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**39th Meeting of the NOAA Science Advisory Board
Washington, DC
30 November – 1 December 2010**

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, Weather Industry and Government Partnerships, The Weather Channel; Dr. Heidi Cullen, CEO, Climate Central; Dr. Eve Grunfest, Director, Social Science Woven into Meteorology; Dr. Jeremy Jackson, Director, Center for Marine Biodiversity and Conservation, University of California at San Diego; Dr. Peter Kareiva, Chief Scientist, The Nature Conservancy; Dr. Frank Kudrna, Kudrna & Associates Ltd; Dr. James Sanchirico, Associate Professor, University of California at Davis; Dr. Jerry Schubel, President and CEO, Aquarium of the Pacific; Dr Thomas Zacharia, Associate Laboratory Director, Oak Ridge National Laboratory

NOAA senior management and Line Office representatives in attendance: Dr. Jane Lubchenco, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator; Ms. Margaret Spring, Chief of Staff of Commerce for Oceans and Atmosphere; Dr Larry Robinson, Assistant Secretary of Commerce for Oceans and Atmosphere, Dr. Paul Sandifer, Senior Science Advisor to the Under Secretary; Dr. Jack Hayes, Assistant Administrator, National Weather Service; Mr. Paul Doremus, Acting Assistant Administrator, Program Policy Integration; Mr. Craig McLean, Acting Assistant Administrator, Oceanic and Atmospheric Research; Dr. Alexander MacDonald, Deputy Assistant Administrator, Oceanic and Atmospheric Research; Dr. Charles Baker, Deputy Assistant Administrator, National Environmental Satellite, Data and Information Service; Mr. Eric Schwaab, Assistant Administrator, National Marine Fisheries Service; Dr. David Kennedy, Assistant Administrator, National Ocean Service; Rear Admiral Philip Kenul, Commissioned Officer NOAA Corps and Office of Marine and Aviation and Operation.

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

WEDNESDAY, 30 NOVEMBER 2011

Welcoming Remarks and NOAA Update

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

Summary

Dr Jane Lubchenco began by stating that this is a special time to engage the best scientific minds to help NOAA meet challenges and she also thanked the SAB for their help. She gave a brief overview on some of the highlights from last year and also highlighted priorities for the next year.

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She began with focus on people and leadership positions. She mentioned that Dr. Larry Robinson was absent from the meeting as he was attending the World Heritage designation ceremony for the Hawaii National Monument. She announced that Dr. Scott Doney was nominated as NOAA's Chief scientist and his confirmation hearing was being held that later that afternoon. Scott Doney would be NOAA's first chief scientist in the last 16 years. There are currently two open positions for Assistant Administrators (AA) for National Ocean Service (NOS) and Oceanic and Atmospheric Research (OAR): NOS search for an AA had just closed and the NOAA is using an executive search company to search for an AA. There are a number of senior managers who are close to retiring thus NOAA will be looking for new to fill these positions.

Dr. Lubchenco said the NOAA Next Generation Strategy Plan (NGSP) was now posted on the NOAA website and she thanked the SAB for their feedback and comments. She said that there are different parts of NOAA which have an overarching focus. The focus is on four long-term goals which are: 1) Resilient coastal communities and economies, 2) Climate Adaptation and Mitigation 3) Healthy Oceans and 4) Weather Ready Nation. Dr Lubchenco said there was an annual guidance memorandum that shows the grand vision and identifies which areas NOAA focuses on each year. She talked of the three different areas where items are set up for the future, new items being implemented and items to be sustained to achieve the vision. She gave the example of the National Climate Service which was being set up last year and should be implemented this year and sustained and grown in coming years.

In regards to National Climate Services, Dr. Lubchenco last SAB meeting spent time framing what the Climate Service would look like and how it would be structured. She said a lot of work was done by the SAB, NOAA and others such as the study done by the National Academy for Public Administration (NAPA). The NAPA study reviewed the plans and ideas and delivered a report that endorsed the direction NOAA was headed as well as the strong need for a Climate Service. Dr. Lubchenco said NOAA National Climatic Data Center (NCDC) provides monthly analyses of temperature trends and she emphasized that the goal of the National Climate Service was to make these more efficient.

Dr. Lubchenco reviewed climate trends for 2010. She said the January to Oct 2010 period tied with 1998 for warmest combined land and ocean temp on record. The average sea ice extent in October was the third lowest since records began in 1979.

Dr. Lubchenco next talked about the Weather and Water Services where she said NOAA was in the startup phase. She said NOAA will create a new vision. She said the goal was to have a vision for services that include infrastructure. Dr. Lubchenco showed a photo of a Global Hawk (unmanned aerial vehicle) looking into Hurricane Earl and said this is a vision of what can be done. The Global Hawk can see the hurricane the entire time and provide data on how storms form and behave.

Dr. Lubchenco talked about 2010 accomplishments. She said 2010 was a banner year for forecasting. She said the Atlantic tropical outlook was very accurate with 19 named storms of which 12 became hurricanes and five of 12 storms reached category three or above. 2010 was an

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above average season and forecasted numbers were accurate. She said the good news for the year was that most of the storms did not make landfall in the US. Dr. Lubchenco said NOAA will continue to make communities storm-ready and more are joining the program.

Dr. Lubchenco gave a preview of activities for 2011. She said NOAA would continue the 4D weather cube test bed. NOAA will implement National Ocean Policy based on the Executive Order signed July 19, 2010. The policy places emphasis on coastal and marine spatial planning (CMSP) as a tool for healthy oceans and coasts and helping coastal communities. The activities involved are underpinned by science. The National Ocean Council met for the first time and NOAA is organized to be supportive of this new opportunity.

She said NOAA was working on eliminating overfishing and rebuilding depleted fisheries. NOAA will remain committed to ecosystem-based management (EBM) of fisheries to maintain healthy oceans while allowing commercial and recreational fisheries. NOAA finalized the catch share policy and released it publicly. The policy is aimed at fisheries management council and encourages them to consider catch share where appropriate and to provide guidance when needed. She said sector revenue was up 12 percent over previous year. Dr. Lubchenco said a major goal of catch share is to empower fisherman to be part of process. She stated that NOAA will make improvements in a number of depleted stocks, increase the number of stocks assessed and create a roadmap for the future of fisheries and aquaculture including science information to get to sustainable fisheries.

There have been a lot of activities that aim at strengthening science at NOAA. The first NOAA-wide science workshop was held in May to establish a science vision and grand challenges. The NOAA Research Council approved a NOAA administrative Order for enterprise monitoring and evaluation of research. Plans for 2011 include a series of NOAA science conferences and workshops and also strengthening ties with the external science community. NOAA also plans to establish a NOAA scientific integrity policy, improve its recruitment and retention policy, and develop a NOAA-wide ecosystem science plan to include social science to support policies. NOAA would like to engage the SAB and their working groups on these activities.

Dr. Lubchenco said she spent time in the Gulf of Mexico (GOM) and NOAA will continue working on GOM issues. A video of surface oil distribution showed how dynamic the event was and the importance for NOAA to project oil trajectory given the weather wind and wave information. NOAA work in progress is protecting seafood safety, providing continuous weather information, conducting science and monitoring to understand where the oil was and the oil's impact on protected species. Even though the oil flow has stopped, NOAA's work continues on analysis of subsurface oil. Important NOAA work includes assessing the damage and participating on the interagency team focused on restoration.

NOAA is also focusing on the Arctic area where responsibilities include stewardship, service, and science potential. NOAA created an Arctic vision and strategy in the past and will work on an interagency basis to identify roles and responsibilities to make best decisions possible. In 2011 NOAA will partner with other agencies to conduct surveys, analyses, sea ice models, and the scientific underpinnings to gather the best possible information in this challenging environment.

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Dr. Lubchenco stated that satellites are tools that enable other areas to function. In 2010 NOAA crafted a new vision on the Joint Polar Satellite System (JPSS) and is working on this with NASA. The NPOESS Preparatory Project (NPP) satellite is a gap-filler until JPSS is implemented. NPP will be launched in 2011.

Dr. Lubchenco concluded by seeking input from the SAB on how NOAA can be most strategic in achieving its priorities, She also wanted to hear from the SAB how NOAA was performing and the areas that NOAA could improve. Finally, Dr. Lubchenco asked if the SAB had any ideas on how they could assist NOAA.

Discussion

Dr. Jerry Schubel said NOAA performs many things extremely well. He said however, NOAA needed to emphasize science and service and this could be achieved by more engagement with Congress and others. Dr Lubchenco responded saying that it is very true that science is critical to NOAA. NOAA was thinking more about engagement in designing the climate service and all its programs, as well as a renewed emphasis on social science to engage more effectively.

Dr. Frank Kudrna concurred with Dr. Schubel's statements. He also commented on the NOAA retirements and said these would be a major issue for NOAA. He asked if NOAA had an internal strategy to help meet those personnel needs. Dr. Lubchenco said serious discussions on transition planning for some of these positions were underway. She said NOAA needed suggestions for how to improve and she could share with the SAB what NOAA was planning.

Dr. Thomas Zacharia echoed Dr. Schubel that NOAA performs well in most aspects. As deputy director of a federal laboratory that relies on federal funding, Dr. Zacharia said they spend time on contingency plans for possible decreases in budget. There are possibilities that funding projection may change from what has been planned and he asked what would happen to NOAA's strategic plan if the funding track was not met. He wanted to know if NOAA had an insight on this and how the SAB could assist. Dr. Lubchenco responded that NOAA is cognizant of the budget environment and is preparing for various contingencies

Dr. Heidi Cullen mentioned the transition in both the Senate and Congress. She asked NOAA how the SAB could be of assistance in this period which could be potentially tough for scientists. Dr. Lubchenco said there is need to talk about the importance of science and stewardship but especially services because what people see on the ground are services provided such as weather, water and navigation services. These are the touchstones for many members of Congress who have differing opinions on climate or sciences. Having champions who can emphasize the importance of the services would be helpful.

Mr. Ray Ban stated that as NOAA competes for very limited resources, the relevance of NOAA will be a critical dimension in how much of the decreasing budget NOAA can get. Over the past 12-18 months, NOAA had an opportunity to boost its relevance because of its profile in issues such as the Deep Water Horizon (DWH), climate change, and weather. Mr. Ban asked how this would increase expectations and how relevancy has come up in addressing these challenges. Dr.

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Lubchenco's response was that, from her perspective, it seemed that NOAA's relevance has become more obvious in the last few years given services and stewardship. She said most people learned about what NOAA during the DWH. She said the challenge was that NOAA does so much and many people know different parts of NOAA but do not understand it all.

Dr. Jeremy Jackson said in hard budget times, one area that does well other than defense is health. NOAA is just as important as the National Institutes of Health (NIH) but the public does not understand this. The issue of individual well-being is so central but there is profound ignorance.

Dr. Schubel said NOAA did an Earth Day event at the Aquarium on a weekend. He said NOAA provided information on safety of seafood in Gulf and National Weather Services (NWS) and Fisheries had panel discussions in which Congressman Dana Rohrbacher also participated. He said people were surprised how much NOAA does. He suggested that more of these be done across the country.

Dr. Zacharia said he was at the AAAS meeting and heard a report from the President's Council of Advisors on Science and Technology (PCAST) on energy. The PCAST Subcommittee suggested revenue stream tax on gas that would fund the Department of Energy (DoE) projects. They framed energy as a decadal problem. He asked if NOAA should be seeking similar help from PCAST to support NOAA budget priorities. Dr. Lubchenco said NOAA has had discussions with PCAST on studies and some are still underway. She said PCAST is an important voice and there are multiple avenues to be working with.

FY2011 NOAA Budget Update

Maureen Wylie, NOAA Chief Financial Officer

Summary

The purpose of this presentation was to give an update on the current status of NOAA's budget process. NOAA's Chief Financial Officer, Ms. Maureen Wylie, said the budget was currently on a Continuing Resolution (CR) and that NOAA was operating on a low level. She added that CR is likely to continue through February, 2011. Ms. Wylie stated that she expected to see a substantial decrease in the fiscal year 2011 (FY11) budget relative to fiscal year 2010 (FY10).

Ms. Wylie said NOAA typically has increased expenditures in second quarter on contracts and grants. She said if NOAA could hold the FY 2010 funding level on a continuing resolution then NOAA would be in a good position. She mentioned that NOAA will be submitting the fiscal year 2012 (FY12) budget before getting an indication of when the FY11 will be passed. Ms. Wylie expected that in FY12 the budget will be reduced.

Discussion

Dr. Thomas Zacharia said it is very confusing to deal with two budgets at the same time thus he suggested a yearlong CR could be a reality. There is also a concern that there is downward

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pressure that is based on the President's budget that was not enacted. Dr. Zacharia stated that Congress may look at science agencies as donor programs paying for other things and he asked Ms. Wylie if could speculate on this. Ms Wylie responded that she thought she can make a case for NOAA's priorities because NOAA has broad, multifaceted constituents. She added that new members of Congress may not know how difficult it is to work on two budgets. There may need to be a catalytic event like a debt ceiling that will set the parameters for what happens next.

Dr. Frank Kudrna said Secretary of Defense Robert Gates went through reorganization and restructuring to make the Department of Defense more efficient. He asked if this is now an opportunity for NOAA to reinvigorate the concept of an organizing act for the agency. Ms. Wylie responded that this is probably not a good time as there seems to be some bias against science agencies in the Congress. Ms. Margaret Spring added that it would seen as appropriate to "streamline" thus it would be difficult to push for the act. It would be good for NOAA to have the act but pushing for it now might provide an opportunity for Congress to make cuts. NOAA will wait to see how new members of Congress react to the current proposed NOAA budget. She also said that the proposed National Climate Services reorganization will be looked at in light of streamlining.

