) Program. The SAB will transmit this report to the NOAA Administrator.

Action 4: NOAA will provide a response to the OER review report within one year. Details on this will be worked out with the new Ocean Exploration Advisory Board.

## **Presentation on the National Research Council Report “Weather Services for the Nation: Becoming Second to None”**

John A. Armstrong, IBM Corporation, and Chair, Report Panel for the NRC Board on Atmospheric Science and Climate

### Summary

John Armstrong presented the second of a two part National Research Council report on the Modernization and Associated Restructuring (MAR) of the National Weather Service (NWS). The MAR was officially completed in 2000. The second phase was an end-to-end assessment that addressed the past modernization as well as the lessons learned to support future improvements to the NWS capabilities. The overall lesson learned from the assessment is the need for continuous modernization of the NWS. As a science-based agency to providing critical services to the nation, the key challenges include keeping pace with accelerating scientific and technological advancement, meeting the expanding and evolving user needs, and partnering with an increasingly capable enterprise. Dr. Armstrong also put in to context the challenges of continuous modernization. Budget resources are uncertain and will likely be constrained in the next decade. Also, operational performance standards, set by international weather service counterparts and private sector entities, are increasingly high. The report presents three main recommendations for addressing these challenges. The first is to prioritize the NWS core capabilities. Second, evaluate the function and structure of the NWS while seeking areas of improvement. And finally, leverage the entire enterprise of NOAA to move forward.

### Discussion

Eric Barron pointed out there are past NRC reports for NWS that have the same recommendations, including ongoing modernization. When he was first started on the SAB, the members noted NWS was slipping to second, third or fourth in the world so he is happy to see the title “second to none”.

Ray Ban said the reference on Cooperative Research and Development Agreements (CRADAs) is more important - a well-formulated enterprise strategy. The American Meteorological Society played a very constructive role and created a forum after the NRC’s 2003 report, *Fair Weather – Effective Partnerships in Weather and Climate Services*. A similar forum may be a good approach for NOAA this time as well.

Heidi Cullen asked what Tom Bogdan, Director of the University Corporation for Atmospheric Research (UCAR), and advocate for formation of a Weather Commission think of this report. Mr. Ban said Dr. Bogdan is likely supportive of the idea of having a well-formulated strategy across the enterprise.

## **Preliminary Recommendations from the SAB R&D Portfolio Review Task Force**

Peter Kareiva, The Nature Conservancy, SAB member, and Co-Chair, PRTF

Roberta Balstad, Columbia University and Co-Chair, PRTF

### Summary

The purpose of this presentation was to provide the NOAA Science Advisory Board (SAB) with the preliminary findings and recommendations to the report on NOAA's Research and Development (R&D) Portfolio, which the Portfolio Review Task Force (PRTF) was charged with reviewing. Co-Chairs Peter Kareiva and Roberta Balstad gave an overview of their charge, noting that the Task Force members decided early in the review process that they were not going to make recommendations for or against specific programs. In January 2012 the Task Force began its review of NOAA's R&D. Since then the PRTF has had five in-person meetings and four teleconference meetings. Task Force members have also participated in calls with various groups and individuals including former NOAA Administrators, Cooperative Institute (CI) and Sea Grant Councils, NOAA social scientists, and NOAA Presidential Early Career Science and Engineering (PECASE) award winners. In addition questionnaires were sent out to 2720 bench scientists in the agency asking them about the research they found exciting, why, and the supportiveness of their work environment. The Task Force also requested and reviewed a large amount of information related to the charge.

The Co-Chairs discussed their findings and recommendations; there were three major findings and a total of seventeen recommendations. The major findings were that 1) NOAA's R&D is world-class and critical to the nation's security, economy and health, 2) NOAA requires a R&D portfolio that is more focused on key areas essential to improving services and meeting the requirements of the Next Generation Strategic Plan, 3) Given fiscal realities, NOAA cannot meet its mandate without significant changes to the management of the R&D portfolio and without greater budget flexibility. Among the seventeen recommendations the Co-Chairs placed emphasis on about five recommendations including: 1) Develop strong research capabilities in socioeconomics and integrated ecosystem sciences, 2) Maintain a strong core of internal scientists whose skill sets fit NOAA's strategic priorities, 3) Increase flexibility by leveraging partnerships in academic, public and private sectors, 4) Replace the Chief Scientist position with a Deputy Under Secretary of Commerce for R&D who works across the agency and has budget authority to direct research, and 5) Implement the changes by eliminating or consolidating duplicative research as well as working closely with administration and congress to manage funds more flexibly. The Task Force recommends that NOAA implement management and organizational changes by September 30, 2015. Dr. Balstad stated that since the report is not finished; the Task Force would like the SAB's input before the draft goes out for public comment.

### Discussion

Eric Barron noted that in the report the words "climate", "weather predictions" and "services" were only mentioned in the goals. No additional mention was made even though these areas constitute, in large part, what NOAA does. Dr. Barron asked whether there is a message in omitting these references. He stated that in the report he saw much focus on the expansion of ecosystem and social sciences and asked if this would broaden NOAA so much that the core is

lost, with the exception of observations. He added that there was no discussion telling NOAA how to prioritize. At what point is the determination on CIs done, i.e. which CIs are given up and which are strengthened. The report is not clear on this.

