

Panel 5: Living Marine Resources (LMR)/Ecosystems: Paul Sandifer

- Many coastal programs in SARP are also relevant to living marine resources so there is overlap. NPCREP and SARP are very small programs, \$4 and \$2M respectively. If we look at what the effects of natural variability (e.g. ENSO) are on living marine resources, it gives us a picture of what may happen as climate changes, and it doesn't appear to be a good thing. There is a lot of information out there, and our challenge is to pull this information together.

Where do we go from here:

- First, we need to decide if NOAA is in the climate and ecosystems business. If so, where is the home (climate or ecosystem goal)?
- Need to build our regional scope following NPCREP model and ensure sustained support, engagement and partnerships. The focus needs to be on a critical but limited suite of information products and services that are needed by people who work with ecosystems at the temporal and spatial scales that are useful to them (at least at decadal and at large marine ecosystem levels, if not better).
- We need to develop scenarios that have enough certainty to be helpful to managers.
- Need to improve partnerships and provide incentives for collaboration.
- More effective integration of observations, monitoring, research and modeling is key to allow for climate information to be incorporated easily into ecological models.
- We need to think more boldly than we have previously and step out smartly in our future efforts.

Kenric Osgood, Panelist:

- Key concern is how it all fits together and how we decide who serves what to whom.
- There are many people out there with different needs and we need to be prepared for all levels of familiarity.
- What is the entry point for people who are not familiar with the NOAA structure? The Climate Portal is part of that, but there also needs to be something that addresses the interpretation of information.
- Climate information is important for ocean and coastal areas in addition to the land.

Bryan Hannegan, Review Team: If you were to build out to all regions where NW model would apply, what would the overall budget look like?

Paul Sandifer, Panel Lead: \$30-40M seems to be a logical extrapolation of what is currently being spent, but haven't done the detailed math. The key is to figure out how we are going to do this consistently while still addressing regionally relevant issues.

Jake Rice, Moderator: The NW is better understood than many other regions, so the price tag would be higher for regions where less is known about the oceanography. The SE and Gulf in particular will require bigger budgets.

Paul Sandifer, Panel Lead: There are certain parts of certain regions that are well understood, but the data is not as integrated. They would not be starting with a blank slate.

Chet Koblinsky, Goal Team Lead: There are two major initiatives in the works related to ocean acidification and another related to large marine ecosystems (starting with California Current System).

External Panelists

1. Michael Beck, The Nature Conservancy: The Nature Conservancy has worked most closely with NOAA on coral reefs and climate over the past years. Most work with NOAA on climate issues has not been with climate teams but with coral reef teams that have addressed climate issues through their programs. It is unclear how NOAA is operating internally and if this would improve in a climate service context. They have concerns that it would not. Partnerships extend beyond U.S. reefs internationally and focused on research and outreach. They are trying to create projects that are beneficial to managers.

2. Penny Dalton, Washington State Sea Grant: Climate and ecosystem work has been very separate and sees bringing these issues together as a challenge.

Four Main Take Home Messages:

- 1. Management needs and public interest should drive product development.** Ocean acidification is of huge concern, and we don't know enough. This is happening now and people are concerned about it. There is a huge need for information and scientists have been very responsive. Salmon is another area where people are paying attention. There is a need to establish partnerships and maintain them. Now is the time to do this.
- 2. When you find something that works, use it.** The Climate Impacts Group is an example of a success story. Don't get caught up in the diagram. Focus on the products and the capacity/people that are involved. They have created a set of guidelines that are being used as an approach for dealing with multiple issues.
- 3. Focus on ecosystem impact assessments now.** There are so many changes occurring and it is challenging/impossible to determine the causes right now. Fundamental pieces are building the human dimensions (need to actively engage social scientists), understanding and anticipating the effects of alternative energy.
- 4. Regional community action agendas are powerful tools for delivering climate products.** Though not focused uniquely on climate, they have a lot of public input and involvement and can serve as a tool for distributing climate information. It is focused on risk management.
 - Finances are important too, both the amount of money and how you distribute it. Researchers are sending out proposals like crazy and there aren't enough reviewers. There needs to be a better mechanism for dealing with this.

3. Denise Reed, University of New Orleans: Background: focus is on coastal ecosystems and to help people plan coastal restoration projects. Most areas where she works have problems that

need to be solved independently of climate; climate is just another layer that needs to be integrated.