Update of the SAB Working Group Subcommittee

Frank Kudrna, Kudrna & Associates, Inc. and Member, WG Subcommittee and SAB

Summary

The purpose of this session was to discuss a proposal on realignment and future operation of SAB Working Groups. The SAB had formed the Working Group Subcommittee after the July SAB meeting to consider this topic. The Subcommittee is chaired by Eric Barron and members include Heidi Cullen, Frank Kudrna, Jim Sanchirico, Jerry Schubel, and Thomas Zacharia. Frank Kudrna presented the proposal from the Subcommittee because Eric Barron was neither able to attend the meeting nor dial in.

The Subcommittee proposed that the current set of standing SAB working groups be modified to match up with the four goals of the NOAA Next Generation Strategic Plan (NGSP). Two of the current working groups – Climate and Ecosystem Sciences and Management – appear to align already with the Climate and Healthy Oceans goals. The Environmental Information Services Working Group could conceivably align with the Weather-Ready Nation goal. There is not an existing working group that aligns with the Resilient Coastal Communities goal although Climate and ESMWG address some of those issues. Neither the Data Archive and Analysis Requirements nor the Ocean Exploration Advisory Working Groups line up specifically with one of the goals although both are important topics on which the SAB should continue to provide advice. The OEAWG is due to be disestablished, however, upon creation of a new federal advisory committee in NOAA on this topic, the Ocean Exploration Advisory Board, so this is considered not to be a concern for the SAB in the long term. The WG Subcommittee further proposed that the "enterprise objectives" in the NGSP could be addressed by the SAB through the use of ad hoc working groups or task forces in the future.

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Frank Kudrna stated that he had discussed the proposal prior to the meeting with Eric Barron and Ray Ban and they agreed that there should be more discussion of this proposal by the Subcommittee before anything is approved by the full Board. The SAB then discussed the current proposal and asked for specific comments, both from the members and from NOAA, to be provided to the subcommittee subsequent to the meeting. The comments on the proposal will be discussed by the subcommittee, which will provide a revised proposal at the January 2011 teleconference of the SAB and a final version for consideration and approval at the Spring 2011 meeting.

Discussion

Jim Sanchirico asked for clarification on the genesis of this Subcommittee. He pointed out that the existing working groups were supported by NOAA to address issues on which the SAB doesn't have a lot of expertise. He was concerned if the SAB and NOAA were going to change this strategy and questioned whether the SAB needed to create from scratch working group to address the four goals. He prefers the process in which NOAA asks for a group to address a concern.

Frank Kudrna pointed out that although it is usually NOAA that proposes a working group, sometimes the SAB has also proposed a working group. The Subcommittee tried to address two concepts in its proposal - task forces, or ad hoc working groups, that are limited in scope with a defined process and standing working groups that exist without termination date. The primary issue in this proposal is for a change in standing working groups that could be assigned topics over time.

Jeremy Jackson stated that the SAB should believe in the strategic plan and goals and that NOAA wants to hear from the SAB on these topics. This reorganization in the SAB may be part of the overall growing pains on adapting to the strategic plan for the whole organization.

Jane Lubchenco said regardless of how the groups are structured, the SAB should keep two goals in mind. There are topics on which NOAA asks advice from the SAB and there are topics the SAB wants to address that the agency might not have considered. Whatever structure is developed should be sensitive to both.

Jerry Schubel said the feeling of committee was that the proposed structure does accommodate both. It would allow the SAB to make better use of task forces with shorter duration and assigned tasks that are then disestablished. However Frank Kudrna pointed out that, under current process, there is a time period before an *ad hoc* working group gets going. Leaving these groups more-or-less in place expedites the ability of the working groups to deal with additional topics in the future.

Mary Glackin said moving forward on this realignment will need to be considered in light of other NOAA federal advisory committees and what they can provide as well. In addition, the Environmental Information Services Working Group has been an experiment. The agency heard strongly from private weather sector that it wanted to give NOAA advice on weather and science services. The agreement was that the EISWG would focus on this initially then the SAB and

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NOAA would reassess its work. At that point, the EISWG might be asked to expand beyond just weather. This is another driver for this working group in addition to the NGSP.

Ms. Glackin also pointed out that, in addition to the four goals, the NGSP contains enterprise objectives such as research that should also be considered in this structure. She is concerned that nothing is lost from consideration under a new structure. The SAB is a body that can help NOAA look across whatever stove pipes might exist so the SAB does not want to stovepipe its own working groups. She thinks the SAB should further consider the enterprise objectives in its structure. In addition to research, observing systems and modeling are other topics found under the enterprise objective – e.g. hydrological, sociological, and economic models linking together. This might be lost under the proposed goal-oriented working groups and not covered well by a task force or ad hoc working group. She is not convinced that the four goals are the best way to organize the working groups.

Jerry Schubel suggested that a temporary task force might provide advice on how to structure the best working group to address observing systems and modeling.

Mary Glackin said NOAA could work with the SAB to develop a list of challenge areas going forward. For example, there have been two working groups on social sciences but NOAA has not yet successfully integrated this into its structure. It is not clear where in the goals this idea is covered.

Jim Sanchirico had similar concerns. He saw climate adaptation and resilient coastal communities in separate goals and isn't sure how are those linked. It isn't clear that everything can be binned into one or the other in the social sciences, for example.

Frank Kudrna said process issues can be fixed fairly easily. On the structure side, however, everything does not fit neatly. The subcommittee is also concerned about how many standing working groups NOAA can support. These and other issues should be considered.

Thomas Zacharia recognized that proliferation of working groups does not serve NOAA. He is concerned about process for disestablishing working groups. He worries that there are a number of aspects of NOAA's science mission that cuts through any strategic plan. He raised the DAARWG as an example, which is involved with all the goals. It is important to preserve option to have working groups that support NOAA's mission where there are crosscutting elements. Ray Ban asked if Thomas was suggesting that crosscuts were a way of identifying standing working groups rather than the vertical goals. Dr. Zacharia replied that the crosscuts should not be the only standing working groups; there can be others but crosscuts should not be excluded.

Jeremy Jackson said he could not imagine crosscutting climate change and adaptation; it is interdisciplinary by definition. He pointed out that data management is a service while the goal is climate adaptation. He thinks the mission goals are not stovepipes at all but are fundamentally interdisciplinary. For this reason the proposed working group structure to support the goals would also be crosscutting.

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Jim Sanchirico said he is not just trying to be a defender of the status quo. But, for example, he wanted to consider where the ESMWG would fit under the new structure. Would it be broken up, with one piece in Healthy Oceans and one in the Resilient Coastal Communities goal? NOAA identified the need for a working group to deal with these interdisciplinary issues of ecosystems so this working group has NOAA support and has been very productive. Jeremy Jackson responded that he is also not suggesting that everything be changed but that he would like to see how the SAB can best be of help to NOAA in the context of the NGSP. Dr. Zacharia agreed that he does not want the working groups to operate as stovepipes. He thinks the goals are very broad and it would be difficult to have working groups that could address each one. He just thinks the SAB should have the capability to set up groups that address what the SAB and NOAA want. Dr. Jackson pointed out that there is a gap between social perception and the goals. The SAB could look at this through the resilient coastal communities working group, for example.

Frank Kudrna said it is clear that the SAB is not ready to resolve the question of how to organize its working groups yet. He suggested that members email further comments on the topic to Eric Barron after this meeting, by 31 December. The Working Group Subcommittee will have a conference call in January to consider these. He also asked for NOAA to provide input on which working groups it thinks are appropriate to disestablish.

Ray Ban noted that the proposal needs more discussion within this subcommittee. He asked Jeremy Jackson to be an addition to this subcommittee; Dr. Jackson agreed. Larry Robinson is the current NOAA point on this subcommittee. He asked for Larry to address NOAA's questions on subcommittees, if possible. If the SAB members want to make the structure more efficient and effective, they need to give it more thought.

Paul Sandifer asked the SAB, as it goes through this next iteration, to think about the overarching emphasis on strengthening science. All of the working groups that are organized should consider how NOAA can build its science base. Jerry Schubel said he agreed with strengthening science but is also concerned about how to provide this information to society. He wondered if there was a mechanism developed that can take advantage of NOAA's science to make decisions on, for example, sea level rise from case studies done.

Ray Ban asked Dr. Schubel if he was proposing to stand up an *ad hoc* working group to take the NOAA message to the next level – the relevancy of the agency in its broadest sense. The messaging needs to be better interpreted so the nation grasps the value proposition. Jerry agreed but said that it should also cover the development of tools and the need to work with local decision makers in developing them.

Ray Ban asked Jerry Schubel to outline the vision of the task force or *ad hoc* working group and what it should be. It only needs to be a few paragraphs to send around to SAB for discussion at the January SAB conference call. Jerry Schubel agreed to do this.

Action 1: The Science Advisory Board members will send additional comments on the SAB Working Group Subcommittee proposal to E. Barron and Subcommittee

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Action 2: The Science Advisory Board Working Group Subcommittee will develop a new proposal for discussion at the January 2011 SAB teleconference and revise for final discussion and decision at spring 2011 SAB meeting.

Action 3: NOAA will provide written input to the Science Advisory Board Working Group Subcommittee on various options for organizing SAB working groups.

Action 4: The Science Advisory Board will add Jeremy Jackson to the membership of the Working Group Subcommittee.

Action 5: Jerry Schubel will prepare a proposal for a new Science Advisory Board *ad hoc* working group on communicating the relevancy of NOAA for discussion at January 2011 teleconference.

The Future of NOAA Oceanic and Atmospheric Research

Craig McLean, Acting Assistant Administrator, NOAA OAR

Summary

The purpose of this presentation was to provide plans for the future of the Ocean and Atmospheric Research (OAR) Line Office in NOAA. The acting Assistant Administrator (AA) of OAR, Craig McLean, began by outlining some recent OAR preeminent research, including the following:

- Climate observations and modeling that set the stage for NOAA's climate service
- Hurricane track forecasts that yield 5-day forecasts as accurate today as 3-day forecasts were ten years ago
- Telepresence technology/*Okeanos Explorer* that brings the seafloor ashore
- Air quality research that has led to \$9 billion in savings and 64,000 jobs over ten years for the state of Texas
- NOAA best practices for lab reviews, scientific integrity, and project-level analysis

Mr. McLean pointed out that NOAA's grand scientific challenge is developing and applying holistic, integrated Earth system approaches to understand the processes that connect changes in the atmosphere, ocean, space, land surface, and cryosphere with ecosystems, organisms and humans over different scales. He added that there were seven major science needs for NOAA to meet this overarching grand challenge. These include:

- Knowledge of human behavior, societal values, and economics
- Interactions between atmospheric composition and climate
- Role of the oceans in climate and the effects of climate change on the ocean and coasts
- Role of ecosystem processes and biodiversity in sustaining ecosystem services and resilience
- Understanding of the water cycle to improve our ability to forecast
- Approaches to reduce environmental degradation, overfishing, and climate change

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- Atmosphere-ocean-land-biology and human observing systems, long-term data sets, and new observing technologies.

Mr. McLean said restructuring OAR will result in this line office having a NOAA-wide role via the OAR AA serving as Senior Advisor to the NOAA Chief Scientist as well as Deputy Chair of the NOAA Research Council. These roles will help OAR strengthen science and integrate research across the NOAA line office and external partners as they address these scientific challenges. OAR restructuring will place greater focus on transformative, innovative, and technological research and will allow OAR to pursue near-term opportunities, such as weather research for the future, ocean acidification, resilient coastal communities, Gulf of Mexico long-term research and sustainability of biodiversity and ecosystem services. Mr. McLean emphasized that a strong, centralized research capability in NOAA is essential for the development of new technologies and improved services for the Nation.

Mr. McLean further stated that OAR has articulated NOAA's long-term research vision and served as its "innovation engine." Today OAR is a place of innovation, incubation and integration. Innovation within OAR enables discovery, development, and deployment of science. OAR is where transformational, long-term research is identified and incubated. OAR integrates by bridging research activities across NOAA and its external partners.

As an example of where OAR is heading in the future, Mr. McLean said the line office would move towards development of a NOAA-wide ecosystem research agenda using the Great Lakes prototype. This will include: 1) conducting long-term research and monitoring; 2) forecasting ecosystem functions and services; 3) examining how human communities are affected by and respond to environmental change; and 4) investigating unexplored areas.

He ended by requesting feedback from the SAB. He asked the SAB to suggest how NOAA can best engage the external community to inform its research agenda and optimize its research portfolio. He also asked if the SAB can recommend the best examples of research organizations for benchmarking in the future.

Discussion

Dr Frank Kudrna said Mr. McLean had used the word a "conversation" when talking about managing its portfolio. Dr. Kudrna asked if this meant that NOAA had to convince Congress about its proposed budget. Mr. McLean's responded that there was a need to discuss and then come to a consensus on OAR's future; Dr. Lubchenco has the authorization. Mr. Kudrna commented that the Great Lakes is a pending issue but there was no mention of invasive species such as the Asian carp and he wanted to know if there has been any discussion on this topic. Mr. McLean said OAR has not had the resources to engage on that specific topic. This is an example of ecosystem forecasting, however. Scientists would like to be able to forecast where they would move but are currently not at that level of understanding.