Dr. Kareiva agreed that the text on NOAA's core and goals could be strengthened. He added that the Task Force could also work on strengthening the language about predictions. Dr. Kareiva's thoughts on prioritization were that the NOAA Next Generation Strategic Plan (NGSP) may not have provided enough detail. Dr. Balstad added that NOAA should prioritize according to the NGSP; however, the Task Force was focusing on things within the portfolio that it did not see. Dr. Kareiva stated that the Task Force may be able to assess which things CIs are particularly good at doing, for example, NOAA's contact with external scientists. Dr. Barron stated that the objective for CIs is leveraging things NOAA does not do well internally; there could be several different metrics that could be applied. He expressed his concern that the report could be aimed at prioritization of science but a roadmap was not presented. He was concerned that people may make assumptions based on what they did not see in the report.

Marshall Shepherd asked about extramural funding versus core competency in NOAA research labs. He asked whether the Task Force, in the framework presented, was suggesting that NOAA downsize internal research capacity or balance expertise. He stated that using extramural capacity allows for a quicker agency response to new issues rather than the time required to change expertise on the staff. Dr. Shepherd agreed with the Task Force's recommendation on the role of the Chief Scientist.

Jerry Schubel commented on the role of CIs. He stated that through the CIs NOAA can get more science cheaply, and service and stewardship can be added both regionally and thematically. Mr. Ban said there are management/leadership insights needed that a Task Force does not have on internal agency function. Dr. Barron stated that for rebalancing there should be some criteria for funding CIs. It may be asking too much from a Task Force to tackle this issue in detail.

Dr. Shepherd said if he was to testify to Congress or speak to stakeholders, there should be something in the report that states what research is inherently NOAA and there should be core NOAA research competencies identified. Dr. Balstad replied there is not one area of research that should be completely internal or external. Internal competency is necessary to determine the quality of external research; there should be both types of research. She added that when the budget declines, it should decline for both areas. In response to Dr. Shepherd, Dr. Kareiva said that his take home message was the Task Force has not adequately represented NOAA research competencies in the text of the report. Dr. Shepherd restated that he was looking for statements about what must be done by NOAA. Mr. Ban added that because of NOAA's service, mission, and connection to the end user, NOAA informs priorities and guides decisions for many outside the government. This makes NOAA indispensable to the nation. Dr. Schubel said core competencies are what the nation would do without if NOAA stopped research. He added that academic researchers do not synthesize material. Kathryn Sullivan stated that she would urge the Task Force to report on why NOAA is critical; there is active work being done to bring services and stewardship to the public. Dr. Sullivan said there is a functional rationale that requires inherent research capacity integral to everything of value NOAA does.

Heidi Cullen noted the Task Force spoke with a lot of different groups of people; and asked if there was some way to conduct consumer research on value to NOAA. The answer was there

was not really a way to do this for the PRTF. Dr. Barron noted that the research to operations, connected to service and stewardship are what is unique to NOAA.

Dr. Schubel stated that in this time of declining budgets, NOAA can only complete its mission if it is given flexibility in managing funds.

Robert Detrick said one of the problems he had, after reading the first section of the report, was that there was only mention of research, not development. Dr. Detrick thought the Task Force should include research as it relates to developing products, and the link between research and users, since this is what makes NOAA research unique – it supports user-driven research.

Dr. Sullivan noted on recommendation seven that there is a NOAA Observing Systems Council that is taking on this same charge. She stated this group is doing requirements revalidation, and identification of tools needed to assess the observations portfolio. She wanted to be sure that the SAB was aware of this. Dr. Sullivan offered to send information related to this Council to Dr. Kareiva and Dr. Balstad. Holly Bamford added that there is an interagency ocean observing council, and she also offered to send this information to Dr. Kareiva and Dr. Balstad. Dr. Detrick noted that observing and monitoring systems are unique to NOAA, e.g. they are not covered by NSF.

Dr. Barron said there was a recommendation for an office that manages research to operations and facilitates it. Al Powell said there was a Transition Planning Board in NOAA at one point but that it no longer exists. There are Transition Managers in each Line Office now.

Dr. Shepherd asked if there were areas where NOAA should not be involved. Dr. Balstad said they were not looking for things to eliminate. However, if they did find redundancy they would recommend that NOAA combine units to eliminate redundant missions.

Mr. Ban suggested revisiting Dr. Barron's first comments on the missing topics – weather, prediction, and climate. Dr. Barron stated that when he referred to 'research' the Task Force was most likely referring to weather, prediction and climate, however, the community would have a problem if these are not mentioned. Dr. Barron elaborated if you are doing a rebalancing and mention only certain things the assumption will be that the things not mentioned are what should be cut. Dr. Kareiva he said the Task Force would add language on forecast and predictions in the report. Dr. Shepherd said it would be helpful to use storylines to emphasize the importance of research, for example, Hurricane Sandy and Dual Pole Radar. Dr. Cullen agreed and said if these came from users it would be more persuasive. Dr. Sullivan commented it is important to bolster the rationale for research at NOAA.

Jane Lubchenco asked Dr. Detrick about the 5-Year Research Plan. Dr. Detrick responded that a cross-Line Office team in NOAA is working on developing a five-year research plan for 2013-2018. The NOAA team members are using the science challenge workshops, implementation plans and various goals and enterprise objectives as input. Dr. Detrick stated that they have a draft report, but wanted to hear the Task Force recommendations and incorporate the science issues into 5-Year Plan. He said the intent is to include the PRTF recommendations and then put the 5-Year Plan out for public comment. The 5-Year Plan will be finalized after the Task Force report is finalized. Dr. Lubchenco said the timeline of the 5-Year Plan should be revised to incorporate the PRTF recommendations so NOAA is not operating in a vacuum. She added that

there will be more discussion about this, and the 5-Year Plan's comment period should be after the Task Force final report is released. Dr. Balstad said the Task Force accelerated the process and intends to have the final report to the SAB at a February teleconference meeting.

