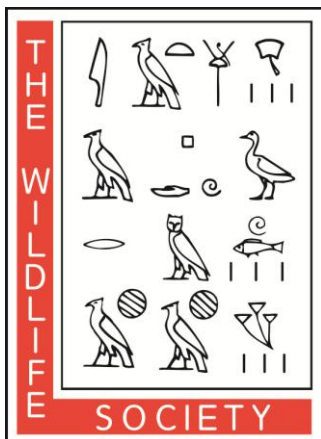


Report on the National Partners Dialogue

A Multi-Stakeholder Consultation on the
National Climate Change and
Wildlife Science Center
and DOI Climate Science Centers



Meridian Institute

Connecting People to Solve Problems



Introduction

The earth's changing climate, including changes in temperature, weather patterns, and precipitation, will have significant impacts on fish and wildlife resources in the United States now and in the future. Our nation needs robust scientific information and management strategies to anticipate and plan for these changes, while also minimizing adverse effects on fish and wildlife. In response to these challenges, in 2008, Congress created the National Climate Change and Wildlife Science Center (NCCWSC) within the U.S. Geological Survey (USGS). The Center's primary goals are to:

- Forecast fish and wildlife population and habitat changes in response to climate change;
- Assess the vulnerability and risk of species and habitats to climate change;
- Link models of physical climate change (such as temperature and precipitation) with models that predict ecological, habitat, and population responses; and
- Develop standardized approaches to monitoring and help link existing monitoring efforts to climate and ecological or biological response models.

Since its beginning, the NCCWSC has been a partnership-oriented institution. The Center works closely with natural resource agencies and scientists inside and outside government to gather the information and build the tools managers need to help fish and wildlife and their habitats and ecosystems adapt to climate change. These interactions at the national, regional, and landscape levels are intended to ensure that NCCWSC's science is focused on key priorities - as defined by managers - and is delivered to users effectively.

Over 60 stakeholders from federal agencies, state agencies, non-profit organizations, universities, and tribal groups met for this important dialogue on November 30th and December 1st, 2011 in Arlington, Virginia. The meeting's main objectives were to:

- Provide stakeholders with a progress report on the implementation of the NCCWSC and Department of the Interior (DOI) Climate Science Centers (CSCs);
- Solicit feedback on a draft of emerging national priorities for natural resource-related climate adaptation science by the NCCWSC and CSCs and on their approach to science delivery; and
- Identify opportunities and strategies for enhancing operations of the NCCWSC network.

USGS convened the National Partners Dialogue in partnership with the Ecological Society of America (ESA), the Wildlife Society (TWS), and the Meridian Institute to receive feedback and suggestions on its implementation and progress thus far. The structure of the NCCWSC is intended to ensure that the enterprise focuses on the right scientific questions in the right places, and delivers the answers in an effective and efficient manner. The National Partners Dialogue provided a key opportunity for partners to give feedback and suggestions to the Center on realizing these important goals at this key early phase in its development.

This report outlines the feedback and suggestions that emerged from the National Partners Dialogue in nine thematic categories:

- Communication and Collaboration between Scientists and Natural Resource Managers;
- The Need for National Synthesis, Collaboration, Leadership, and Infrastructure: Possible Roles and Tasks for the NCCWSC;
- Feedback on the Draft National Science Agenda for the NCCWSC;
- Strategies for Ensuring Non-Governmental Stakeholder Input into the CSC Science Agendas;
- The Importance of Involvement and Input from Tribal Communities and State Agencies;
- Strategies to Help the CSC Advisory Committees Prioritize Management-Relevant Science Needs;

- Creating Relevant Science: Strategies for Helping Researchers and Managers to Co-Develop Science;
- Strategies to Build Lasting Relationships and Communication between and among the CSCs and LCCs; and
- The NCCWSC Federal Advisory Committee (FAC): Topics and Tasks to Address.

Specific questions posed by USGS and the project team during breakout group and plenary discussions are listed in the agenda in Appendix A.