Ray Ban asked how NOAA currently engages with the external community to inform them of its research agenda. Mr. McLean said they have periodic meetings with Cooperative Institutes (CIs), the SAB, and are looking for methods to engage more broadly with the scientific community at large. He agreed that OAR needs to have more interactions, such as the NOAA-

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wide science workshop (held in April 2010), with the broader community. There is a plan to have quarterly communication calls with extramural partners.

Mary Glackin said she endorsed what Mr. McLean had said and added that there will be workshops (based on topics identified in the science workshop) that involve the extramural community and NOAA will inform the SAB of these dates. She also said that the Five-Year Research Plan will be another way to focus interactions with the extramural community. Mr. Ban asked if this would happen on the weather side and if University Corporation for Atmospheric Research (UCAR) could represent a consortium on that topic. Ms. Glackin said UCAR was a key partner with NOAA; other partnerships were with Sea Grant and CIs. There is need, however, to equally reach out farther than the traditional partners. Mr. McLean agreed and added that any advice from the SAB would be appreciated. Jack Hayes, AA for the National Weather Service, pointed out that there are strong partnerships on the Weather Research and Forecasting (WRF) Model with other agencies and academic community including UCAR.

Mr. Ban said “Knowledge of human behavior, societal values, and economics,” which is one of the seven major science needs mentioned by Mr. McLean, was a social science driver and not physical. Mr. Mclean agreed and said that the physical scientists identified these needs so it was a demonstration of how important this idea has become. Paul Sandifer said NOAA tried to have strong representation at the science workshop in April from the small contingent of social scientists in NOAA. The identified social science needs were identified by every workshop breakout group. This is recognition that physical scientists cannot do their jobs without understanding how people understand and use the NOAA science. Mr. Ban said this helps the agency to understand needs and also important at front end of the value proposition as it creates a common language for the agency to be recognized by the external community.

Mr. Ban asked for comments from the SAB members on the formal input requested by OAR. Mr. McLean said he wanted to reiterate his earlier comments on the need for the SAB to address strong science and also for the SAB to freely comment and provide any ideas.

Action 5: Jerry Schubel will prepare a proposal for a new Science Advisory Board *ad hoc* working group on communicating the relevancy of NOAA for discussion at January 2011 teleconference.

Action 6: NOAA will include Science Advisory Board and SAB working group members in consultation and as participants as it moves forward with workshops on the grand scientific challenges (from NOAA Science Workshop, April 2010).

Overview, Background and Introduction to the Climate Service, Including Responses to the Five Reviews and Reports from the SAB Climate Working Group

Chester Koblinsky, Director, NOAA Climate Program Office

Summary

The purpose of the presentation was to provide a background and introduction to the Climate

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Service and provide responses to the reviews and reports provided to NOAA by the SAB and its Climate Working Group.

Dr. Chet Koblinsky started by explaining that NOAA had requested a series of reviews that covered three programs as well as the strategic plan for a National Climate Service review. These reviews were all set up and run by the CWG over the past three years. NOAA is now responding to the recommendations from those reviews. He summarized the reviews as follows.

Climate Observations and Analysis Program Review

The general finding from the Climate Observations and Analysis Program is that there is considerable excellent work going on in NOAA. The activities in the COA program are providing many valuable climate observational products and services to the nation that should be continued. The essential work of collecting observations and creating climate records, assuring their quality, documenting metadata, and making them accessible to the climate research, applications research, and decision-making communities is of great importance and should receive a high priority in the NOAA Climate Goal. However, the program was not developed with a particular objective, so that it lacks an overall coherent theme and a strategic plan.

The Review Panel identified several overarching strategic issues that affect the management of the COA Program and the NOAA Climate Goal in general. These include the need for a shared vision that:

- provides a coherent, integrated structure for COA activities and services, in essence a strategic plan;
- improves the functioning of the NOAA internal process that integrates program planning, budget formulation and execution, and processes used to determine priorities when requested and appropriated budgets differ;
- advances the approach to engaging partners from the external communities in COA and Climate efforts; and
- furthers the integration of the many efforts under COA with one another and other activities under the Climate Goal.

The Review Panel suggested that if a Climate Service were a distinct line of NOAA then it would ease many of the perceived management difficulties.

Dr. Koblinsky said NOAA climate services had done several things to respond to this report, such as proposing a separate Climate Service line office within NOAA, establishing an office for climate observations in the proposed Service, co-locating global climate observing program (ocean, atmosphere, and Arctic) in a new Climate Observation Division with the NOAA Integrated Ocean Observing System assisting to improve coordination, and proposing expansion of the greenhouse gas observation network among many others. The climate program office is also addressing problems imposed by the NOAA program planning budget and execution system (POPBES) process by working with the new integrated budget logic model process to improve overall coordination. NOAA climate services are currently work on several additional items, including developing a strategic framework for a NOAA climate observing system, adopting a

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“climate information system” approach, and establishing synergies/interrelationships among observing components to aid prioritization. They have yet to work on enhancing ocean observing system (deep-diving Argo, additional Ocean Reference Stations, biogeochemical sensors), conducting a Strengths, Weakness, Opportunity and Threat analysis, and committing a fixed fraction of program funds to peer-reviewed extramural funding, and maintaining this funding commitment.

Climate Research and Modeling Review

The Review Panel for this program concluded that Climate Research and Modeling Program is producing important, useful, and interesting research that represents a major contribution to the extremely important and now highly-visible, world-wide enterprise of climate research. General findings from this report were that NOAA scientists have made many world-class contributions to the scientific investigation of the Earth’s climate and global change and NOAA’s superb contributions to recent international assessments are particularly noteworthy. Additionally, NOAA’s provision of information on climate variability and the impacts of climate variability on society were commended. A key challenge for the future is to improve the overall design and cooperative interactions of the many institutional components involved in the CRM Program.

Dr. Koblinsky said strategic planning was obviously required to meet this challenge. He expanded his point by saying that CRM must develop a comprehensive and in-depth Strategic Plan that defines its vision, mission, goals, and objectives, and lays out clearly the roles and required interactions of the numerous laboratories, centers, institutes and grant programs engaged in CRM-related activities. In terms of Strategic planning and management, NOAA has developed a Next Generation Strategic Plan with a goal to support climate adaptation and mitigation. A more detailed scientific and service strategy is provided in the Climate Services Vision and Strategic Framework. For financial management there is new budgeting, reporting and incentive mechanisms that have been developed through the new NOAA budget process. Dr Koblinsky also stated that they have worked on a balanced research portfolio. What is yet to be done within this program is working on understanding roles of greenhouse gases, as well as work on expanding, improving and implementing proposed modeling on decadal-scale climate models, Earth System Modeling. Work in progress includes multi-agency services and partnership development and also development of approaches to customer identification. The Climate Research and Modeling Program has not done all the strategic planning recommended for scientific as well as management goals.

Climate Information Products and Applications Review

The Review Panel for this aspect of climate services was generally impressed by the NOAA work in many respects. However, the Panel found that both the level and the nature of the existing NOAA efforts fall far short of the national need for climate services. The Panel noted that the landscape for these products and applications is undergoing rapid change as the Nation begins to recognize the importance of climate services in addressing the issues of climate adaptation and mitigation. It is expected that these societal needs will lead to the establishment of a National Climate Service. Within this emerging context, therefore, the Panel believes a new course should be charted for CIPA.

The Review Panel recommended that NOAA develop a strategic plan and framework for its climate information products, applications, and related services. It was also recommended that NOAA give highest priority to scaling up the level of its effort to match the growing scope and accelerating pace of societal needs. It also noted that NOAA should strive to be less insular, more outward-looking, and do far more to partner and collaborate. So far, NOAA has developed a vision and strategic framework, including an Integrated Service Development and Decision Support (ISDDS) core capability for climate services to ensure the scientific underpinning of the CS information, data, products and services thus making them credible, timely and relevant. They have enhanced regional coordination and development with appointment of six Regional Climate Service Directors at the NWS Regional Forecast Centers and completed a review by the National Academy of Public Administration on organizational options, emphasizing effectiveness and efficiency. A Memorandum of Understanding between the Department of Commerce and the Department of Interior focused on regional climate activities has also been signed. Work in progress for this program includes the development of products and services for societal challenges, conducting of regional inventories of capabilities, and development of outcome based performance measures with clearly identified annual deliverables. There is also the continuation of the development of the Climate.Gov web portal to make it operational and expand its scope to include other federal agencies.

Review of the NOAA Strategic Plan for a National Climate Service

The final review that Dr. Koblinsky talked about was the NOAA Strategic Plan for a National Climate Service. He said the primary recommendation from the *Climate Services External Review Report* (July 15, 2008) was “that NOAA lead an effort, with its partners, to compare and contrast specific national options for the development of climate services.” The report called for the creation of a Coordinating Committee and four Tiger Teams to explore the pros and cons of four National Climate Service organizational options. The Coordinating Committee developed a final report, *Options for Developing a National Climate Service* (aka the Barron Report), which provides NOAA with recommendations related to the vision, mission, and key attributes of a successful National Climate Service. He added that The Coordinating Committee was not charged with making specific recommendations about implementation. Five Key Implementation Conclusions were identified as:

- Internal reorganization of NOAA that enables greater connectivity of weather and climate functions is a necessary step for success
- Each federal agency needs to collaboratively define its role and level of commitment in an National Climate Service and there needs to be a lead federal entity
- Success of a National Climate Service requires recognized, clear, authoritative, responsible leadership within the Federal System at the highest level possible
- A national climate service enterprise requires a defined, independent budget large enough to influence the direction of the service and achieve its mission
- A national climate service enterprise requires an interface best described by a federated structure (i.e., non-profit or federation) because it has a stronger connection to users and the research community

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The Tiger Teams analyzed four organizational options:

- A national climate service federation that would determine how to deliver climate services to the nation;
- A non-profit corporation with federal sponsorship;
- A national climate service with NOAA as the lead agency with specifically defined partners; and
- A weather and climate service within NOAA developed from an expanded and improved National Weather Service.

Dr Koblinsky said that NOAA believes the first two options could support the needed climate service activities and is prepared to work with OSTP on its interagency review of climate services. Elements of each of the last two arrangements would enable NOAA to assemble a climate service that fulfills the attributes described in the CWG's reports. Dr Koblinsky gave a general update of progress. He said that NOAA has sponsored the America's Climate Choices Study performed by the National Academies of Sciences. As mentioned earlier, NOAA has sponsored a review by the National Academy of Public Administration (NAPA) of NOAA's proposed organizational changes for structuring a climate service (completed on September 13, 2010). Dr. Koblinsky also mentioned that an Announcement was made on February 8, 2010 by the Department of Commerce (DOC) and NOAA on the intent to create a NOAA Climate Service line office. He also mentioned that NOAA has prepared an agency reorganization plan for a Climate Service.

Dr Koblinsky ended by giving a summary of the recommendations, which are:

Improve internal budget and planning processes

- Develop a comprehensive strategic framework for climate services
 - Establish and promote internal and external partnerships
 - Provide meaningful methods to evaluate progress and measure performance
 - Promote better integration among climate activities
 - Engage stakeholders and incorporate user feedback
 - improve understanding of NOAA capabilities and assets
- Create a separate Climate Service line office within NOAA to ease many of the perceived management difficulties

Discussion

Dr. Tony Busalacchi, Chair of the CWG, said the CWG was appreciative of NOAA's responsiveness. One of the concerns the CWG sees is the issue of integration and prioritization. He said all areas had heritage of a research but the challenge would be in transitioning from research programs to service delivery. He said that the manner in which reviews were conducted was an NRC study based. There was an external chair and external experts together mixed with CWG members. He stated the CWG supportive of the change to adaptation and service aspect in terms of reference. He added that the SAB should look at some interim reporting as there is a time lag between meetings and when the reports sent to NOAA.

Mary Glackin noted that NOAA needs advice on performance measures rather than on critiquing and could use help in identifying these for the climate service. Tony Busalacchi responded

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saying that performance measures could be an issue for a working group because some outside expertise in this area may be needed. It may be useful to use the NRC model of reviews or a topical forum to expand expertise. Tom Karl said science connected to performance measure is a way to make sure NOAA has relevance. Dr Busalacchi said there could be collaboration between CWG and EISWG on performance measures.

Jane Lubchenco thanked the large number of people involved these reviews. She said even though all products have not been implemented, NOAA had benefitted from this thoughtful input. Dr Busalacchi said there were over 100 people involved in the reviews and that communicating back this appreciation is a good idea.

Cynthia Decker explained the process for the responses. She said the SAB members will have an opportunity to review the written responses to the reviews and will allow the CWG members to review them as well. Comments will be collected and provided to NOAA for revising the responses after which NOAA will formally transmit the final response reports to the SAB Chair.

Action 8: The Science Advisory Board will review NOAA Responses to Climate Working Group products and seek comments from the CWG members as well. Comments will be collated and sent to NOAA.

Action 9: NOAA will revise Responses to Climate Working Group products as per Science Advisory Board and CWG comments and as appropriate and will transmit final versions to the SAB

Report on the Climate Service Study by the National Academy of Public Administration *Michael Jackson, Chair, NAPA Panel and President, Firebreak Partners, LLC*

Summary

The purpose of this presentation was to present the result of the study done by the National Academy of Public Administration on the formation of a Climate Service line office within NOAA. Michael Jackson was the Chair of the Panel that conducted the study. The National Academy of Public Administration (NAPA) is a Congressionally-chartered public agency of elected Fellows who provide advice on a variety of topics. Eight of ten fellows selected for this panel were subject matter experts in climate.