Dr. Schubel stated that more is needed to strengthen the case for NOAA in the PRTF Report. The nation needs to understand what would be lost without NOAA research. He stated there are opportunities to educate the public through aquaria and NSF. Dr. Barron asked about prioritization. Dr. Kareiva said the Task Force will go through the report and assess what kind of guidance could be provided on priorities.

Dr. Lubchenco invited Line Offices to comment on how this report could be useful to them. She asked if there are things in the report that Line Offices thought were missing, could be strengthened or would help them achieve their mission. Dr. Bamford stated that the way the recommendations are written, she could see the vision but not how to get there. She asked about internal versus external research, and added that there are political challenges associated with the recommendations. Dr. Bamford also inquired about directions on how to enhance versus consolidate NOAA Cooperative Institutes. Dr. Schubel said that making such decisions can become a hunting license, so NOAA needs to make those decisions, not the PRTF. Dr. Schubel added that the NGSP places burden on the programs to justify how they fit with the NGSP. Dr. Barron said that perhaps the report should not discuss how to prioritize as it would distract them from making other good recommendations. He suggested that a group of persons apart from the report could think about prioritization and added that USGCRP could be a template for making these decisions.

Dr. Detrick suggested that the Task Force also look at the balance between internal/external as well as the balance between research and development. He said the PRTF should use some criteria to do this.

Dr. Kareiva stated that it is NOAA's job to decide on priorities because it has the best knowledge of what is needed and the budget. Dr. Detrick said any help that would provide a framework for making decisions would be useful. Laura Furgione commented that use-inspired science is a useful framework.

Mr. Ban brought up the issue on budget management and flexibility. He said the Task Force moved quickly to the organization and management of research because the members saw this as an area where they could bring more value. The Task Force had a lot of discussion about NOAA's ability to change course, direction, and move people and money.

Richard Merrick said there was no recognition of mandates that structure research done by NMFS and NOS. He said that he would like the Task Force thoughts on how that could be balanced. He added that the Magnuson-Stevens Fisheries Management Act mandates single species stock assessments not ecosystem assessment, so some guidance on this would be good. Dr. Balstad said the PRTF cannot recommend changes to legislative mandates but introducing new types of science to leverage directives could be the balancing act that is needed. James Sanchirico said it is not a question of not doing stock assessments and ecosystem assessments. It is the gain from doing ecosystem assessments versus the gains of doing stock assessments. Dr. Sanchirico said you can improve stock assessments but improving ecosystem assessments would have more benefits.

Jean May-Brett asked about the results of the bench scientist survey. Avery Sen said most of the respondents were from OAR, NOS and NMFS. Dr. Balstad stated they promised anonymity so they did not ask for information to pinpoint them, such as length of service. Mr. Sen said they did ask people to identify themselves by discipline. Ms. May-Brett asked about percentage of response rates. Mr. Sen replied OAR 40%, NOS 50%, NWS 50%. He stated NMFS counted scientists differently by job series. Dr. Kareiva said no one group was underrepresented.

Pat Montanio said that having another group identify criteria should be done in conjunction with the report, if not in the report.

Dr. Lubchenco thanked the Task Force for the work they are doing. She stated it was done in a thoughtful way.

Drs. Kareiva and Balstad stated that their next steps will be to revise this report, distribute an updated draft to the Task Force, get comments, and incorporate those comments. Any additional comments from the SAB should be received before November 26.

Mr. Ban thanked the Drs. Kareiva and Balstad.

Cynthia Decker noted that comments to the Task Force should be sent to Steven Fine and herself by Wednesday November 21. NOAA will collate these comments and send to Dr. Kareiva and Dr. Balstad.

Action 5: The Science Advisory Board Research and Development Portfolio Review Task Force (PRTF) will revise its preliminary draft report per comments received at the meeting. The next draft version will be sent out for public comment.

Action 6: Additional comments from SAB members on this version of the SAB PRTF draft report may be provided to the SAB Office and Steve Fine for consideration and possible incorporation in the next draft.

## **Climate Working Group Report**

Heidi Cullen, Climate Central, SAB Member and Liaison to the Climate Working Group

### Summary

Heidi Cullen provided an overview of the Climate Working Group (CWG) report and highlights of the July CWG meeting. The working group welcomed Bob Detrick as the new Assistant Administrator for OAR as well as the Climate Goal Champion. CWG also congratulated Chet Koblinsky on his forthcoming retirement and thanked him for all his years of service as Director of the Climate Program Office (CPO) and all his efforts on behalf of the larger climate science community through some rather turbulent times. This was the first meeting of the CWG since February, 2011. Given the some changes in NOAA's Climate portfolio, the Climate Program Office chose not to have a CWG meeting in the intervening 18 months. As a result, this meeting served as more of a reset in terms of considering NOAA's climate activities, rather than an in

depth look at any one particular area. The main topics for this meeting were the execution of the Climate Goal strategy across line organizations, an overview of observations and monitoring, regional climate modeling, the five societal challenges of coastal inundation, weather and climate extremes, drought/water resources, marine ecosystems, and mitigation/atmospheric chemistry, how to message NOAA's climate goal, and changes to the CWG Terms of Reference and membership.