Overview of Introductory Remarks

After a welcome from the meeting Co-Chairs Cliff Duke and Michael Hutchins, DOI Deputy Secretary David Hayes provided some opening remarks through a video message. Hayes gave an overview of DOI's efforts to address climate change, and also emphasized the importance of partnership to make the NCCWSC enterprise work.

USGS Deputy Director Suzette Kimball also expressed the importance of the NCCWSC's coordinated approach, which embraces the scientific community as meaningful partners. She emphasized the importance of producing actionable science at USGS, and how this can be accomplished at the NCCWSC through ensuring all partners stay involved and committed. She encouraged all attendees to participate actively in the meeting and provide as much feedback as possible, so that USGS can see what is going well in the NCCWSC and what USGS may need to do differently in the future.

Doug Beard, NCCWSC Director, and Robin O'Malley, NCCWSC Policy and Partnerships Coordinator, gave an update on the current status of the NCCWSC and CSCs. The NCCWSC has its core headquarters staff in place and manages a network of eight regional DOI CSCs and an expanding portfolio of scientific activities intended to inform management of natural and cultural resources. This enterprise strives to meet the scientific needs of resource managers, foster partnerships aggressively, maximize resources for science, utilize the strengths of universities, tribes, NGOs, and state and federal government, and focus on ecosystems (rather than jurisdictions). The development of an overall science agenda for NCCWSC and the CSC enterprise is being managed from the bottom-up, beginning with Landscape Conservation Cooperative (LCC) Science Assessments, which will feed into regional Science Agendas at each CSC, and eventually into a national agenda. Participants from state agencies also emphasized the use of existing State Wildlife Action Plans, which identify key species and habitats within each state as a starting point for discussion.

The enterprise consisting of CSCs at the regional level, and the NCCWSC at the national scale, with close partnerships with LCCs at the "landscape" scale, is committed, in its structure and operations, to a partnership-driven model. A Progress Report on the NCCWSC, which was written in late 2011 and provided to all National Partners Dialogue participants, is included in Appendix C. The report describes the Center's key framing principles, its history and development, structure, and intended goals. The NCCWSC is now approaching full implementation of the core ideas identified in an extensive stakeholder consultation process, which consisted of regional and national workshops in 2008 and 2009 that were hosted by ESA, TWS, and the Meridian Institute. A Final Report on Outreach and Recommendations based on this process is available on the NCCWSC website: (<http://nccwsc.usgs.gov/documents>).

Common Themes Emerging from Partner Discussions

The topics listed in this section emerged repeatedly during discussions on a variety of issues. These represent potential challenges and issues of concern that resonated among many partners throughout the meeting.

Communication and Collaboration between Scientists and Natural Resource Managers

A key tenet of the NCCWSC is to produce climate-related science that natural resource managers can use. When partners were asked how the NCCWSC and CSCs can help scientists and managers co-develop science, communication and relationship-building were mentioned frequently.

In order to create usable science, scientists and managers need to be able to communicate with each other effectively and often, which, as many partners identified, can be challenging. Obstacles encountered during this process range from language and terminology differences that can create misunderstandings, to deeply entrenched differences in professional training and personal values. The current academic paradigm of training scientists to be independent and individualistic may not be producing effective communicators and collaborators. Managers may be intimidated by scientists with formal experience and credentials, and/or may have unrealistic expectations of what science can do for them. Regardless, it's clear that for the NCCWSC effort to succeed, ongoing collaboration and communication need to exist between managers and scientists. Below are some ideas generated by partners to address this important issue, along with some concrete suggestions on how to move forward.