Dr. Jackson said NOAA was very cooperative in working with NAPA on the study. He said the people in NOAA have a passion about what they are doing. He noted that this is a growing area of importance for the nation and globe and that the work of NOAA is crucial. He said the members of the NAPA Panel talked to a lot of people and read reports produced by the SAB and CWG in addition to others at federal, state and private levels. NAPA agreed with the Administration proposal to create a climate service within NOAA but also thought there should be work across the federal government to ensure adequate integration and focus for this growing area. This will ensure that the government is provided with adequate resources and remain focused on the mission.

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Dr. Jackson said greater clarity was needed on strategic planning and policy on climate services. The Panel's recommendation was that these efforts need to increase greatly. He said it is very difficult for the government to operate without a lead agency on this topic; the President needs to know who to turn to for science. The NAPA Panel thought the climate debate was too politicized and that NOAA's involvement would bring credibility and impartiality on this topic. The key decision makers needed a tighter focus on climate issues and a place to go for science advice.

The panel held that the basic structural proposal for NCS was solid because it is focused on science and research. One change suggested by the panel was inclusion of the National Weather Service National Centers for Environmental Prediction Climate Prediction Center as a core part of the Service.

Dr. Jackson went on to discuss the strategy for the early years of the NCS. He said managing any organizational change was difficult so the Panel suggested that NOAA should not focus on the approval process but on how to operate once approved. He said NOAA could look at the start-up of new agencies, such as the Transportation Security Agency (TSA) and the Department of Homeland Security (DHS), for lessons learned. The panel recommended that NOAA focus on structure, team and the process to build the climate service. The NCS should have a transitional leader to implement the changes and a flat management team. The panel discussed how to make the organization work and concluded that it would be difficult unless the core leadership team in Washington wanted to make this work. The panel also suggested each of the key positions be competed once the NCS is established.

Dr Jackson said the organization should be bold in establishing long-term goals but should be cautious when setting expectations for the community. It is important to clarify what can be delivered in the near term and any set of expectations must be managed well. He said not all end-users are equally important so they will need to identify critical services and users. NAPA's view of the NOAA budget for the climate program is that it is inadequate to meet the proposed long term goals. This will be a fundamental challenge where there are high expectations and great ideas that cannot be realized.

The NAPA Panel suggested that If NOAA is recognized by the Administration as the center for research and services related to climate, other agencies will follow and partner. The NAPA panel believed there must be lead agency first and did not think all the other agencies should be part of NCS. The Panel also suggested that NOAA could bring detailees for expertise needed on an interim basis. It was the panel's belief that If NOAA is a center of activity, it can pull resources from the private sector and other federal agencies to create interconnectivity.

Discussion

Frank Kudrna said general public could identify with TSA and DHS because of terrorist threat but this was not the same for climate. He asked if there was emphasis on engagement training and service products identified for Congress. Dr Jackson responded saying Congress likes to be a broker because the members like to connect with community service. It is important for them

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to put together agency expertise with a problem that their constituency has for service delivery. This is how NOAA should approach Congress.

Heidi Cullen commented that the creation of the leadership team at DHS seemed to be a business advisory team. Dr. Jackson agreed saying TSA also hired those kinds of people as a way to provide different views; this helped to change the culture of the organization. He said there was need to recruit from other places in order to “expand the gene pool.”

Ray Ban asked what NAPA thought was the most vulnerable part of the plan. Dr. Jackson responded that the recent election results made it a degree more complicated to get launched. It may take more work to get this through Congress and it will be necessary for the President and his Administration to make it a priority in order for it happen. It’s important that the Department of Commerce leadership is already committed to it. Secondly, the start-up team and change management may be difficult as there will be resistance from people. It will be necessary to focus a lot of effort on the change management process and persuasion.

Dr Lubchenco thanked Dr. Jackson and his team for a very rigorous and helpful report. . She thought the report was very helpful because there was great value added. The NAPA team highlighted the essential elements for success such as paying attention to change management and recruiting new talent. Dr Lubchenco said it was important to have an independent voice saying the nation needed a climate program.

Strategic Framework for the Climate Service and the Way Forward - Tom Karl, Director, NOAA NESDIS National Climatic Data Center, Mary Glackin, Deputy Under Secretary of Commerce for Oceans and Atmosphere

Thomas Karl gave a background of the new Climate Service office. This office would create a single office for climate science and would thus be more organized to respond to the needs of users. Dr Karl said significant progress had been made. This included hiring regional climate service directors: completion of early activities and National Academy of Public Administration Study requested by Congress; development of draft programming package; and vision and strategic framework document. Dr Karl shared that the vision and mission statements of the new Climate Service Office were consistent with NOAA’s Next Generation Strategic Plan (NGSP).

He discussed the Climate Service core capabilities. He said many questions had been raised by both the private and public sector regarding issues such climate-related information for numerous sectors such as energy, transportation, human health, water resources, climate extremes, ocean productivity, and sea level rise in the context of climate variability and change. The new Climate Service’ core capabilities address these societal concerns. The core capabilities have four activities which are:

- Integrated Service Development and Decision Support
- Observing Systems, Data Stewardship and Climate Monitoring
- Predictions and Projections
- Understanding

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He added that science should be connected to decision making to ensure the most effective synergy between climate research and services. He noted that there was concern about the budget balance between research and services and therefore it was important to look at both long and short term investments. .

Dr. Karl said that they work with many partners, which include international, federal, state and local, non-governmental organizations (NGOs) and also the private sector. Sixty percent of funding goes to external partners, especially international.

Dr Karl said NOAA provides basic climate services to different sectors which heavily rely on climate services, for example, agriculture, energy, health and transportation. He stated that the initial priorities to meet societal challenges were in the areas of sustainability of Marine Ecosystems, Coasts and Climate Resilience, Climate Impacts on Water Resources and Changes in Extremes of Weather and Climate. Dr Karl mentioned that to meet these societal challenges, the Climate Service will be heavily dependent on other line offices such as National Ocean Service (NOS) for issues such sea level rise. Dr Karl provided examples of specific services and activities that the Climate Service can provide to meet societal challenges. He said with respect to the marine environment, local residents appreciate the value of understanding regional climate change within a context of global change has both spatial and temporal richness that projects onto patterns of climate change that affect habit for example. . With the energy sector, he said a number of states have laws that require energy usage be linked to climatological normals, so it is important to get these right and understood how dynamic that are turning out to be. . The energy industry and consumers need to know if the climatology is going to be changing. He highlighted some of the activities that the Climate Service is doing regarding communication and education. Dr. Karl said the goal for the Climate Portal was to be a one-stop-shop for NOAA's climate information. He said all NOAA line offices should improve access to data and integrate climate data. He also mentioned the Summer Institute on Climate Change which will be hosted by NOAA's Cooperative Institute for Climate and Satellites which will be held in Asheville North Carolina in June-July, 2011 (and since has been cancelled due to the continuing resolution).

In the strategic plan, assessments are very important. Thus, Climate Services will engage in three types of assessments:

- National and international climate science assessments
- Problem-focused climate science assessments
- Needs assessments

He said these assessments were important to the public and must be timely because they affect decision making. He added that these assessments are not valuable if they are not credible and if they are to be credible they need more than internal review. They will often need to meet criteria for influential and highly influential reports.

Dr Karl spoke about the NAPA recommendations and proposals which included administration, organizational and implementation. He talked about the feedback received on the Strategic Framework. The feedback included

Organization:

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- Change the name from NOAA Climate Service to the National Climate Service
- Reconsider the exclusion of the NWS Climate Prediction Center, and OAR AOML, PMEL
- Consider a core capability around “Predictions and Projections”
- Revisit the fifth societal challenge
- Emphasize the importance of Federal interagency partnerships, relationship to USGCRP

Focus:

- Role and importance of basic research and academia
- Prioritization: Balance long versus short term, user-driven versus NOAA-driven
- Increase focus on and partnership with socio-economic sciences
- Importance of private sector engagement
- Increase specificity and detail, especially regarding delivery
- More focus on downscaling, seasonal prediction, regional & state-level services
- Better balance climate “variability” and “change”

Dr. Karl ended by stating the next steps for the Climate Service. He said the next steps would be to finalize the vision and strategic framework document, engage congress on the reprogramming package and also pending approval, implement the Climate Service. He emphasized partnerships because the climate services cannot be done in a vacuum.

Discussion

Heidi Cullen asked if the name of the organization would be The Climate Service or the Climate Service. Tom Karl said it would be “the Climate Service with a small “t”.

Jane Lubchenco asked that of services that the Climate Service anticipates providing, what fraction were predictions and projections as opposed to correlations/analyses of past trends. She also stated that the hurricane outlook for Atlantic was in the latter category and asked how much of the projections and predictions are in each of two categories. Dr Karl responded that at the longer time scales, predictions are first principles but in the in shorter time scales projections are statistically based. He added that as predictability is improved, one can get a good idea of, for example, what El Nino can do.

Dr. Lubchenco clarified that the reason why she was asking was for communication purposes. She said these would affect messages when giving the number of analyses based on trend analysis. She asked a second question which was directed at SAB members. She said that many of the SAB members were involved in organizations related to the provision of climate services and wanted to know what they think NOAA should focus on and what opportunities for partnerships they may have identified.

Jeremy Jackson said people are fundamentally suspicious of models. He said one of the things NOAA could do to sell climate services was to compile a list of examples that emphasize what NOAA does.

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Peter Kareiva said in terms of partnerships Cisco and Google could be good because they would provide great visualizations. He added that there was need for local information so that it can be more useful.

Jerry Schubel said as many as 250 million people visit informal science institutions each year because of their interests in science. He said this provided an opportunity to reach many people. He also noted that it was reassuring to have the reviews by NAPA and it would be useful to focus on just a few of them.

Frank Kudrna said Dr Karl's presentation hit on a number of applications and tools. He said he would begin a presentation with the applications and tools and then all the details later. He said engineers are required to do continuing education each year and if NOAA could provide this information this would make for a large cadre of users and supporters.

Ray Ban said the private industry had already undertaken efforts to look at climate products and services and thus there must be some overlap. He asked if there had been any interactions to avoid conflict. He suggested that perhaps the Climate Working Group (CWG) and Environmental Information Services Working Group (EISWG) could help by creating a task force that would explore the private industry for climate services and how they could better coordinate with NOAA. Dr Karl said the comments were excellent points and what NOAA has done so far focused on specific weather and climate forums, but a sustained activity would be welcome. Ms. Mary Glackin added that NOAA may think of engaging the private sector in leveraging a national assessment.

Dr. Schubel said the problem will be how to classify products and services as they need to be bundled in a way that they hold together. Dr. Lubchenco asked him to elaborate. Dr Schubel said, for example, in Colorado people were impressed with products but the products were all over the landscape. People must be able to find products quickly. Dr Lubchenco asked if there were obvious bins. Dr Schubel said he would give it some thought.

Heidi Cullen said this could be a charge to a SAB communications task force. Dr Schubel said in making the decision tools, it is necessary to engage decision-makers to provide products and services people will use. Mr. Ban agreed but that the entire relevance of the climate service shouldn't be tasked to the communications group; the latter needs to be much broader in its outlook.

Paul Doremus said they have started a product and service taxonomy in the agency. Dr Karl said the problem was that NOAA did not have all the capability requested internally on the communications side, and thus will need to draw from outside the agency.

Mr. Ban asked about engaging Congress on reprogramming package and how will that be structured and if NOAA will engage the broader community. Ms. Glackin said NOAA had been working with appropriations and authorization committees. NAPA has been to the Hill, communicating its findings. Secretary Locke had also hosted a roundtable on climate services and that information was provided to the Hill. She said NOAA's ability to communicate will be important as the agency moves forward with the climate service.

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Mr. Ban asked if NOAA had thought about engaging industry. Ms Glackin answered that NOAA had engaged consumers but could do more. She added that NOAA needed to leverage service providers. Mr. Ban stated that it would be good to have a portfolio on initiatives. He added that there were many people on the Climate Working Group (CWG) and on the Environmental Information Services Working Group (EISWG) who have thought through end-user opportunities. Tony Busalacchi further suggested the NAS Board on Atmospheric Sciences and Climate (BASC) has hosted a forum to examine public-private partnerships in weather services. They could do something similar in climate services as well.

Eve Gruntfest asked why NOAA's name was removed from the climate service because removing the name takes away NOAA visibility. The response was that the agency had hoped that the service would serve the nation as the National Weather Service does and that a NOAA service could appear by some to only serve NOAA.

Action 10: R. Ban, H. Cullen will work with the Climate and Environmental Information Services Working Groups to form an ad hoc team to provide input to the Science Advisory Board on engagement of private providers to the climate enterprise.

Public Comments

There were no public comments provided at the meeting.

Other Discussions

During the time for public comments, because there were none, Mr. Ban took the opportunity to raise the issue to the members of having scientific talks at the meeting. This was based on an idea from Dr. Jim Sanchirico. Dr. Jeremy Jackson agreed this would be a good idea. The members discussed how a decision would be reached on whom to invite for each meeting. They agreed that NOAA could generate a list of topics and speakers and select an appropriate one for each meeting. The members agreed that one talk of not more than 45 minutes (30 minutes for the presentation, 15 minutes for discussion) would be optimal.