### Discussion

Ray Ban read comments that Susan Avery provided in writing (she was unable to attend the meeting):

“This meeting summary has a lot of important information in it. And if I read it correctly, in addition to fiscal issues and cross-agency coordination issues, there now seems to be a bureaucratic approach being taken which I fear may lead to more reports rather than better observational capacity, modeling, and providing climate services. This working group is essential and needs to meet more regularly with some concerted effort in coming up with solutions for the climate program within NOAA.”

Bob Detrick said in terms of membership, two have declined to serve due to other commitments. The alternates were contacted to see if they are willing to serve. The specific dates for the next meeting have not been set but will likely be in February or early March 2013 after the release of the President's budget. OAR has a solicitation out for a new director of the Climate Program Office (CPO) with options for an Interagency Personnel Act (IPA) position and a federal position. This will broaden OAR's applicant pool. He asked those present to let others know about the position.

Jerry Schubel made a motion to accept the report, Marshall Shepherd seconded and the motion was passed unanimously.

### **Public Comments**

There were no public comments.

### **Adjourn**

**Thursday, 15 November 2012**

**Opening Remarks**

Dr. Cynthia Decker, Executive Director, Science Advisory Board

**National Sea Grant Advisory Board Annual Report to Congress**

Nancy N. Rabalais, Louisiana Universities Marine Consortium and Chair,  
National Sea Grant Advisory Board

RADM Richard West, U.S. Navy (Ret.) and Member, National Sea Grant Advisory Board

**Summary**

The 2008 Sea Grant Act (PL110-394) requires the National Sea Grant Advisory Board (NSGAB) to submit a biennial report to Congress on the status of the National Sea Grant College Program (NSGCP or Sea Grant). The first report was given to Congress in 2010. Nancy Rabalais presented the National Sea Grant Advisory Board's (NSGAB) second report to the SAB. The NSGAB is made up of 15 board members and is in the process of filling five vacant seats. The NSGCP is made up of 33 university-based programs in partnership with state, industry and over 300 other partner institutions nationwide. These connections allow Sea Grant to have national, regional and local priorities all supporting NOAA's mission. The NSGCP, up for reauthorization in 2015, is generally doing exceedingly well. Sea Grant's niche is conducting research on urgent coastal issues and providing trusted information to stakeholders. The central finding of the NSGAB is that Sea Grant is an effective, solid investment of public money in response to the needs of coastal and Great Lakes communities. For the nation to achieve maximum benefit from Sea Grant, however, new resources are required. Challenges include the 5% spending cap on the national Sea Grant Office (NGSO) and the relative decrease in funding levels over time that have negatively impacted staffing, expertise and buying power in that office. The NSGAB recommends that Sea Grant should continue to focus on advancing national priorities while remaining connected to local needs. Partnerships should also continue to be cultivated and progress tracked through reporting of cumulative, measureable impacts of activities toward program goals. The NSGAB also recommends the federal budget should allocate resources to reverse the erosion of buying power. Finally, the NSGO should review the base funding structure, including the allocation and distribution of funds to state programs.

**Discussion**

Jane Lubchenco thanked Dr. Rabalais and Rear Admiral Richard West, who led the development of the Report, and said she agrees on the value of the Sea Grant program, particularly with the work the local programs did with NOAA on the Deep Water Horizon oil spill. She then asked if the 5% cap was in authorization or appropriation. RADM West said it was in the authorization language.

RADM West mentioned that site visits by the NSGAB to programs were important and they learned a lot. Dr. Rabalais said that rather than concentrating their efforts on a series of site reviews done state-by-state as in the past, the NSGAB now sees their role as more focusing on the overall national program and how to improve it and its value to NOAA. She mentioned that Hurricane Sandy was a wakeup call to all coastal communities and impacts in the future with

other storms and rising sea level. She then mentioned that Sea Grant stands ready to help in those areas. She introduced Joshua Brown from the NSGO and noted that his presentation on what the national and state programs are doing in response to Hurricane Sandy will be an example of how Sea Grant can help.

Kathleen Sullivan asked if Dr. Brown will quantify leverage on behalf of NOAA in terms of the economic return. Dr. Sullivan applauded the national and state programs on cohesion of effort among the state programs. Leon Cammen agreed and said Sea Grant's appropriation of about \$60 million is supplemented by \$30 million in matching funds and another \$60 million in leveraged program funds. For some state programs, only 25% of the funds are federal with most funding being provided by universities, states, and other agencies. When the NSGO evaluates a program, it looks at the whole program including the leveraged funds. All of Sea Grant's leveraged funding is now allocated to NOAA priorities as a result of the rigorous strategic planning process that all state programs undergo to align their programs with the national priorities. The \$170 million economic impact cited in the report does not include leveraged funds and the 4000 jobs cited do not include people directly hired using Sea Grant funds. He said this is a summary of impact but it is underreported. If the 4000 jobs with a value of \$50K each are included the value of the wages alone could be near \$1 billion per year.

Raymond Ban said the value proposition seems like a grand slam. When considering all the community players, the value the nation is receiving seems outstanding.

Dr. Cammen said a committee is evaluating best practices for how to determine and report economic impact. RADM West said it is hard to document the value of volunteers. The NSGAB has discussed how one can calculate the value of volunteers in the review. The challenge to account for the value of volunteers runs across NOAA programs. One must be careful in these calculations and how the numbers are used.

Dr. Jerry Schubel said this was a great place to increase socioeconomic effort in NOAA. This has been a remarkable evolution in the Sea Grant program. He remarked that it is really a network and not individual programs.