- **Engage translators and communicators.** Translators who understand the scientific world and the managers' point of view are needed throughout the NCCWSC effort. This could be a short-term solution while some of the suggestions below (education, creating incentives) may take more time to implement.
- **Implement mutual education and training.** Not all managers or scientists are good communicators, and the uncertainty embedded in most climate-related science can make communication even more important and challenging. Generally, scientists need training on how to communicate and translate their work for different audiences, how to state what they can and cannot deliver and manage expectations accordingly, and also how to deal with unrealistic expectations. Managers need to know how to get their management needs and concerns across to scientists, and need to understand the implications of their decisions on natural resources. Below are some ideas to address these significant challenges:
 - Give graduate students and post-docs researchable management-related questions that make links between science and management needs early in their careers.
 - Get managers and scientists in the same place together periodically, whether it's a classroom or a field site.
 - Include training on listening skills too, as listening is an integral part of effective communication.
- **Create incentives.** To more effectively and efficiently address high priority, management-relevant issues, scientists could be encouraged to direct their research in these areas with financial and career incentives. Likewise, dis-incentives for inaction and/or maintaining the status quo could be implemented. Following are specific examples of incentives that could catalyze and facilitate scientist-manager interactions:
 - Provide funding for science that meets the identified priorities of management partners.
 - Encourage research projects that include managers as co-Principal Investigators (co-PIs). Or, more generally, build funding mechanisms to encourage scientists to include managers, the local community, and local/traditional knowledge in their work (e.g.

- proposals get more points if they have a co-PI from the local community, or interact with managers from the outset, or will deliver usable products to varied constituencies).
 - The CSC host institutions have a good history with applied research and are rewarded for that. Figure out how to harness that in the NCCWSC effort.
- **Frame science in an accessible context.** Framing science in ways that show the relationship to larger societal concerns – jobs, economic health, water supply – may help to center discussions around something that all parties can relate to. Also, focusing on a specific issue may make it easier for managers and scientists to connect; the more specific the question, the easier it may be to have a conversation.
- **Establish and support ongoing relationships.** Improving communication and education may not be all that is necessary to support ongoing relationships. Other activities that may help build and support these relationships include:
 - Build scientist/manager interactions into annual science planning at both the regional and national levels.
 - Ask scientists and managers to jointly identify decisions that need to be made.
 - Ensure that CSC Directors have ongoing relationships with the LCCs in their region.
 - Foster early manager/scientist interactions at LCCs to formulate useful and researchable questions.
- **Implement recommendations from the report on “Informing Decisions in a Changing Climate” (National Research Council, 2009),** which covers some basic principles for ensuring effective communication between scientists and management.

The discussion about communication and relationship-building between managers and scientists also identified some great progress that is being made. In the Southeast, for example, the CSC host institution is training post-docs to summarize their research for other stakeholders, understand the social impacts of their work, and communicate with wider audiences.

Participants also recognized that the CSCs are creating stakeholder committees that will have scientists and managers, and that these committees will serve a key formal role in achieving these goals, complemented by informal interactions between CSCs staff and others.

It is important to recognize that managers and scientists are both heterogeneous groups, made up of professionals with a variety of skills and languages. Knowing the intricacies of both groups will be critical to refining communication strategies and making them more effective. Also, understanding *what form of science* the managers need is just as important as knowing *what science* they need. This needs to be determined early in the process to make sure the way science is presented will be useful to managers.

The Need for National Synthesis, Collaboration, Leadership, and Infrastructure: Possible Roles and Tasks for the NCCWSC

The NCCWSC effort is a bottom-up process. Providing national oversight and guidance to the CSCs and LCCs, while they are simultaneously shaping the overall enterprise from the ground-up, may always be a significant challenge. Regardless, there is a real need for the NCCWSC to provide overall guidance and coordination in order to ensure that:

- The NCCWSC enterprise remains an open system that will accept information and input from all partners;
- The enterprise operates effectively and efficiently;
- Regional and national partners are able to identify clusters of effort, redundancies, and gaps in knowledge and resources to get the most out of available funding;
- All NCCWSC entities communicate clearly and frequently with each other; and

- Common methods for collecting, storing, and distributing data, and for activities such as mapping and habitat definition, facilitate larger scale conservation efforts, enabling the achievement of conservation goals. Such successes would demonstrate the power of the enterprise and help ensure funding continuity and expansion.