Action 11: NOAA will work with the Science Advisory Board to set up a NOAA science presentation at each SAB in-person meeting.

Adjourn

The meeting adjourned for the day at 5:30 PM

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Chair of the SAB, Ray Ban opened the meeting. Dr. Cynthia Decker, Executive Director and DFO for the SAB reviewed the agenda for the day.

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Education Overview: A Presentation to the NOAA SAB

Louisa Koch, Director NOAA Office of Education

Summary

The purpose of the presentation was to share with the SAB the current status of NOAA's education programs and to summarize the results of a recent study on NOAA education conducted by the National Research Council (NRC). NOAA's Education Director, Louisa Koch started off by saying that she was very proud of the NOAA's educators. She said they have built a community and come to a consensus on NOAA's needs and mission in engagement. She also thanked SAB member, Dr. Jerry Schubel and Frank Kudrna for helping with the development of this.

Ms Koch said education falls within the engagement enterprise in the Next Generation Strategic Plan. (NGSP) She said she was very happy with the new NOAA mission statement included in the NGSP because it includes sharing information with others. Ms Koch said the issue for her office was how they could bring together NOAA's education assets to more coherently support NOAA's engagement objective.

Ms Koch said as part of America Competes, NOAA's Education Council had written a strategic plan with the following two goals:

- An environmentally-literate public supported by a continuum of lifelong formal and informal education and outreach opportunities in ocean, coastal, Great Lakes, weather and climate sciences.
- A future workforce, reflecting the diversity of the Nation, skilled in science, technology, engineering, mathematics, and other disciplines critical to NOAA's mission.

Ms Koch highlighted some of the programs that support NOAA. She said NOAA facilitates education across the country because every field office has the capability to go into the community and educate.

Ms Koch next discussed the National Research Council (NRC) report. The Committee for the Review of the NOAA Education Program was established by the NRC to examine the existing education portfolio and review the education strategic plan mandated by the America COMPETES Act. The committee was specifically asked to comment on:

- NOAA's role in education,
- its education goals and outcomes,
- the composition and management of its education portfolio,
- its education evaluation practice, and
- the impact of its education efforts

Key findings from this report were that NOAA has the legislative authority to engage in education and that NOAA has a role to support state and local education. The report also found

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that characteristics of NOAA make management of the education portfolio challenging. Other findings were that NOAA has created a large number of education programs with a small budget and NOAA education evaluations are limited in scope and quality and are uneven across the portfolio.

The NRC came up with several recommendations. The first recommendation was that NOAA should fulfill its role in education through its expertise, place-based assets, and partnerships. In order to adequately address the mismatch between its available resources and its ambitious education agenda, NOAA should better align and deploy its resources. This may require the termination of certain activities and programs that, based on appropriate evaluation, do not directly and effectively contribute to its education and stewardship goals. Within the constraints of NOAA's mandates in education, the agency should continually evaluate where it leads, collaborates, follows, or declines to participate in partnerships with others. These decisions should be guided by consideration of the agency's role, assets, resources, and priorities in education and the strengths and missions of other agencies, institutions, and organizations engaged in education.

Second, NOAA should address broadening participation as an important outcome of all program phases. NOAA education programs should formally address broadening participation of underrepresented groups as an important outcome through all phases, from the initial stages of planning through implementation and evaluation. The environmental literacy goal, in particular, should include outcomes related to reaching out to underserved and underrepresented communities.

Third, the NRC recommended that NOAA should develop a system to monitor and catalogue the portfolio as this would guide decisions about programs. Fourth, NOAA should continue to support improved evaluation practices and portfolio management. Finally, the NRC recommended that NOAA should draw on research and evaluation evidence to better support education practices.

Ms Koch said the next steps for NOAA education are:

- Improving partnerships with a focus on climate literacy, ocean policy and evaluation
- Leveraging the Educational Partnership Program with a focus on students and scientists, Fisheries and Weather Service.
- Expanding knowledge of NOAA's education portfolio with a focus on audience and regions
- Implementing a monitoring and evaluation framework with a focus on logic models and performance measures
- Being an early adopter of best practice with a focus on formal and informal education

Ms Koch ended by saying that her desired outcome from the presentation was to receive feedback from the SAB on efforts to bring together education assets to support NOAA's engagement objective.

Discussion

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Peter Kareiva asked if NOAA's the Office of Education invests in control groups or experimental metrics. Ms Koch's response was that NOAA's education programs have metrics, some of which are experimental. Some of NOAA's education programs have control groups but not randomly assigned control groups. NOAA educators are working with the North American Association for Environmental Education to develop benchmarks for environmental education and to assess best practices.

Dr. Kareiva said there is public support to have children and people in general connecting people with nature and wanted to know if NOAA Education was using that as a framing principle. Ms. Koch said that many of NOAA's education programs connect people with nature as a core part of their programs. For example, the NOAA Bay Watershed Education and Training (B-WET) Program involves students exploring their bays and watersheds. Educators with the National Estuarine Research Reserve System in Oregon were instrumental in that state's adoption of a No Child Left Inside Program.

Frank Kudrna said when Extension, Outreach and Education Working Group worked on the engagement report they were told that NOAA accepted the same definition of education as the Department of Agriculture. He asked if Ms Koch could give an update on the program with regards to NOAA education. Ms. Koch said that NOAA General Counsel has concluded that the America COMPETES statute supports educational activities including training, extension, communications and outreach. She said the Communications Office has embraced engagement and the Gulf of Mexico engagement pilot recommended in the SAB report has been implemented.

Thomas Zacharia said he applauded this wonderful program. He noted that NOAA has a number of leadership vacancies, including the Climate Service. He thought education could be a leadership pipeline but that would need involvement in graduate education. Ms Koch said NOAA's largest education component is in undergraduate and graduate level and also Science, Technology, Engineering, and Mathematics (STEM) education. NOAA would like to make more progress in climate; the Corporative Institutes (CIs) are good partners for this. Ms Koch said she would like to see NOAA make a recommendation about what a climate degree should include and she has discussed this idea with the CIs. In terms of working with states, NOAA worked with some states on the Department of Education's Race to the Top proposals, although none of those were successful. NOAA educators have worked with the California educational curriculum and with the Oregon No Child Left Inside. NOAA has more capabilities in ocean states but is seeking more opportunities with inland states.

Jerry Schubel said progress on education programs under Ms Koch's leadership was remarkable. He said NOAA Day at the Aquarium of the Pacific was successful and could be expanded to other places and in time to encompass a weekend. He said science must be made more exciting to attract students not just through informal but also through formal education. He added that education should show kids that science is important and fun. Ms. Koch responded saying that NOAA has an important role to play because the agency brings science to life.

Craig McLean reminded people to look at best practices. He noted that the Sea Grant (SG) Fellowship distribution has changed from a ratio of 25% women and 75% men to 80% women and 20% men. Ms. Koch said Sea Grant has done a lot to attract women, but most of the

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program participants are Caucasian, thus there is need to focus on recruiting underrepresented minorities into the Knauss Fellows program.

Ray Ban wanted to know how to minimize duplication and leverage climate information into education. Ms Koch said that NOAA has one climate educator and limited capability overall. The NOAA educators promote integration through interagency efforts by leveraging efforts. Supply is so vastly inadequate relative to need so she is not concerned about duplication at this point.

NOAA Educational Partnership Program with Minority Serving Institutions Cooperative Science Centers

Audrey A. Trotman, Acting Director, NOAA Office of Education Educational Partnership Program; Reza Khanbilvardi, Director, NOAA Cooperative Center for Remote Sensing Science and Technology (CREST), The City University of New York/City College; Bradley G. Stevens, Distinguished Research Scientist, NOAA Living Marine Resources Cooperative Science Center (LMRCSC), University of Maryland Eastern Shore

Summary

The purpose of the presentation was to introduce the NOAA Cooperative Science Centers (CSCs) to the SAB by providing outcomes in education and outreach, research, and NOAA intellectual capacity created through the CSCs. The CSC directors also engaged the SAB members in discussion about the unique roles, leveraging mechanisms, and new opportunities for the CSCs and on-going CSC contributions to the NOAA mission.

Dr. Audrey Trotman led a set of presentations that included Dr. Reza Khanbilvardi and Dr. Bradley Stevens. Dr. Trotman said CSCs have been looking for ways to better leverage their NOAA mission-relevant capacity within NOAA. These programs have resulted in significant national impacts and have been key resources in developing NOAA capacity at minority-serving institutions (MSIs). There are five CSCs, each aligned with a specific NOAA Line Office. Each CSC is comprised of: (a) a lead Minority-Serving Institution that has an accredited doctoral degree program in at least one NOAA mission-relevant Science, Technology, Engineering, and Mathematics (STEM) discipline; and (b) partner institutions selected to enhance the capability of the MSI to discharge functions of the Center, prepare a well-trained and diverse next-generation workforce, and advance collaborative research in support of the NOAA mission. The five CSCs are:

- NOAA Center for Atmospheric Science (NCAS) at Howard University (10th Year)
- NOAA Cooperative Center for Remote Sensing Science and Technology (CREST) at City College of The City University of New York (10th Year)
- NOAA Environmental Cooperative Science Center (ECSC) at Florida A&M University (10th Year)
- NOAA Interdisciplinary Scientific Environmental Technology Cooperative Science Center (ISETCSC) at North Carolina A&T State University (5th Year)

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- NOAA Living Marine Resources Cooperative Science Center at the University of Maryland Eastern Shore (LMRCSC) (10th Year)

These CSCs have trained a total of 1,573 students with 833 graduated in NOAA mission related sciences. There have been 82 CSC-funded students hired by NOAA as of May, 2010 and there was significant impact on national statistics in NOAA mission fields. The CSCs produced 100% of African American Ph.D. graduates in Atmospheric Sciences (2008 NSF data); there were 506 collaborative research projects between Centers and NOAA scientists. All CSCs have increased workforce diversity at NOAA and other federal agencies through the number of graduates currently working at NOAA and mission-aligned agencies. All CSCs have also developed new courses in earth, physical, atmospheric, and environmental fields. Each CSC also has specific research goals and conduct collaborative research with NOAA scientists and laboratories. The ultimate strategic goal for each CSC is to educate and train a future workforce skilled in sciences critical to NOAA's mission and reflecting the diversity of the nation.

Each specific CSC's achievements were discussed. The presentation ended with a statement of the desired outcome for each one. Dr. Trotman said CSCs were playing a significant role in NOAA mission relevant areas and as such were seeking the SAB's engagement in leveraging, collaboration and advocacy.

The CSC presentation was jointly delivered by Dr. Trotman, Dr. Khanbilivardi and Dr. Stevens. They provided details of the history, goals, and outcomes, with specific accomplishments, from each of Centers.

Discussion

Mr. Ray Ban said he was impressed by the presentation. Dr. Jeremy Jackson asked if they had thought about training students not just for NOAA but also other universities. He said an example is that Scripps Institution of Oceanography program did not have a single minority Ph.D. student. He suggested having a post-graduate program to place students in other institutions. The response was that the CSC program is in a third round of competition and that includes a post-doctoral program, that is, each Center must have two post-doctoral positions. The CSC program would welcome further discussion about additional opportunities; it is producing more students than NOAA can accept thus they see more opportunities in the private sector. Dr. Reza Khanbilivardi said many doctoral students get many offers and sometimes go to academic institutions. There are schools and employers that know about the program and understand the quality of the graduates.

Dr. Thomas Zacharia said there are other opportunities at Oak Ridge National Laboratory. He said they currently have 500 post docs, 300 grad students doing Ph.Ds. He added that as long as students are doing research, the costs can be met. Dr. Reza Khanbilivardi said they would like to increase the awareness of the CSC program around the country to increase opportunities for the students.

Ms. Mary Glackin said that Dr. Lubchenco was very impressed with what this program is able to accomplish and applauded the results.

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NOAA Cooperative Institutes – Update

John Cortinas, Director, NOAA Cooperative Institute Program

Summary

The purpose of the presentation was to provide the SAB with information on NOAA's Cooperative Institute (CI) policy, value of CIs to NOAA, CI program FY2010 update, and role of the SAB in the CI policy and CI reviews.

Dr. John Cortinas started by outlining the overall NOAA CI policy. NOAA supports CIs to promote research, education, training and outreach aligned with NOAA's mission in addition to obtaining research capabilities that do not exist internally, and/or to expand research capacity in NOAA-related sciences. The CIs can be composed of one or more research institutions such as universities and non-profit research organizations. These institutions should be able to demonstrate outstanding research performance; have strong education programs with established graduate degree programs in NOAA-related sciences, and should provide significant coordination of resources among government and non-government partners.

The process for establishing and maintaining all new CI demands NOAA-wide involvement and NOAA Administrator approval. All official NOAA CIs are established with an open competition and peer review process. The initial award period is five years, with one non-competitive renewal up to five additional years at a funding level commensurate with the final rating of a peer review near the beginning of the fourth year. NOAA encourages collocation of federal and CI employees to foster collaborations. CI funding can be terminated prior to end of current award period for reasons that may include poor CI or fiscal management, inability to complete proposed research within the time proposed, and unavailability of NOAA funding for prospective research area(s) pursued by the CI. Four CIs were awarded in 2010 – the Joint Institute for the Study of the Atmosphere and Ocean (JISAO), the Cooperative Institute for Marine and Atmospheric Studies (CIMAS), the Cooperative Institute for Meteorological Satellite Studies (CIMSS), and the Cooperative Institute for Marine Ecosystems and Climate (CIMEC). The Cooperative Institutes for Marine Resource Studies (CIMRS) and Mesoscale Meteorological Studies (CIMMS), and the Joint Institute for Marine and Atmospheric Science (JIMAR) will expire in 2011.