At the end of this meeting section, Dr. Brown gave a brief presentation of how Sea Grant responded to Hurricane Sandy. He said the state Sea Grant programs and the National Office worked with Federal and State agencies to provide critical information before and after the storm. They shared their best practices to get ready for the hurricane with the groups and teams on which they have representation. They also helped organize Sea Grant resources for dealing with damage to livelihoods and property. Using their network connections, they were able to bring response and recovery expertise from the Gulf of Mexico and the southeast U.S. More specifically, Sea Grant agents and researchers are currently helping communities assess impacts to coastal geology, coastal businesses (e.g. marinas, aquaculture, and commercial fishing) and environmental impacts on water quality. Sea Grant is also assisting through community recovery plans, long-term resilience planning and the assessment of mitigation choices.

Dr. Marshall Shepherd asked if Sea Grant efforts involved public warnings or hurricane literacy prior to the storm. Dr. Brown said yes. A lot of work has been done in conjunction with the National Weather Service on various hazards like rip currents, particularly along the Gulf coast.

Mr. Ban thanked Dr. Rabalais, RADM West and Dr. Brown.

### **NOAA and Hurricane Sandy**

Kathryn Sullivan, Assistant Secretary, Environmental Observation and Prediction; Deputy Administrator and Acting Chief Scientist

Louis Uccellini, Director, NOAA NWS National Centers for Environmental Prediction

#### Summary

Dr. Kathy Sullivan provided an overview of NOAA-wide efforts in preparing for the storm and actions taken afterwards. Dr. Louis Uccellini provided a detailed technical summary of Hurricane Sandy characteristics, forecasts, models used, verifications, and challenges.

Dr. Sullivan began by describing how the storm was first noticed as an anomaly in data from the GOES-13-East spacecraft. They moved a second satellite (GOES-14) to get a better view of the storm. NOAA left both satellites in place – putting GOES-14 on a one minute rapid-refresh cycle to better document the storm’s evolution. The National Weather Service (NWS) also increased upper air soundings. On the ground, NOAA tightened coordination with the Federal Emergency Management Administration (FEMA) and embedded NOAA staff at impacted state operations centers. Safe navigation teams were prepositioned similarly to an oil spill rapid response team. NOAA Oceanic and Atmospheric Research’s Hurricane Research Division also prepared to fly into storm.

Post-storm, getting the ports of Norfolk and New York/New Jersey reopened was a top priority. NOAA prepositioned teams to get fuel supplies to power producers. Navigation response teams were positioned in eastern Long Island to assist and ports were reopened in 48-hours after the storm had passed. NOAA planes conducted flyover surveys in support of FEMA damage assessment teams. The NOAA Office of Response & Restoration came into play on a vessel leaking in Staten Island and had the lead for the response. New York Harbor survey work was done five days after storm and NOAA survey assets cleared 60% of NJ/NY ports. Finally, Sea Grant staff in the states assisted communities in assessing damage to marinas and coasts.

Dr. Uccellini continued the presentation with a summary of the storm’s characteristics and NOAA science models applied to forecasts and analysis of the storm. He began with an overview of basic characteristics of Hurricane Sandy and then discussed forecasts for Sandy from the forecaster perspective. He continued with an overview of the initial models used by forecasters and the verifications of those models. Finally he discussed the issues and challenges with forecasting such a large storm and concluded with a description of ongoing experiments.

Hurricane Sandy was a large storm that stretched from Bermuda to Des Moines, Iowa. It had a large fetch and the deepest central pressure ever recorded (940 mb). From a NCEP perspective, every NCEP center but Space Weather was involved. The National Hurricane Center (NHC) coordinated forecasts from other offices to create collaborative forecasts. These forecasts were generally based on ensemble model approach (from U.S., Europe and Canada) and performed with remarkable accuracy. Information regarding those forecasts was shared with the NOAA

Office of Policy Coordination (OPC), NHC and local Weather Forecasting Offices (WFOs) resulting in coordinated New York City evacuations and shutdown of its public transportation system. Forecasts were also shared with the Federal Aviation Administration (FAA) for re-routing of planes and closing of airports. All of these efforts allowed for a seamless, consistent message to be sent out to emergency decision-makers and the public. This messaging focused on impact-based decision-support services, emphasizing the historic nature, unique characteristics, and destructive potential for the storm.

After the storm, the NWS was able to assess its predictive success and evaluate where models could do better in the future. Overall the integrated model approach worked well, however there is always room for improvement. On-going research involves higher-resolution ensemble forecasts and experiments in which scientists study the behavior of model runs when denying different data inputs.

### Discussion

Jane Lubchenco mentioned Senator Barbara Mikulski (D-MD) is very impressed with NOAA's commitment. Dr. Lubchenco thanked Louis Uccellini and his team for all their work. She then asked for comment on the nature of the warnings. Some asserted that warnings should have been posted all along the coast and Dr. Lubchenco wanted people to understand the rationale behind the postings, and to be aware of the One NOAA effort. She expressed frustration and concern that NOAA did not get the recognition it deserved for the work it did on the prediction and coordination with other agencies.

Dr. Uccellini mentioned that he attended a Mid-Atlantic Regional Coastal Ocean Observing System (MARCOOS) meeting after the storm where fishermen and emergency response personnel pointed to NOAA's team effort and remarkable success.