The Center will face resource limitations in overseeing and conducting national-scale syntheses and collaboration. The NCCWSC's top short- to medium-term priority in terms of funding and infrastructure is to set up the network of CSCs and ensure they are fully operational. Therefore, currently, staffing and resources dedicated for the national Center are being kept to a minimum. Partners understand this approach, but they also want to ensure that there is sufficient national infrastructure and support available to the CSCs as they become fully established. For example, it wouldn't be effective if all the CSCs were established, but not coordinated – and thus less effective -- because the national infrastructure and oversight was insufficient.

Partners agreed with the theme of fostering national coordination, but to different extents. A number of partners likened the NCCWSC's potential to foster interagency communication and collaboration to the beginning of a revolution. They see the family of federal agencies as becoming increasingly disconnected, and think the Center is an ideal place to facilitate a revolutionary change in the way agencies do business, particularly in regards to action around climate change. Some partners conversely thought that, though more national coordination and synthesis would be ideal, it would be impossible for the NCCWSC enterprise to do it all, and were concerned that this issue could eclipse other activities viewed as higher priorities by local and regional managers. Still others viewed the evolution of the Center in phases and agreed with an approach that focused first on getting the NCCWSC, CSCs and LCCs fully networked and operational before trying to coordinate a wider, national effort.

Below are four main suggestions regarding national collaboration and synthesis that emerged from the National Partners Dialogue. It was recognized that some of the actions suggested below and throughout this report may already be happening at USGS and within the NCCWSC enterprise. When this is the case, partners suggest that USGS simply communicate its efforts regarding these actions more widely.

- **Develop a diagram or chart of who is doing what.** Many partners were confused about the various roles of federal agencies and the wide-ranging work that each one is doing on climate change. There seems to be a real need, especially from the perspective of state agencies and non-federal partners, for a comprehensive schema that displays who is working on what; this will help others make strategic investments and understand the broader context of how their work fits in with broader efforts and relates to the goals and objectives of the NCCWSC. It will also help identify connections, acknowledge redundancies, and could help initiate a new way of communicating and collaborating across federal agencies. Partners acknowledged that the Council on Environmental Quality is moving forward with a related initiative, but given NCCWSC's "on the ground" status, encouraged NCCWSC to undertake action in this area.
- **Establish formal operating procedures, guidelines, and a strong communication plan.** There may be a need for national coordination to ensure that non-federal partners have sufficient communication and input into regional entities. For example, though most LCCs are encouraging non-governmental partner participation, some LCCs apparently are not allowing non-governmental representatives to participate in planning discussions. The fact that this was happening was of great concern to many attending the meeting. Many CSCs are currently doing a great job of communicating with each other, identifying overlaps, and are aware of what everyone is doing in their region. The NCCWSC should ensure this continues in these areas and occurs elsewhere by providing national coordination and guidelines. Informal contact between the CSCs and the national Center has worked well so far, but now is the time to formalize

regular contact so the NCCWSC isn't straining to keep up with all the communication in the future.

- **Clearly articulate roles among the various entities in the NCCWSC enterprise.** Partners need some clarification about the continuum of CSCs and LCCs, and their relationship with the bureaus that sponsor them. More details on this topic are covered in Part II: Strategies to Build Lasting Relationships and Communication between and among the CSCs and LCCs.
- **Determine the high priority, large-scale climate research needs.** Partners were concerned that, unlike many other countries, climate adaptation planning in the United States is not centrally managed. As part of creating a more coherent and integrated national approach to climate change, partners suggested that the NCCWSC could (a) provide a focal point for the science needed for natural and cultural resource management, and (b) encourage the integration of related activities in other sectors, such as health and agriculture, while advocating to establish a national strategy and vision to address climate adaptation challenges. Such national visioning and integration, however, must include two-way communication with regional and local efforts, so that those helping to shape the vision understand what is happening at smaller scales, particularly regarding adaptation planning.

Feedback on the Draft National Science Agenda for the NCCWSC

Shawn Carter, the NCCWSC Science Coordinator, presented a preliminary outline for the NCCWSC science plan that included the following:

Draft National Science Agenda Goals:

- 1) Assess and synthesize our state of knowledge about climate change impacts to lands and waters.
- 2) Work with resource managers to develop adaptation methods that minimize climate change impacts to the Nation's fish, wildlife, and habitats.
- 3) Foster research that investigates the interactions between climate and the physical, biological, and chemical forces that influence ecosystem structure and function and the goods and services they provide.