Dr. Cortinas provided a list of CIs, which are located all over the nation. He explained the relationship between the CIs and NOAA and the benefits to NOAA. One example is that CIs have familiarity with local and regional issues. Consequently, this gives NOAA knowledge of regional-to-national emerging environmental issues. CIs can also provide rapid research responses to environmental events. A recent good example is the Deepwater Horizon incident where the CI for Ocean Exploration and Research Technology (CIOERT) sampled corals in the eastern Gulf of Mexico for presence of oil. Other CIs were also involved in related activities. CIs train a future scientific workforce via both undergraduate and graduate students participating in CI activities. CIs also increase knowledge and foster collaboration. In 2010 there were 1,648

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peer-reviewed publications by CI employees. CIs provide a pipeline to NOAA employment as well; in 2010 there were ten new NOAA employees from CIs.

Dr. Cortinas stated that funding for CI has increased from 2007 and is currently at about \$175 million. He said fifty percent of the funding is salary support for scientists and research associates.

Dr. Cortinas said the SAB had a direct and indirect role with the CIs. The direct role is that “the SAB is the official reviewing authority that approves science reviewers and makes recommendations(s) regarding the quality of science and management of the CI to the Under Secretary and the responsible Line Office Assistant Administrator after the review.” They also provide recommendations for improvements to review process. The indirect SAB role is the provision of input into NOAA planning documents, including the Five-Year Research Plan and the 20-year Research Vision, which influence NOAA-supported research activities at CIs. The SAB also participates in review of proposals for new CIs.

The SAB conducts reviews and provides recommendations to NOAA Administrator and Line Office Assistant Administrator(s) in the fourth year of the initial five-year award. The NOAA Assistant Administrator (AA) requests review from the SAB. The lead line office (LO) provides reviewer recommendations and supports review team which typically comprises of five reviewers with panel chair from the SAB. The review occurs over two days and when complete the review panel Chair presents the report to SAB for approval and acceptance. The SAB provides final report to Under Secretary and requesting AA. The LO oversees implementation of recommendations.

The review rating will be used when considering renewal options. An Outstanding rating means the CI has consistently demonstrated superior achievement of all initially agreed goals, as well as evidence of an on-going resource commitment that enhances NOAA’s resources to support collaborative research. A Satisfactory rating denotes that the CI has achieved some or all of its agreed goals and has demonstrated acceptable performance. Its performance, however, is not considered Outstanding and/or the CI’s resource commitment provides a limited enhancement of NOAA’s resources. Finally an Unsatisfactory rating indicates that the CI has demonstrated a failure to achieve some or all of its agreed goals and its performance is unacceptable and/or the CI has also provided minimal resources to enhance NOAA’s resources to conduct collaborative research.

Recent reviews completed were the Northern Gulf Institute (NGI) (October 7-8, 2009) and the Cooperative Institute for Limnology and Ecosystem Research (CILER) (October 5-6, 2009). Upcoming reviews for 2011 include the Cooperative Institute for Alaska Research (CIFAR) and the Cooperative institute for Climate Science, Princeton (CICS-P) .

Dr. Cortinas concluded by saying that NOAA’s views are that CI policy and related activities have brought heightened awareness to CI activities and have resulted in more NOAA interaction with the CIs. The SAB reviews have been very valuable in providing recommendations that have led to improvements at the CI and NOAA. Additionally, the SAB involvement in CI competition reviews has been helpful in improving CI proposals. Dr. Cortinas said the desired

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outcome was increase knowledge of resources available to NOAA through the CI program to help make informed SAB recommendations to NOAA.

Discussion

Cynthia Decker mentioned that there will be two reviews of CIs in 2011 and that there is need for an SAB member to chair each of these. She also asked members to serve as reviewers for proposals for CI recompetitions.

Frank Kudrna complimented Dr. Cortinas and NOAA on progress. His concern was on the inability of the CIs to be recognized as NOAA-related. Dr. Cortinas said that the issue of using NOAA logos is a Department of Commerce (DoC) policy. The CIs are permitted to use the logo in their own presentations and when a NOAA person is involved. They are not allowed to use the NOAA logo on a website.

Craig McLean commended Dr. Cortinas for his outstanding work on CIs over many years. Mr. McLean informed the group that Dr. Cortinas has been asked to serve as the Director of the OAR Office of Weather and Air Quality and will be leading the coordination of environmental modeling and weather research across NOAA.

External Review of the Cooperative Institute for Limnology and Ecosystems Research (CILER), University of Michigan

Dr. Jerry Schubel, President and CEO, Aquarium of the Pacific, Chair, CILER Review Committee and Member, SAB

Summary

The purpose of the presentation was to present the SAB with the results of the external review of the Cooperative Institute for Limnology and Ecosystems Research (CILER). Dr. Jerry Schubel served as the chair of the review panel. Other panel members were Barry M. Lesht CSC, Inc, Hugh J. MacIsaac Great Lakes Institute for Environmental Research, University of Windsor; Peter B. Ortner, Director of the Cooperative Institute for Marine and Atmospheric Studies, University of Miami; Heather M. Stirratt, NOAA, NOS Great Lakes Regional Coordinator.

Dr. Schubel began by giving a few facts of the Great Lakes (GL) area. He said this was the largest group of fresh water lakes on Earth in terms of area and volume and it holds 21% of the world's surface liquid fresh water . The GL hold 84% of North America's surface water and is the source of drinking water for 35 million people. He said 10% of U.S. population lives within the basin.

The CILER is housed institutionally at the University of Michigan School of Natural Resources and Environment. CILER conducts research and promotes educational training opportunities in the region through opportunities such as postdoctoral fellows and student summer fellowship program. CILER's vision statement is "To fully engage participants from universities throughout the Great Lakes region that carry out research, education, and outreach in order to

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help address NOAA's highest priorities in the Great Lakes region. The mission “To engage in research that improves understanding of the fundamental physical, chemical, biological, ecological, social, and economic processes operating in the Great Lakes region and identifying the critical socio-economic drivers and feedbacks shaping natural resource use and conservation in the Great Lakes basin”

Dr. Schubel noted that the CILER was established in 1989 and its first SAB external review was in 2005. The current CI was awarded to University of Michigan through a competitive process in 2007.

In the last SAB review of the CILER in 2005, key recommendations were: 1) develop a strategic plan, 2) hire a Director, 3) consolidate Great Lakes programs into one building, 4) increase partnerships with other parts of NOAA and other universities, 5) increase CILER’s research, education and outreach efforts, 6) reinvigorate the Council of CILER Fellows and engage them in strategic planning for research, and 7) re-examine the use of CILER as a funding mechanism for Great Lakes research.

Dr. Schubel said that CILER research is of high quality and in alignment with NOAA’s strategic plan & priorities. CILER education & Outreach programs are diverse and of high quality and there has been new leadership at CILER and the NOAA Great Lakes Environmental Research Laboratory, a partner with CILER. However, Dr. Schubel said CILER had many challenges, including 1) institutional cultures in transformation, 2) lack of a clear and compelling vision for CILER, 3) lack of a coherent science plan, 4) lack of involvement of partner institutions beyond the University of Michigan, and 5) lack of adequate funding for Task I functions that contributed to Education/Outreach deficiencies (no staff dedicated to this function). Dr. Schubel said CILER is poorly branded and is not well recognized among research & educational institutions in the Great Lakes region and thus needs differentiation. All of these things, combined with poor governance, contributed to the conditions and institutional culture the new Director inherited in 2008.

The panel questioned if NOAA’s funding of CIs was extramural or intramural support. The review panel also thought that the competitive award process established for CI renewal has resulted in more specific themes and perhaps less flexibility in changing themes once a new Cooperative Agreement has been established.

The review panel’s recommendations to these challenges were that NOAA should support cultural changes & provide adequate financial support for Task I activities and also assure eligibility of CIs for competitive extramural programs. On the other hand CILER should initiate a process that leads to creation of a clear, compelling vision for CILER that will brand it among the research institutions within the Great Lakes region. CILER should appoint at least a part-time person to lead the Education & Outreach efforts and develop a research plan that takes advantage of CILER’s competitive advantages. CILER should also get more involved in the academic life of UM & get UM more involved in CILER as well as develop an effective governance structure. It was also recommended that the University of Michigan should honor the commitments it made in the re-certification process.

Finally, Dr Schubel said the review panel gave the CILER Satisfactory rating, which as defined by NOAA is “...the CI has achieved some or all of its agreed goals and has demonstrated

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acceptable performance. Its performance, however, is not considered outstanding and/or the CI's resource commitment provides a limited enhancement of NOAA's resources...NOAA may opt to renew a CI for a period less than 5 years that may be at a significantly reduced funding level, pending availability of funding." The review panel believed strongly that NOAA should not reduce its commitment to CILER, either in terms of renewal period or funding. Instead, NOAA should make its expectations clear and hold CILER accountable.

Discussion

Dr. Jim Sanchirico questioned why the CILER was given a Satisfactory rating taking into consideration the review of 2005 and current review. Dr. Schubel said the quality of research and education was sufficient for a satisfactory grade and the new leadership in CILER has been there for only two years and is trying to fix the problems. He said the problems in the 2005 review were mostly the result of organizational leadership and management.

Mr. Alan Burton, CILER Director, said they are disappointed in the overall message and that this was a review of the CILER that he inherited. He said he was working with the new GLERL director to change CILER. Mr. Burton said a lot of time and energy was spent changing course; peer-reviewed publications and funding were at record levels and they were engaging the partners with 35 external investigators and 20 institutions involved. He said they had a \$92,000 deficit in Task I and no funding for post-doctoral fellows and had to terminate the part-time Education & Outreach position. Mr. Burton noted that he has modified the governance and formed an Executive Board that provided recommendations. He has also formed a Fellows Council to develop goals as a result of recommendations from the Executive Board. He concluded that the poor rating was not reflective of the last 25 months and that this would hurt them in working with the University of Michigan. In response, Dr. Schubel said the review panel looked at the comments on governance and agreed that CILER deserved more time and support. They looked at the quality of research but also had to make sure that CILER had fulfilled the special responsibilities of a Cooperative Institute.

Dr. Lubchenco said a CI is supposed to be a partnership between NOAA and academia. She had not heard of any enthusiasm on part of University of Michigan... She said the willingness of the university to participate is crucial to making this work and thus she questioned the continuation on this path. Dr. Schubel said the situation between CILER and UM was due to past CILER and GLERL leadership. However, Mr. Burton has been fully embraced by the University of Michigan and thus the review panel believed past problems were correctable.

Marie Colton, GLERL Director, reiterated the difficult situation that was inherited. She said people had become isolated from one another. In the last year they have worked on the message that NOAA and CILER are there to collaborate not compete. They are working at various levels with the university and are asking the SAB forbearance on this. Dr. Schubel said there had been a lack of oversight and governance at both CILER and GLERL. He said governance is not the same as management and therefore there was need to meet more frequently than once a year. Dr. Colton agreed that the Executive Council needs to be engaged more frequently. Dr. Lubchenco

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commented that it may be necessary to have engagement at the highest level of the university. She said she felt that the physical location may be a hindrance for engagement. She added that for this partnership to work the university must be committed. Dr. Schubel suggested that the university vice president and provost would be appropriate for engagement and that someone from NOAA leadership should engage with the leadership at the University of Michigan.

Ray Ban said the SAB needed a motion to accept the review and relay it on to NOAA. Mr. Ban noted that if the vote to accept the review rating as Satisfactory was passed then this would be the rating transmitted to NOAA. Dr. Kudrna proposed adding to the recommendation that a high level designee from NOAA and GLERL director should engage with the university.

Mr. Ban wondered if the board was ready to bring a motion forward at this time. Peter Kareiva said he would say no at this time because commitment from the University of Michigan was unknown.

Dr. Kudrna thought that the review should go forward; NOAA still has the action to determine whether to extend the agreement.

Thomas Zacharia said the SAB had empowered a competent review group. He believed the review was good although it identified some flaws in the CI. He believed that the review and recommendation should be accepted. He added that NOAA should seriously consider whether it should continue funding for CILER.

Jim Sanchirico wondered if the added wording that the review recommends continuing commitment to CILER would be sufficient. He was concerned whether the CI has the commitment from the University of Michigan.

The SAB discussed changes to the language to addresses active participation of the University in the CI. This language should add that NOAA will maintain its commitment contingent on recommitment by the University of Michigan. The conclusion of the discussion was that the SAB accepted the CILER Review Report but with the change in the language to the recommendations. The language will be initially drafted by the CILER Review team and then sent to the SAB for review. The SAB will discuss the changes to the review in a January teleconference meeting before transmitting to NOAA.

Action 12: SAB will work with the Review Team for the Cooperative Institute for Limnology and Ecosystem Research to revise language in the Review Report.

Action 13: After endorsement of revised CILER Review Report language, the SAB will approve and the Report will be transmitted to NOAA with a cover letter indicating any remaining concerns.