On the warnings, Dr. Uccellini said the key challenge was the transition from tropical to an extratropical storm. NWS knew there was a forecasting issue with the transition and whether it would be a tropical storm at landfall. During the 4-5 days when NWS was predicting the transition, the agency worried if they had a hurricane forecast and it was technically no longer a hurricane, local weather forecasters may take down the hurricane warnings. They decided to focus on warnings and impacts like storm surge, winds, and other impacts predicted over a long period of time. This way the message to local forecasters was for them to not get hung up over whether or not it was a hurricane, but instead focused on the storm's impacts. Once that decision was made, the agency did not change the message that might downgrade the perception of the storm's potential severity.

Dr. Kathryn Sullivan asked if there was any feedback from emergency managers and broadcasters and what they intended to do. Dr. Uccellini said he had calls about this but once they got closer to the event, those questions stopped.

Jerry Schubel commented that this is a remarkable example of a One NOAA effort and asked what NOAA is doing to get the story out. Dr. Lubchenco said she has started the discussions internally on this. Dr. Schubel emphasized the longer NOAA waits, the less impact the story will have on the public. He suggested there should be a "Science on the Sphere" presentation about the science story and NOAA's role during the storm.

## **NOAA Response to the SAB Report from the Climate Partnership Task Force and NOAA Response to the SAB White Paper “Towards Open Weather and Climate Services”**

Robert Detrick, Assistant Administrator, Oceanic and Atmospheric Research

Edward Johnson, Director, Strategic Planning and Policy Office, National Weather Service

### Summary

The highlights of and NOAA response to two reports, “Toward Open Weather and Climate Services” and the Climate Partnerships Task Force Report were covered in this single presentation. The full written responses are contained in two separate documents. NOAA concurs in principle that the weather and climate enterprise should have open access to various types of data that NOAA produces and that NOAA should develop new capabilities and systems in an open and transparent fashion. The NOAA Policy on Partnerships in Provision of Environmental Information (NOAA Partnership Policy, NOAA Administrative Order 216-112) states, in part: “The nation benefits from government information disseminate by both Federal agencies and by diverse nonfederal parties including commercial and not-for-profit entities. NOAA recognizes that cooperation, not competition, with private sector and academic and research entities best serves the public interest...”

NOAA does have some limitations for Open Environmental Information Services (EIS) including: limitations of the internal architecture of NOAA’s data systems; limitations on NOAA’s capacity to provide data to external parties (limited bandwidth and server infrastructure); limitations on the use of NOAA data by external parties after they acquire it (issues with data format, encodings and lack of universal geo-referenced framework for some observations); and limitations due to available resources within NOAA (funding and people).

NOAA proposes to establish a process to facilitate the identification and implementation of specific projects or actions to demonstrate an Open EIS as well as steps to remove impediments and to facilitate projects and actions. Next steps include:

- engaging the SAB and its working groups such as the Environmental Information Services, Climate, and Data Archive and Access Working Groups in a discussion about the Open EIS implementation strategy
- using existing mechanisms such as the Small Business Innovative Research program to develop partnerships with private-sector companies so they can develop and market enhanced products and services using weather and climate data
- determining the measures of success for Open EIS to evaluate the pilots and begin to develop a library of best practices

## Discussion

Kathy Sullivan noted that NOAA has a lot of committee structure; as Dr. Detrick, and Dr. Johnson prepared this response she asked if thought had been given to streamlining these to help outside communities to make this more tractable.

Ed Johnson responded that in going through the preparation of the NOAA response, NOAA consulted a number of internal groups who will deal with some of the challenges identified. One example of the challenges is how NOAA should manage proprietary information. One option is for NOAA for NOAA to identify a single individual to examine all of these issues.

Kathy Sullivan noted that we need to build better structures, including better human processes and better coupling of observing system data so that all parties can access these without having to learn all of the data protocols.

Ed Johnson responded that the basic architecture is acceptable however it is difficult to address even one of these challenges given multiple limitations. Robert Detrick added that the pilot approach suggested in the response will be useful to begin addressing these. Each pilot will address different aspects of NOAA's structure. If the agency then assesses what is learned, over 2-3 years NOAA will have a better understanding of how to do things. Kathy Sullivan added that NOAA has an obligation in policy and law to be fair; as a government entity NOAA has to be very mindful of its approaches in dealing with all players, not just the private sector or a certain category of the private sector. NOAA needs to bring different players together to allow for more interaction, to develop ways for many people to participate. Ed Johnson stated that the overall weather and climate enterprise needs to develop ways to overcome shared problems; pilot projects can help with this.

Ray Ban commented that the CWG and EISWG agree in principle with the NOAA response. They recognize that there are issues to address but if things are organized correctly and the correct processes are put in place, the enterprise can move forward to make this work. Ed Johnson and Robert Detrick agreed and noted the pilot projects are the mechanism to address this. Heidi Cullen commented that she was gratified by the response. Jerry Schubel also added that it was a good response to the two reports.