Draft National Science Agenda General Research Themes:

- 1) National synthesis of climate impacts to fish, wildlife, and associated ecosystems.
- 2) Development of best practices for regional analysis.
- 3) Forecasting and scenario development.
- 4) Vulnerability assessment, risk assessment, uncertainty analysis.
- 5) Downscaled derivative products.
- 6) Ecosystem processes, services, and resilience.
- 7) Integrated monitoring design and protocols.
- 8) "Adaptation research," evaluation of adaptation strategies.

Participants said that the draft national science agenda was on target and agreed wholeheartedly with the overall goals and themes. A few suggestions emerged throughout the plenary and breakout group discussions:

- The goals and themes are on target, and the most important next step is finding ways to achieve these goals. A good place to start is identifying the crosscutting issues emerging from the CSCs and prioritizing the "low hanging fruit;" this may help demonstrate some early successes.

- Begin with the first goal on assessing and synthesizing our state of knowledge. The sub-bullets under this goal reflect the fundamental questions many partners need answers to now.
- Include traditional ecological knowledge in the first goal.
- When determining priority gaps in scientific understanding of climate change impacts, estimate what it will cost to fill those gaps.
- Tribes can help identify gaps and fill some gaps.
- Social sciences and economics are missing from the research themes, but are very important to understanding all aspects of climate change. Key themes include the human response to climate change, the resulting impacts on fish and wildlife, and balancing human needs and wildlife needs. Monitoring changes in awareness, understanding, and behavior is also important, so that the NCCWSC can evaluate how well the science being generated is being acquired, understood, and applied.
- When looking at the research themes, it is important to communicate what science can answer now, versus what still needs to be investigated.
- Monitoring is incredibly important; this is the only way to capture environmental changes that are happening locally and regionally due to climate fluctuations. This information will be very important to demonstrate trends and identify challenges for the future.
- When looking at climate change impacts there is still a great deal of uncertainty involved. It is important to simultaneously look for ways to reduce uncertainty, become better at communicating it, and also develop ways to help managers make decisions in the face of uncertainty. A few specific ways forward include:
 - **Facilitate the development and use of frameworks for making decisions within the context of uncertainty** – such as Structured Decision Making – **and link these to the needed research.**
 - **Identify and foster use of common protocols and data systems.** This will help reduce uncertainty by ensuring that questions can be answered at landscape, regional, and national scales in a standardized manner.

Strategies for Ensuring Non-Governmental Stakeholder Input into the CSC Science Agendas

Input from a variety of stakeholders is key to the wider NCCWSC effort. At the CSC level, advisory committees will be comprised of representatives from governmental entities in the region and will be independent from the national level NCCWSC federal advisory committee. Based on consultations with regional partners, USGS has decided not to formally charter these committees at this time. The Federal Advisory Committee Act (FACA) does not allow federal agencies to accept consensus advice from non-governmental parties unless it is provided through a chartered advisory committee. USGS expressed strong interest in obtaining and using input from non-governmental partners as well. Below are some ways suggested by partners for CSCs to get informal input from these important non-governmental stakeholders on their science agendas:

- **Encourage and create opportunities for informal input whenever possible.** Many CSC host institutions are not bound by FACA requirements, so it's possible for them to organize informal meetings to solicit input and get feedback from non-federal partners and NGOs. Every CSC and host institution should be required to set up informal opportunities for input from these partners. Managing expectations is important, however, and all partners should know that decisions will ultimately be made by CSC staff, that many factors are considered, and that many people are providing input to CSC science agenda decisions. CSC advisory committees could also advertise their meetings to the public and include time for public comment during their meetings. NGOs and other non-governmental stakeholders could attend, provide input during public comment periods, or give talks at advisory committee meetings.