The State of Sea Grant 2010: Impacts, Challenges and Opportunities. National Sea Grant Advisory Board First Biennial Report to Congress

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

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Summary

The purpose of the presentation was to make the SAB aware of the Sea Grant Advisory Board's work and specifically its first biennial report to Congress. RADM Richard West began by talking about the Biennial Report. He said The National Sea Grant Advisory Board, a federal advisory committee "shall report to the Congress every two years on the state of the national sea grant college program. The Board shall indicate in each such report the progress made toward meeting the priorities identified in the strategic plan in effect under section 204(c)."

Congress established Sea Grant in 1966 to bring practical scientific information from the nation's universities to coastal businesses, citizens and all levels of government in order to capture the economic and social benefits of the nation's oceans, coasts and Great Lakes in a sustainable way. The mission of Sea Grant is to "Enhance the practical use and conservation of coastal, marine and Great Lakes resources to create a sustainable economy and environment."

Sea Grant is a network of 32 university-based state programs administered by the NOAA through the National Sea Grant Office. The network supports and draws on the work of more than 3,000 scientists and is engaged with over 300 renowned universities providing access to R&D assets in the oceans, along the coasts, and in the Great Lakes. The network also support 350-400 research projects annually and 400 graduate students and connects 4500+ partner organizations each year.

The findings of the Report were that the Sea Grant program is an effective program that responds to local needs of the coastal and marine-related community while at the same time addressing critical national needs. The constraints that have impeded Sea Grant's achievement of its full potential are underutilization of Sea Grant's established regional education and outreach, the need for better integration with other NOAA coastal programs, the perception that Sea Grant is not a "national" program, and decreased funding.

The committee recommended that the Sea Grant program can play a significant role in helping to meld the national science program with local and regional presence. It also recommended that ways must be found to integrate Sea Grant with other NOAA coastal programs so they function together as one. Other recommendations from the committee include improvement in performance measures, capitalizing on proven leadership with regional stakeholders, being more nimble and responsive, and finding sustainable funding.

Discussion

Dr. Frank Kudrna said Sea Grant does not only great research but also excellent outreach and he felt that NOAA really benefits by Sea Grant. He said other agencies such as EPA in the Great Lakes all recognize Sea Grant's expertise but this don't seem to feel the same way about NOAA overall.

Ms. Mary Glackin thanked RADM West for the presentation. She said there have been some challenges in funding for Sea Grant due to a perception Sea Grant is part of a block program and not a national program. The strong alignment of the Sea Grant priorities to NOAA's NGSP priorities should be helpful. She agreed that NOAA needs to improve in performance measures. She asked if the panel have any thoughts to help Sea Grant. RADM West's response was that Sea Grant was on a good path but more work needed to be done.

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Dr. Lubchenco asked, as the National Ocean Policy begins to be implemented, including CMSP, and as regional governance grows, what role would Sea Grant have with the existing governor's entity. RADM West said that would vary by program but the process exists for Sea Grant to be an asset. Dr. Lubchenco said many examples given by RADM Richard West were at the state level but she wanted to know if they were also true from a regional perspective such as the Gulf of Mexico. RADM West replied that the Great Lakes have an excellent consortium and the Gulf of Mexico program was pulled together by Katrina and the Deep Water Horizon oil spill. Sea Grant used to be mainly state-based but was now increasingly regional emphasis. Dr. Paul Sandifer said in the South Atlantic Alliance, Sea Grant is as actively involved as it is in the Gulf. Dr. Laura Furgione added that all eight regional NOAA regional collaboration teams have Sea Grant representatives. She encouraged Sea Grant to broaden itself by participating in the Weather-Ready Nation programs.

Dr. Kudrna noted that it is important to recognize Sea Grant is required to have a 50 percent matching funds. Dr. David Kennedy said what Sea Grant is better understood now than in the past. In DWH, local outreach was not working well and Sea Grant was asked to lead outreach efforts because of its local knowledge and reputation for being knowledgeable and trustworthy.

Dr. Schubel said as NOAA moves towards more engagement, Sea Grant would be more helpful particularly with coastal regions. RADM West said NOAA needs leadership to draw on all the capabilities that it has and cannot allow territoriality. He suggested that they look at the Department of Defense who do a summer study every year and have done a study of oceans in the next 40 years. RADM West said he would provide a copy of the study to the SAB.

Mr. Craig McLean said the legislatively-mandated five percent overhead rate limits the percentage of funds that can be spent on administration in Sea Grant and this results in limits on headquarters staff. There is an education challenge in NOAA and Sea Grant would be the first place to go to for education questions, however.

Action 14: RADM Richard West will provide the Science Advisory Board with the Department of Defense Summer Study on the oceans in forty years.

Working Group Updates

Ecosystem Sciences and Management Working Group
Peter Kareiva, The Nature Conservancy; member, SAB; liaison, ESMWG

Dr. Peter Kareiva presented a request for approval of two new members to fill vacancies on the Ecosystem Sciences and Management Working Group (ESMWG) and renewal of one member for a second term. He also provided an update on the Coastal and Marine Spatial Planning (CMSP) white paper that the working group expects to present at the March 2011 meeting.

Dr. Kareiva said two vacancies have been created as David Helweg and Gordon Kruse were unavailable to be reappointed and the first term of Mike Beck is expiring in January 2011. The ESMWG has reviewed its need for expertise given the current tasking and proposes that the SAB

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approve a second 3-year term for Mike Beck and also approve Efi Foufoula, University of Minnesota and Jacquelyn Grebmeier, University of Maryland as new members. The SAB members had been provided with the CVs for both new candidates.

Dr. Kareiva said that the ESMWG also wanted to engage with the SAB members on the topic of Coastal and Marine Spatial Planning (CMSP) implementation. An ad hoc subcommittee of the ESMWG is preparing a white paper: "Strategic Advice for Designing and Implementing CMSP." The subcommittee is examining 17 different marine spatial planning efforts from around the world. These encompass plans that have a wide range in areal extent and comprehensiveness of uses considered. The members of the subcommittee developed a set of questions about the plans and then queried the individuals involved with them. Based on the responses to these questions, they have developed a set of overall findings about CMSP efforts that have been conducted to date.

Dr. Kareiva said interim findings presented to the SAB in November 2010 will be followed with preparation by a final report by February 2011. This final report will be presented at the March 2011 SAB meeting for consideration by the Board.

Discussion

Dr. Lubchenco said she appreciated the ESMWG was bringing an interim report to the SAB early and thought this that this was good practice. She asked if the ESMWG was considering how science was being used in the different plans reviewed in the CMSP report. She noted that most of the evaluation presented was descriptive and asked what the group considered as a combination of factors for success. Dr. Kareiva said the use of science is captured in decision support tools and framework analysis. He said it may be difficult to gauge success in the early stages but that the group perhaps could identify best practices. Dr. Lubchenco agreed that best practices would be very useful for the new CMSP effort that is being put together in the US under the National Ocean Policy. Ms. Glackin said that it would be good to identify the early steps that should be taken in such planning efforts to ensure the plan will be sustained and endure over the long term. Dr. Kareiva said the subcommittee is considering "early wins" that will show the benefit of this approach.

Dr. Jeremy Jackson said the evolution of the management of the Great Barrier Reef is an example of marine spatial planning. They are constantly re-evaluating how well it works. This effort has established a monitoring program in order to evaluate the success. This and other programs are inordinately important in making the case. Dr. Kareiva agreed with this idea.

Dr. Kudrna noted that it will be very difficult to set up a coastal spatial planning effort in the Great Lakes because they are all state waters so the federal government can only provide guidance.

Dr. Steve Murawski pointed out that there are others areas in the world that are looking at comprehensive CMSP. There was a meeting in Portugal for the European Union to address the same issue and there is an opportunity for the WG to link forces with this effort. Dr. Sanchirico

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said the subcommittee is operating under the assumption that NOAA needs this information soon thus linking with the EU group could slow things down at this point.

Dr. Sandifer commented on the lack of more information on ideal benefits, particularly non-conservation benefits, which are critical for many sectors. He said it would be important to demonstrate the benefits of CMSP to the economy. Dr. Sanchirico responded that the group doesn't have enough information on that and is unlikely to get it now because of the short lifespan of this effort. Dr. Lubchenco said perhaps a way to tackle this would be to identify crosscutting issues that would be conclusions that come from the process. Conclusions would be based on what was original intent was, were those goals met, were there any unanticipated benefits. Dr. Sanchirico and Dr. Kareiva agreed to bring these suggestions back to the subcommittee of the working group.

A motion made to approve a second term for Mike Beck, seconded and approved unanimously. A motion to approve Drs. Foufoula and Grebmeier to serve on the ESMWG was made, seconded, and approved unanimously.

Dr. Murawski said it is difficult to balance portfolio and both of these individuals are strong in areas different than members who were not renewed. He also noted that it will be important to have representatives from other agencies on the working group.

Mr. Ban said he liked the idea of the working group bringing forward its preliminary findings and recommendations to the full SAB for discussion. He pointed out to the liaisons to other SAB working groups that this is a good practice for the future.

Action 15: The Science Advisory Board will renew Michael Beck as a member of the Ecosystem Sciences and Management Working Group and will send a letter of renewal.

Action 16: The Science Advisory Board will appoint Efi Foufoula-Georgiou and Jacqueline Grebmeier as new members of the Ecosystem Sciences and Management Working Group and will send letters of appointment.

Ocean Exploration Advisory Working Group

Robert Ballard, University of Rhode Island and Larry Mayer, University of New Hampshire, Co-Chairs

The purpose of the presentation was to provide new members and refresh existing members with knowledge on the NOAA Office of Exploration and provide the findings and recommendations of the U.S. Commission on Ocean Policy. The final Commission report touches on virtually every aspect of ocean and coastal policy and should serve as a blueprint for ocean policy in the 21st century.

The second purpose of the presentation is remind the SAB members that Public Law 111-11 passed in early 2010, mandates the creation of a federal advisory committee under NOAA, the Ocean Exploration Advisory Board. The SAB had agreed to disestablish the OEAWG once the OEAB was created. The OEAB has not yet been established so the OEAWG is requesting the

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SAB to extend members for 18 months needed to bring the OEAB into existence. The following are current members whose terms need to be extended for 18 months:

- Robert Ballard – University of Rhode Island, Co-chair
- Vera Alexander – University of Alaska
- Jamie Austin – University of Texas
- Jesse Ausubel – Rockefeller University
- Terry Garcia – National Geographic
- Larry Mayer – University of New Hampshire, Co-chair

Three other members - Ruth Blake, Yale University; Patricia Fryer, University of Hawaii; and Timothy Shank, Woods Oceanographic Institution – are still in their first terms and do not need to be formally renewed at this time.

Dr. Ballard also reported on the most recent Okeanos Explorer expedition. He said this was a 5-year partnership for the purpose of exploring the marine geology and biology of one of the most diverse regions of the world – the waters in and around Indonesia. The lead agencies on this expedition are US NOAA, RI Ministry of Marine Affairs and Fisheries and, RI Agency for the Assessment and Application of Technology. Mission partners are US Embassy Jakarta, The Exploratorium and, and SeaWorld Indonesia. He said expedition participants included more than 30 scientists and technicians from the US and Indonesia as well as both US and Indonesian agency staffs. Dr Ballard said the expedition mission objectives were bathymetric mapping, HD video seafloor surveys and, education and outreach.

Dr. Ballard also talked about the Exploration Vessel Nautilus (E/V Nautilus). The E/V Nautilus is equipped with the remotely operated vehicles (ROVs). It has a high-bandwidth satellite system on board to facilitate remote science and education via the Inner Space Center (ISC) at the URI Graduate School of Oceanography and Exploration Command Consoles located around the world. The E/V Nautilus explored regions in the Mediterranean Sea, off the coast of Turkey and Greece.

Agency Leads on this exploration are NOAA and the Office of Naval Research. Mission partners are Ocean Exploration Trust, Institute for Exploration in Mystic, CT, and Center for Ocean Exploration (URI/GSO). Countries participating are U.S.A., Turkey, Cyprus, Greece, and Israel. Several American universities as well foreign universities and agencies also participated. A total of 126 days were spent at sea of which 52 days were underwater traveling at 1,247 nautical miles. Thirteen ancient shipwrecks were found and photographed along with 147 isolated ancient artifacts located and photographed. Numerous new hydrothermal vents and new species and an active volcano were located and sampled. Footage of the exploration from 464 hours of HD and 612 hours of SD video footage can be viewed on a website which had 232,094 web visits from 115 countries/territories. This exploration has resulted in a major expansion of DOC network.

Dr Ballard highlighted OEAWG's actions for 2011 which are:

- January 11, 2011 nest meeting at Inner Space Center
- Host workshop for EX program in the Atlantic and Caribbean for 2012 and beyond

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- Meet with NURP Directors to review strategic plan
- Meet with Nautilus Advisory Board to coordinate ship schedules
- Review Office of OE programs as directed by SAB
- Meet with new Advisory Group once created.

Discussion

Dr. Jane Lubchenco asked what the relationship was between two vessels, for example, crew and geographic area. Dr. Ballard said the hope is to have the each vessel at sea for at least six months instead of the current four to five months. The vessels use the same technical terms which puts a strain on personnel thus schedules must not overlap. The OEAWG also wants to see the education and outreach effort sustained throughout the school year.

Dr. Lubchenco asked about the distinction in capabilities of the vessels. Dr Ballard said the vessels have similar capabilities but the Okeanos Explorer has multibeam mapping system whilst the E/V Nautilus has systems that the Okeanos Explorer doesn't have. He mentioned that there is a common pool of engineering intellect thus the software is interchangeable and that eventually the both vessels will the same capabilities.