Walt Dabberdt commented that the Climate Partnerships Task Force was a rapid-response task force and made a broad range of recommendations. While the EISWG agrees that the Open EIS is a better system, the broader theme of the Climate Partnership Task Force work has not really been addressed in the NOAA response. He also noted that one caveat to Open EIS is that it is great for requesting appropriations to deal with data information issues, it falls short as a full option because it does not have a symbiotic relationship with other areas including software development. He also pointed out the response is also silent on collaboration on hardware development. Nancy Colleton added that the NOAA response focused on Open Climate and Weather Services but the Co-Chairs of the Climate Partnership Task Force would say this response did not address the recommendations of the CPTF report, particularly on how to involve the private sector in climate services. Robert Detrick responded that there is more information in the written report than was included in the presentation. Ray Ban reiterated that this is just a response; there is no accepting or rejecting the response by the SAB. The SAB and NOAA will look at the next steps together. Kathy Sullivan stated that the NOAA response

proposes a parallel structure for government and the private sector in climate services, taking the key message from the NRC “Fair Weather” report: work together to address the problems and learn by doing as they move forward. Walt Dabberdt responded for the Climate Partnerships Task Force the issue is the role of the public sector versus the private and academic sectors in climate services: identify the barriers then create and foster a collaborative environment, learning from experience with the Weather Service.

Kathy Sullivan asked if the working group wanted NOAA to provide a list of things it would address. Walter Dabberdt said on Open EIS, the response did not address hardware, including satellites and he was not able to read the intent of that. He believed the response from NOAA is very encouraging, but should be more consistent with working group reports provided.

Philip Ardunay commented that he was very excited about what heard in response; any operational agency has difficulties but it is clear there is a vision of how NOAA will provide services and data in the future.

Ray Ban stated that the SAB will need to look at the next steps. As the SAB works within the response framework, it needs to think about how it creates mechanisms in working groups to address the details. The Working Group Chairs will help develop mechanisms for this.

### **Review of Terms of Reference for the Environmental Information Sciences Working Group**

Nancy Colleton, Institute for Global Environmental Strategies, and Co-Chair, EISWG  
Walter Dabberdt, Vaisala, and Co-Chair, EISWG

#### Summary

The EISWG reported on the discussions the group held with respect to the review of the working group that was required in the language of the original Terms of Reference. In discussions on its future role, EISWG members explored a variety of mechanisms by which they could provide advice but decided to remain a SAB Working Group so they could continue to inform NOAA management via the SAB. In addition they propose to expand the EISWG focus beyond the National Weather Service. This would allow EISWG to have a unique cross-cutting focus and to have the ability to address a wide-range of issues - atmospheric, oceanographic, observing systems, data management, etc. To broaden their focus, EISWG will need to broaden the expertise of their membership and will engage other NOAA Line Offices (OAR, NOS and NESDIS). The Co-Chairs noted that EISWG is not well-constructed to address fishery issues.

#### Discussion

Ray Ban thanked Walt Dabberdt and Nancy Colleton for their work on this review. Laura Furgione, Acting Director of the National Weather Service, also thanked the EISWG members for their work. The National Weather Service supports the Open Environmental Information Service (EIS) and other efforts and looks forward to working with EISWG in whatever capacity the SAB sees fit.

Robert Detrick noted that there is some overlap between the EISWG and the Climate Working Group (CWG) and asked how they plan to interact. Nancy Colleton noted that when the EISWG began it had several teleconferences with the Chairs of the CWG and the Data Archive and Access Requirements Working Group (DAARWG). The EISWG and CWG worked together on the Climate Partnerships Task Force and vetted that work with the DAARWG. The working group is trying to be proactive in its collaboration and is willing to do more. Ray Ban added that it is an evolutionary course and groups will need to adapt as necessary; the SAB and Working Groups will need to be cognizant of each other and work on this. Sandy MacDonald, Deputy Assistant Administrator for OAR, said the fact that the EISWG plans to engage other Line Offices is a good step. Jerry Schubel noted that EISWG is an active Working Group and overlap with the CWG is a good thing.

Marshall Shepherd asked if the EISWG will remain the same or will there be some changes. Ray Ban responded that there is a membership issue and perhaps the leadership will evolve. Kathy Sullivan asked about the rules related to terms of current members. Cynthia Decker clarified the membership terms - staggered first terms of 2, 3, or 4 years for the members of a working group with one additional 3-year reappointment possible. There have been resignations so new members have come on board outside those terms. Nancy Colleton added that there are new members including new expertise on social science and emergency management. Kathy Sullivan thanked the EISWG for its work.

Ray Ban noted that as Chair he has focused on SAB Working Groups and how important they are. The Board can't do its work without the work and commitment of the Working Groups. Given that there are only four board members present at this time, Ray Ban moved that the SAB continue the EISWG in its current structure and on the winter teleconference consider this proposal when there are more members present. The motion was seconded by Jerry Schubel.

Action 9: The Science Advisory Board members present at the meeting approved the recommendations from the Environmental Information Services Working Group on its future role. However, because there were so few members present, the SAB will consider the final decision on this at the winter 2013 teleconference meeting.

## **Working Group Reports**

### **Data Archive and Access Requirements Working Group (DAARWG)**

Cynthia Decker reported the DAARWG had a meeting a few weeks ago and addressed some issues that the members plan to bring before the SAB in the next year. They also plan to add two new members in the coming year. Recently the group handled the transition of the new chair. Ferris Webster's term ended in December and Chris Lenhardt was approved at the October SAB meeting. They jointly chaired DAARWG's most recent meeting. The next DAARWG meeting will be in the spring, 2013. There will also be two NOAA responses to DAARWG's reports presented at the spring SAB meeting.

## **Environmental Information Services Working Group (EISWG)**

Walter Dabberdt and Nancy Colleton, co-chairs of the EISWG, reported the working group had a meeting coming up in December. Members will be rotating off and they plan to present new members at the winter SAB teleconference meeting.