- **Advertise ongoing projects publicly and comprehensively.** This could easily be done online, via listservs, or by circulating a newsletter, and will help partners and other CSCs coordinate more efficiently.
- **Create outreach plans for all CSC Directors.** These directors should be speaking to a variety of audiences and meeting with partners face-to-face.
- **Encourage USGS regional executives to attend LCC steering committee meetings.** These executives have an important role to play in the wider enterprise.
- **Use NCCWSC leadership for outreach.** NCCWSC staff should have responsibilities to meet with non-federal stakeholders and attend relevant meetings and conferences.
- **Work with host institutions to engage industry and the private sector.** CSCs should systematically create more opportunities for landowners and resource users to contribute and demonstrate how collaborating with them will be relevant and valuable. If successful, this effort could create wider buy-in, political support, and an additional stream of resources for the NCCWSC enterprise.
- **Hold site-specific conferences** to get input from a variety of stakeholders.
- **Advocate for local managers to attend meetings and provide input.** Often key local staff are unable to get travel funding or time during normal work hours to engage with CSCs.

Partners also feel there is real potential for CSCs to act as a “safe space” for a variety of stakeholders who may not normally communicate with each other (e.g., NGOs and private industry) to self-organize around climate science. CSCs should be encouraged to provide this atmosphere for partners whenever possible.

The Importance of Involvement and Input from State Agencies and Tribal Communities

State agencies will play a critical role in the NCCWSC effort. They represent a network of resource managers that need access to relevant science in order to make critical land management decisions. States need to be able to advocate for getting the information they need; below are some ideas* to help facilitate that process:

- **Communicate what scientists are working on.** Ultimately natural resource management decisions are being made (and not made) daily at the state level that could be better informed.
- **Communicate what science can accomplish and manage expectations.** There is a lot of value in having managers talk with scientists about the decisions they need to make, and having scientists talk with managers about where and whether science can help inform their decisions.
- **Establish a national vision.** The NCCWSC can be a place where people come together to discuss science needs and what science is available. Clarifying this vision and letting managers know where to go for answers is key to the longevity and success of the NCCWSC.
- **Foster more coordination and communication among federal agencies.** This would help all partners, as mentioned previously**, but would also help state agencies in particular operate more effectively. For example, some state agencies regularly receive requests from different federal agencies for the same or similar information. This places an unnecessary burden on already limited staff time; the problem could be solved if agencies were better able to share this type of information effectively.

**These four ideas to specifically help state agencies will also benefit all NCCWSC partners.*

***See Page 5: “Develop a diagram or chart of who is doing what” in the section on the need for national synthesis and collaboration.*

Two representatives of Native American tribal entities were able to attend the National Partners Dialogue, and they helped to reiterate the importance of increasing engagement with tribal communities in the NCCWSC enterprise. Tribes have a lot of information to offer, including generations of knowledge on climate change and experience adapting to it, and can help fill knowledge gaps. Some suggested ways to ensure the NCCWSC has a network of tribes participating in this process are summarized below:

- **Recruit tribal members to serve on the NCCWSC Federal Advisory Committee and CSC advisory committees, and include tribal representatives in LCCs.**
- **Establish a Tribal Subcommittee of the NCCWSC Federal Advisory Committee.**
- **Acknowledge and reciprocate.** The value of tribal information should be recognized and tribes actively engaged in the NCCWSC enterprise. Tribes should be acknowledged for their effort; in many cases this can simply involve recognizing the value of the information they provided and their role in providing knowledge and input.
- **Provide support.** Often tribal members have limited funding for travel. NCCWSC could provide funds to support their collaboration and involvement.