Dr. Jerry Schubel said the expeditions are important to science but also excites and encourages children about marine research. He therefore agreed to the OEAWG to be extended for the 18 months. The motion was unanimously approved for an additional 18 months. Dr. Lubchenco asked if everyone was willing to serve and the response was yes. Dr Ballard noted that it would be good to have a member of the SAB on an advisory group for this 18 month period. Dr. Jerry Schubel agreed to serve as the liaison from the SAB to the OEAWG.

Dr. Larry Mayer was concerned about statement in the presentation of the SAB Working Group Subcommittee proposal that stated that OEAWG does not match with NOAA goals. Dr. Kudrna said this was a misinterpretation of language but he agreed that the words are of concern. The SAB agreed to modify the language.

Mr. Craig McLean said having Dr Ballard and Dr. Mayer helping NOAA been very beneficial and he appreciates all they have done to help the Ocean Exploration and Research program in NOAA.

Action 17: The Science Advisory Board will renew existing members of the Ocean Exploration Advisory Working Group for 18 months or until the Ocean Exploration Advisory Board is established and the OEAWG is disestablished. Letters of renewal will be sent to the members.

Action 18: Jerry Schubel will serve as the Science Advisory Board liaison to the Ocean Exploration Advisory Working Group until it is disestablished or unless other obligations prevent him from filling this role.

NOAA's Next Generation Strategic Plan: An Update on the Coastal Strategy Initiative
Donna Wieting, Director, NOAA NOS Office of Coastal Resource Management

Summary

Ms. Donna Wieting provided the SAB with a response to the letter sent from the ESMWG through the SAB about NOAA's Coastal Strategy Initiative. She began by stating that this was work in progress and she thanked the SAB for their support and interest in coastal strategy that led to it being a goal in the Next Generation Strategic Plan (NGSP). She said she would describe the evolution of the coastal strategy into coastal goal and address SAB ESMWG recommendations. She will also provide an update on the reauthorization of the Coastal Zone Management Act.

Ms. Wieting said that the history of this effort was language from the Office of Management and Budget (OMB) that noted "lack of cohesive and collective strategic mission and management structure" across NOAA's ocean and coastal programs. As a result, NOS developed a coastal strategy to coordinate across NOAA's coastal programs, regardless of line organization boundaries. The strategy has three priorities which include coastal hazards and climate change, competing coastal uses and habitat loss, and coastal pollution and human health effects. Ms. Wieting said stakeholders validated the need for an independent Coastal Goal to focus attention on range of coastal issues. This evolved into NGSP Coastal Goal that strongly links NOAA's coastal objectives with National Ocean Policy priorities. NOAA's long-term goal is "resilient coastal communities and economies," that is, coastal and Great Lakes communities that are environmentally and economically sustainable. This coastal goal includes interdependent and integrated relationships with other NGSP Goal and Enterprise Objectives.

Ms. Wieting said that the SAB called for a comprehensive coastal strategy and for a framework for integrated ecological assessments. NOAA has responded by having a coastal strategy that supports policy and management; incorporates ecosystem and social sciences, and a framework that informs decisions about policy issues; meets needs of end users; and comprises a planning and assessment process. NOAA is cognizant of the fact that collaboration is critical and included in its NGSP statement that "NOAA invests in and depends heavily on the science, management, and engagement capabilities of its partners. Collectively, NOAA's people, its infrastructure, research, and partnerships provide a foundation for NOAA's strategy and the enterprise capabilities advancing the agency toward its vision and long-term goals."

Ms. Wieting said CZMA will be essential to effective implementation of the coastal Goal objectives. The current statute can be used effectively for this purpose but technical modifications would help simplify and strengthen the CZMA to accomplish objectives. She said a bolder and more ambitious reauthorized CZMA could help address new and emerging coastal challenges more effectively.

Finally, Ms. Wieting informed the SAB that the next steps would be to address recommendations regarding ecosystem approach to management (EAM), integrated ecological assessments (IEA), and Coastal Marine Spatial Planning (CMSP) in the context of the National Ocean Policy. This will be done at the SAB March 2011 meeting. NOS will continue engagement and dialogue with the SAB on the implementation of the NGSP and the Coastal Goal objectives.

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Discussion

Dr. Kudrna thanks Ms. Wieting for the presentation and asked if OMB was satisfied with response from NOAA. Ms. Wieting replied that the narrative was sent to OMB and there were no requirements to respond and no response has been received.

NOAA Response: Science Advisory Board Ocean Color Recommendations

Paul DiGiacomo, Division Chief, NOAA NESDIS, STAR Satellite Oceanography and Climatology Division

Summary

Dr. Paul M. DiGiacomo thanked Jim Yoder for his leadership nationally and internationally on ocean color. He informed that the purpose for the presentation was to provide NOAA's response on ESMWG recommendations on ocean color satellite continuity mitigation plan, seek SAB agreement that this response addresses recommendations adequately and outline next steps. Dr. DiGiacomo stated that the SAB ESMWG made three recommendations to NOAA and that NOAA agreed and has taken action on each recommendation. The three recommendations that ESMWG made were NOAA should:

- partner with NASA to build on lessons learned from SeaWiFS/MODIS era;
- conduct a full Analysis of Alternatives to address comprehensive NOAA ocean color requirements; and
- continue to encourage and support the Committee for Earth Observation Satellites (CEOS)-approved Ocean Color Radiometry Virtual Constellation (OCR-VC)

NOAA is responding to the first SAB recommendation in three ways. First, NOAA is working with NASA, NSF, and ONR to help build consensus within the greater ocean color community regarding the national needs for ocean color observations from space, as well as the observational requirements necessary to meet those needs. Specifically, the four agencies have initiated a study with the Nation Research Council (NRC) Ocean Studies Board Study, 'Assessing Requirements for Sustained Ocean Color Research and Operations'. The study began in September 2009 and a prepublication report is scheduled for February 2011.

Secondly, NOAA implemented a Joint NASA-NOAA Ocean Color Radiometry Technical Working Group, approved by NASA and NOAA as part of their Joint Working Group, to formally coordinate and facilitate technical activities.

Finally, there has been a major restructuring of the National Polar-orbiting Operational Environmental Satellite System (NPOESS). A new Joint Polar Satellite System (JPSS) Program is being developed by NOAA in partnership with NASA; the Integrated Program Office for NPOESS ceased to exist as of 30 September 2010. As part of the emerging JPSS structure, a Data Products and Algorithm Group will be led by NESDIS Center for Science Applications and Research (OSTAR), with a number of product teams, including ocean color, to be created and chaired by STAR scientists. The activities of the science product/application teams (ocean color etc.) will be coordinated and communicated with the broader research and user communities.

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Further details on the organization, approach and activities of the JPSS Data Products and Algorithm Group, particularly as it pertains to the ocean color science product/application team, will be shared with the SAB once all of the specifics have been worked out and finalized within the JPSS Program (presently anticipated in the FY11 Q2 timeframe).

NOAA's response to the analysis of alternatives recommendation is that NOAA has finalized study of satellite alternatives as part of NOAA ocean color satellite continuity mitigation plan and has also initiated the NRC Study to help shape examination of non-satellite platforms/assets. BNOAA will revisit the AoA after NRC pre-publication report in February 2011. NOAA will also be continuing efforts to acquire and distribute full resolution ocean color radiometry observations from foreign sources.

NOAA's response to the final recommendation on Ocean Color Radiometry Virtual Constellation (OCR-VC) is that NOAA has actively encouraged and supported the Committee on Earth Observation Satellites (CEOS) in their establishment of OCR-VC, which was approved by CEOS a year ago. NOAA contributed to the OCR-VC Implementation Strategy and Plan Phase I document dated 23 September 2009, and has a number of supporting tasks across the multiple objectives of this plan. NOAA has also and will continue to actively support this important international initiative as it evolves.

Dr. DiGiacomo said the desired outcome from the presentation was to have the SAB approve the response and engage in discussion about next steps. He said NOAA intended to provide periodic updates and engage with SAB and ESMWG accordingly.

Discussion

Dr. Jim Yoder, who chaired the ESMWG subcommittee on Ocean Color, participated in the meeting via phone. He stated that he thought the presentation was excellent. He felt that all of the ESMWG subcommittee's questions had been addressed.

Dr. Murawski acknowledged all the work by NOAA NESDIS. He said the ultimate objective is to maintain the record of remote observations of productivity in oceans; it is crucial not to have gaps in these observations. Thus there is a need to keep continuity of satellite observations to be able to look backward on the time series. Dr. Murawski asked about the two important aspects - the status of the visible/ infrared imager/ radiometer suite (VIIRS) and situ in measurements. Dr. DiGiacomo said part of role of the NASA-NOAA group is to maintain the time series. In regards to VIIRS, he was optimistic in respect to progress. There were some manufacturing anomalies and things are back on track but there are no guarantees of the launch date for JPSS. Dr. DiGiacomo said they were trying to ensure continuity of modeling and observing infrastructure (MOBI) in NOAA because this underpins all the satellite sensors. There are critical specific sites, such as the buoy in Hawaii, that are needed for calibration/evaluation purposes. These sites will be part of a larger system that is still being developed in NOAA.

Action 19: The Science Advisory Board will review the NOAA Response to the Ecosystem Sciences and Management Working Group recommendations on the Ocean Color Continuity Mitigation Study and send comments to NOAA NESDIS.

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Action 20: NOAA NESDIS will finalize the Response to the Ecosystem Sciences and management Working Group recommendations on the Ocean Color Continuity Mitigation Study and transmit to the Science Advisory Board.

Review of Actions

Cynthia Decker, Executive Director and DFO, SAB

Dr. Cynthia Decker reviewed the actions from the meeting. An action was added for SAB members to provide input to NOAA on engagement of private providers to the climate enterprise. A request was made to reword the action on CILER to make it clearer. Dr. Jeremy Jackson agreed to join the SAB Working Group subcommittee. The members asked NOAA for feedback if any SAB working groups had achieved their mission and should be disestablished. The members agreed to provide suggestions for improving meetings. Finally, Frank Kudrna thanked Paul Sandifer and Steve Murawski for their support and wanted this acknowledged in the minutes.

Meeting Adjourn

The meeting adjourned at 3:00 PM.

Actions

Action 1: The Science Advisory Board members will send additional comments on the SAB Working Group Subcommittee proposal to E. Barron and Subcommittee

Action 2: The Science Advisory Board Working Group Subcommittee will develop a new proposal for discussion at the January 2011 SAB teleconference and revise for final discussion and decision at spring 2011 SAB meeting.

Action 3: NOAA will provide written input to the Science Advisory Board Working Group Subcommittee on various options for organizing SAB working groups.

Action 4: The Science Advisory Board will add Jeremy Jackson to the membership of the Working Group Subcommittee.

Action 5: Jerry Schubel will prepare a proposal for a new Science Advisory Board *ad hoc* working group on communicating the relevancy of NOAA for discussion at January 2011 teleconference.

Action 6: NOAA will include Science Advisory Board and SAB working group members in consultation and as participants as it moves forward with workshops on the grand scientific challenges (from NOAA Science Workshop, April 2010).

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Action 7: The Science Advisory Board will provide comments on NOAA plans for the future of OAR. R. Ban will provide the plans to members of EISWG for comment; SAB liaisons for other working groups should consider doing the same.

Action 8: The Science Advisory Board will review NOAA Responses to Climate Working Group products and seek comments from the CWG members as well. Comments will be collated and sent to NOAA.

Action 9: NOAA will revise Responses to Climate Working Group products as per Science Advisory Board and CWG comments and as appropriate and will transmit final versions to the SAB

Action 10: R. Ban, H. Cullen will work with the Climate and Environmental Information Services Working Groups to form an ad hoc team to provide input to the Science Advisory Board on engagement of private providers to the climate enterprise.

Action 11: NOAA will work with the Science Advisory Board to set up a NOAA science presentation at each SAB in-person meeting.

Action 12: SAB will work with the Review Team for the Cooperative Institute for Limnology and Ecosystem Research to revise language in the Review Report.

Action 13: After endorsement of revised CILER Review Report language, the SAB will approve and the Report will be transmitted to NOAA with a cover letter indicating any remaining concerns.

Action 14: RADM Richard West will provide the Science Advisory Board with the Department of Defense Summer Study on the oceans in forty years.

Action 15: The Science Advisory Board will renew Michael Beck as a member of the Ecosystem Sciences and Management Working Group and will send a letter of renewal.

Action 16: The Science Advisory Board will appoint Efi Foufoula-Georgiou and Jacqueline Grebmeier as new members of the Ecosystem Sciences and Management Working Group and will send letters of appointment.

Action 17: The Science Advisory Board will renew existing members of the Ocean Exploration Advisory Working Group for 18 months or until the Ocean Exploration Advisory Board is established and the OEAWG is disestablished. Letters of renewal will be sent to the members.

Action 18: Jerry Schubel will serve as the Science Advisory Board liaison to the Ocean Exploration Advisory Working Group until it is disestablished or unless other obligations prevent him from filling this role.

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Action 19: The Science Advisory Board will review the NOAA Response to the Ecosystem Sciences and Management Working Group recommendations on the Ocean Color Continuity Mitigation Study and send comments to NOAA NESDIS.

Action 20: NOAA NESDIS will finalize the Response to the Ecosystem Sciences and management Working Group recommendations on the Ocean Color Continuity Mitigation Study and transmit to the Science Advisory Board.