## **Ecosystem Science and Management Working Group (ESMWG)**

Jo-Anne Leong, co-chair of the ESMWG, said the October 2012 meeting was cancelled because of hurricane Sandy. The working group is looking at two agenda items for the next meeting. The first item is the use of science in an ecosystem-based fisheries management framework (EBFM). The ESMWG is getting support on this topic from the NOAA fishery science centers and centers' use of ecosystem principles in their work. The second agenda item is habitat restoration. The working group has asked a series of questions and is investigating further with a subcommittee. There are two items proposed to be examined in the future by the group: 1) The use of traditional ecological knowledge and 2) evaluation of ecosystem services and the trade-offs.

Ray Ban asked about status of Arctic discussions. Dr. Leong replied there was a meeting action from July that needs to be followed up on. Mr. Ban agreed to work with SAB staff to follow up on this.

Action 11: The Science Advisory Board will revisit the actions from the July 2012 meeting on NOAA Arctic issues.

### **SUPPLEMENTARY INFORMATION FOR ACTION 11**

#### *Actions from the July 2012 SAB Meeting*

Action 5: Ray Ban, Science Advisory Board Chair, and Cynthia Decker, SAB Executive Director will work out a plan and timeline for NOAA to present its Arctic activities to the SAB.

Action 6: The Science Advisory Board will request NOAA to send the Arctic Implementation Plan to the Ecosystem Sciences and Management Working Group for review.

## **Ocean Exploration Advisory Working Group (OEAWG)**

The announcement calling for nominations for the Ocean Exploration Advisory Board (OEAB) has been published. Jerry Schubel asked when the OEAWG would sunset. It was his understanding that the OEAWG member terms extended until December 2012 or once the OEAB was established.

Tim Arcano, Director of the Ocean Exploration and Research Program, stated he would like to extend the OEAWG until the OEAB has been established. Ray Ban said the SAB will clarify that the OEAWG will stay in place until then.

Dr. Schubel repeated his offer for the middle of June 2013 to hold an Ocean Exploration National Forum at the Aquarium of the Pacific in Long Beach, CA. He said the theme in next two years for the Aquarium will be ocean exploration and will have exhibits, a film, and lecture series. They would waive any site fees for a forum on Ocean Exploration. At the reception the

day following this event there would be opportunities for interactions with the public and media. Bob Detrick said NOAA would check perception and ethics of agency participation in such a forum and let Dr. Schubel know. Jean May-Brett made a motion that the SAB endorse the concept of an ocean exploration national forum as per the OER Review Panel recommendations and the offer from the Long Beach (CA) Aquarium of the Pacific to host this event in July 2013. Marshal Shepherd seconded the motion and it was passed unanimously.

Action 10: The SAB endorsed the concept of an ocean exploration national forum as per the OER Review Panel recommendations and the offer from the Long Beach (CA) Aquarium of the Pacific to host this event in July 2013.

### **Discussion regarding new SAB members**

Dr. Marshall asked for a timeline for new members since the Federal Register Notice (FRN) ends November 29. They need to check if people nominated would serve. This information would be presented to Dr. Lubchenko. Once she makes her decision, they need to be invited. Reasonably it will be another 6 months before members would be on board depending on how quickly they respond.

Ray said they need to get a February teleconference and a March meeting on the SAB calendar.

### **Review of Actions**

Action 1: The Science Advisory Board (SAB) accepted the report from its Satellites Task Force (SATTF) pending a revision to recommendation 1 language about seeking stable funding for the satellite programs. The SAB will transmit this final version to NOAA.

Action 2: NOAA will provide a response to the Science Advisory Board on the recommendations from the SATTF report within one year.

Action 3: The Science Advisory Board accepted the final report from its Ocean Exploration Advisory Working Group on the review of the NOAA Ocean Exploration and Research (OER) Program. The SAB will transmit this report to the NOAA Administrator.

Action 4: NOAA will provide a response to the OER review report within one year. Details on this will be worked out with the new Ocean Exploration Advisory Board.

Action 5: The Science Advisory Board Research and Development Portfolio Review Task Force (PRTF) will revise its preliminary draft report per comments received at the meeting. The next draft version will be sent out for public comment.

Action 6: Additional comments from SAB members on this version of the SAB PRTF draft report may be provided to the SAB Office and Steve Fine for consideration and possible incorporation in the next draft.

Action 7: The Science Advisory Board accepted the final report from the review team of the Cooperative Institute for North Atlantic Research (CINAR) after revisions made per SAB comments. The SAB will transmit the CINAR review report to the NOAA Administrator.

Action 8: CINAR will provide a response to NOAA on the review report by letter within one year.

Action 9: The Science Advisory Board members present at the meeting approved the recommendations from the Environmental Information Services Working Group on its future role. However, because there were so few members present, the SAB will consider the final decision on this at the winter 2013 teleconference meeting.

Action 10: The SAB endorsed the concept of an ocean exploration national forum as per the OER Review Panel recommendations and the offer from the Long Beach (CA) Aquarium of the Pacific to host this event in July 2013.

Action 11: The Science Advisory Board will revisit the actions from the July 2012 meeting on NOAA Arctic issues.

#### SUPPLEMENTARY INFORMATION FOR ACTION 11

##### *Actions from the July 2012 SAB Meeting*

Action 5: Ray Ban, Science Advisory Board Chair, and Cynthia Decker, SAB Executive Director will work out a plan and timeline for NOAA to present its Arctic activities to the SAB.

Action 6: The Science Advisory Board will request NOAA to send the Arctic Implementation Plan to the Ecosystem Sciences and Management Working Group for review.

**Adjourn**