Strategies to Help the CSC Advisory Committees Prioritize Management-Relevant Science Needs

In the face of limited resources and funding, CSCs will need to prioritize their science activities effectively. Below are some ideas to help their advisory committees make these important decisions:

- **Define what the CSC is trying to accomplish first.** Making this clear early in the process can help the advisory committees recommend science priorities that are most aligned to their regional goals and objectives.
- **Ask decision-makers and managers to identify what decisions they need to make.** Encourage decision-makers and managers to jointly identify priorities so that CSCs can conduct science with as broad application as possible. Committees can also take this a step further and ask for input on their science plans.
- **Ask the LCCs what their science needs are.** To insure scientific outputs address local needs, it is important for the CSCs to learn from the LCCs what their science needs are. The CSC-LCC relationship is critical to this enterprise – further elaboration and details are included below.
- **Prioritize science needs based on expected climate impacts.** To help prioritize research needs, begin by identifying the issues and questions that will address anticipated climate impacts. Then categorize the questions as those that can be answered and those that **MUST** be answered first; prioritize accordingly.
- **Identify statutory requirements and shared values to help prioritize needs.**
- **Acknowledge that the science CSCs produce should be relevant to managers as well as management** (i.e. the products should clearly reflect the predicted management needs on the ground, not just the issues themselves).
- **Establish effective and frequent communication between managers and researchers.** Examples of good communication processes between LCCs, CSCs, scientists, and managers are needed to inform the development and implementation of an effective communication plan for the NCCWSC enterprise. Many ideas related to this were covered previously.

Creating Relevant Science: Strategies for Helping Researchers and Managers to Co-Develop Science.

Many of the strategies that partners identified to produce relevant science in the NCCWSC enterprise are related to and are captured in the previous sections. Following are additional strategies participants offered specifically for increasing researcher/manager interactions, increasing integration of related work, and helping researchers and managers to co-develop science:

- **Create opportunities for managers and researchers to jointly identify decisions that need to be made, and the science needed to make those decisions wisely.** If this level of interaction isn't possible at times, rely on the LCCs to help inform and identify managers' needs.
- **Track the use of science and its application over time.** Scientists and resource managers need a better understanding of this process to create relevant science and continually improve its usefulness. In particular, tracking trends in increased understanding of scientific concepts and behavior change will help us know if the information generated is acquired, understood, and applied. Another related strategy could be to focus on decisions that have been made and the information needed to adapt those decisions over time.
- **Acknowledge the interdisciplinary nature of climate change.** This is an issue that relates to the physical, biological, and social sciences, and producing effective science relies on all these disciplines.
- Some specific partner suggestions for creating relevant science and increasing integration are listed below:
 - **Creating slots at professional society meetings** for scientists from the CSCs to present research results that relate to natural resource management and climate change issues.
 - **Publishing a list of projects that are anticipating and/or have received funding from the NCCWSC** is a simple and effective way to increase awareness of existing/ongoing work and leverage resources.
 - **Building mechanisms to get funding directly to the CSCs** from a variety of sources, including states, other federal agencies (such as the Bureau of Reclamation and the Bureau of Land Management), and private industry. As long as the scopes of the CSCs are broad enough to encompass the missions of other agencies, those agencies and other interested parties should be able to provide support.* This could help ensure that cultural resources and issues that relate to water and energy use are incorporated into the NCCWSC enterprise. This can also help address a concern expressed by some partners: that resources provided to the NCCWSC for fish, wildlife and their habitats will be diluted by the demands generated by the broader mission of the CSCs and LCCs (which encompass all natural and cultural resources). There are some concerns that this could create too much influence from funders and dilute the CSC mission, or broaden the scope of the CSCs too much. But, these funding mechanisms would also provide additional, needed resources for relevant science and could be a way for the NCCWSC to produce shared products that are relevant to broad adaptation efforts.

**This process relies to some degree on the LCCs being successful at broadening their scopes beyond the original vision and mandate through the US Fish and Wildlife Service. If some of the issues that relate to, for example, water, energy, and cultural resources are not coming through to the CSC level, the NCCWSC may need to consider reaching out more directly to these management communities.*

Strategies to Build Lasting Relationships and Communication between and among the CSCs and LCCs

The “NCCWSC enterprise” writ large includes NCCWSC and the CSCs, with strong ties to the LCCs, all of which operate at different scales. LCCs have a mandate that encompasses all conservation; CSCs are now identified with a broader DOI mission encompassing conservation of all natural and cultural resources; meanwhile the NCCWSC’s focus is specifically on fish and wildlife and their habitats. Thus, in some ways, the CSCs and LCCs can appear to have a broader scope than the NCCWSC. Partners referred to this as a “scope inversion problem,” which has the potential to make the NCCWSC enterprise operate in an uncoordinated, confusing, and inefficient way.