- Needs information about drivers of processes intrinsic to the system (sea level records, national geodetic survey information, micro-tidal information, storm surges).
- In terms of climate change, most interested in freshwater runoff. This information is most important at the watershed scale.
- Focusing on regions does not really help
- Information is used to think about what will happen in the future and what kinds of restoration options should be laid on the table in light of that
- Trying to inform the decision-making process that selects one of those options.
- Using very low resolution modeling to tie uncertainty to the different options so people understand how wrong they could be if they pick different options
- This helps identify the solutions that could work given the uncertainty
- Working to help people understand how they might have to change their approaches and thinking given this uncertainty.
- The key thing is to develop approaches that embrace uncertainty and work to convey this to decision-makers (not stakeholders).
- Needs combined scenarios (not just IPCC) that place climate in relationship with other factors that are changing (land use, policy, etc)
- NOAA should be the agency that has ownership of wetland change and sea level rise. EPA has taken the lead, and this is NOAA's job.

Discussion

Jerry Schubel, Review Team: To what extent is climate change being incorporated into restoration programs?

Denise Reed, Panelist: on a scale of 1-10, a 3 or 4 because of sea level rise, but with ignorance of other issues that are also relevant (e.g. runoff, temperature changes, etc). The problem is that these people think they need to do everything at high precision, so they are not even trying because they aren't able to do it as well as they do other things.

Jeanine Jones, Review Team: NOAA could also be involved in interdisciplinary and inter-sectoral issues such as fisheries, especially temperature dependent species like the Salmonids. There is a common dialogue that should be occurring that appears to be missing.

Paul Sandifer, Panel Lead: this is related to ecosystem based management and would involve bringing this approach to climate. We could use some help getting more direction on how we could better do this.

Michael Beck, The Nature Conservancy: NW has done this to a certain extent.

Penny Dalton, Washington State Sea Grant: Salmon is dominant in driving decisions and is surpassing climate in its predominance.

Paul: Scaling down to watersheds is important in many other areas and should be considered further in regards to climate change. This is the scale that is most useful for ecosystem/living marine resources decision-making.

Jean Brennan, Review Team: Forest service says they do the headwaters. NOAA does estuary and fisheries. USGS does the in between. Need to keep this in mind.

Tony Busalacchi, Climate Working Group: This is another example of lack of coordination across the agency.

Steve Running, Review Team:

Downscaling is one the many things gets from the Climate Impacts Group in Seattle. One of the things they do well is put all their presentations on the web; it is really easy to find all of their information easily.

Jake Rice, Moderator: It seems like the ESA and ecosystem context would be low hanging fruit because there is a strong legislative mandate, there is money available and climate is absolutely crucial for understanding what strategies could be successful. Especially because of the litigation potential, this may make the Nation start working together as a whole. There is also a need to get the social science community engaged to prepare for inevitable changes in ecosystems and how this will affect communities. How well engaged is the social science community? What can we do to improve this?

Kenric Osgood, Panelist: NOAA had several workshops ~1 year ago. One recommendation was to get guidelines for how endangered species folks could better incorporate information into their actions. They don't want guidelines, but want relevant information that is easily available and help for integrating this information into their decision-making process. NOAA is working to identify the appropriate climate contacts within NOAA for these people so they don't just turn to Google.

Jeanine Jones, Review Team: This kind of information would be particularly important for upland restoration planning, which is very expensive. We need to have this information so we can make smart investments.

Anthony Janetos, Review Team: ESA is a blunt instrument, and even though NOAA has an Administrator that cares about and understands ESA, it will still be a challenge.

Penny Dalton, Panelist: Incorporating climate into ESA in a blanket-like manner is very scary.

Michael Beck, Review Team: Climate is not always a primary driver but is an additional problem. Bridging natural and social sciences are another near term opportunity.

Roger Griffis, Panelist: This community includes not just federal, but also state, entities and there are some areas where they bump up against each other. This is an opportunity. States are all planning to redo wildlife action plans and this is an opportunity for NOAA to help them bring climate change into these plans.

Jean Brennan, Review Team: we should assess all programs that already exist because other agencies already have processes. NOAA should find areas where they can help accelerate processes and create synergies.

Margaret Davidson, Program Manager: Parts of NOAA just got money from stimulus for restoration. In the future, we need to better work with Federal entities, NGOs, etc. to build landscape strategies for restoration, conservation, etc. We could get a lot more if we would work with these partners.

Jean Brennan, Review Team: NOAA is not at the Wildlife Strategy (DOI, NGO) table. This exists in proposed legislation. Fish and Wildlife is starting to do this.

Bill Hooke, Chair: Congratulations to Paul Sandifer on his new appointment as Senior Science Advisor to Dr. Lubchenco.