USGS acknowledged these concerns, but does not believe this is a serious or insurmountable problem. They noted that science on climate impacts on fish and wildlife habitat will share many common elements with science addressing climate impacts on other resources (such as those within the “broader scope” of CSCs and LCCs). In this regard, USGS described an approach of “placing all resource management decisions into an ecosystem context” – whether the focus is a species of water supply for farmers, understanding the breadth of ecological relationships is crucial to making smart decisions. USGS staff indicated that no “out of bounds” requests have been received by CSCs, that there are ongoing discussions over expanding the resources (other than from NCCWSC) that can flow through CSCs, but that they are on the lookout for such cases and will address them as they arise. Close communication between NCCWSC, CSCs, LCCs, and their partners will enable such cases to be addressed appropriately.

Overall, many partners felt that the relationships between CSCs and the NCCWSC were established, well-defined, and currently operating smoothly. They were more concerned with the developing relationships between CSCs and LCCs, and where and how stakeholders can get involved in the process. CSCs will have a mandate and mechanisms to look at issues in cooperation with each other, but these mechanisms do not appear to be as well-established for the LCCs. There was some concern that this could create tension between the CSCs and LCCs and how they operate. LCCs have very collaborative roles in the wider enterprise; developing and maintaining strong relationships among them is important for the NCCWSC to succeed. In order to promote this, partners suggest the following:

- **Develop a clear, formal plan for communication** among CSCs and LCCs, and articulate their different roles.
- **Create clear guidance** for CSCs and LCCs on how to prioritize activities and communicate the emerging research themes to stakeholders, so that non-federal partners can connect and provide relevant expertise and input.
- **Supply CSCs with a handbook on what expertise is where, so that they can find relevant information, data, and key contacts efficiently.** This might include listings of relevant expertise in LCCs, academia, NGOs and professional and scientific societies.
- **Define how the LCCs operate** (as both applied science partnerships and forums for collaborative conservation planning) and implement guidelines so they will coordinate effectively as the program evolves. In particular, LCCs should be aware that the NCCWSC is an inclusive enterprise and involves more than federal partners.
- **Add partnership and communication coordinators to CSC staff.**

The NCCWSC Federal Advisory Committee (FAC): Topics and Tasks to Address

USGS and DOI are working toward establishing a Federal Advisory Committee to provide input and guidance to the NCCWSC and CSC enterprise. An initial meeting is planned in 2012. Participants suggested that the following would be suitable tasks for the NCCWSC FAC:

- Establish national-level science questions and themes that need to be researched across all CSCs.
- Define the roles of the CSCs, LCCs, NCCWSC, and various advisory committees.
- Review and provide feedback on the evolving interactions between CSCs, LCCs, and other national partners.
- Monitor and communicate relevant work being done by other partners and agencies on the landscape.
- Connect to other experts and federal advisory committees (e.g. Forestry Research Advisory Council, National Climate Assessment Development and Advisory Committee).
- Identify subcommittees, including one for partnerships, and one specifically for tribal partnerships.
- Identify responsibilities and opportunities for cost-sharing.
- Ensure that the CSC mission retains some flexibility and creativity; they should not be completely defined by LCCs.
- Make recommendations to address the scope inversion problem.
- Ensure the wider NCCWSC enterprise is operating effectively, including that there is sufficient engagement of non-governmental stakeholders at the CSC level.
- Create a forum for partnering with other federal programs (e.g., Council on Environmental Quality, United States Global Change Research Program, Regional Integrated Sciences and Assessments) and developing a common agenda.

Partners highlighted that the FAC should include regional representatives, in order to ensure effective collaboration and communication with the CSCs. Other ways to improve coordination between the NCCWSC and CSCs are listed below:

- Host LCC/CSC annual conferences, potentially addressing a specific management issue.
- Build problem solving communities that work towards solutions.
- Engage other resources, such as the National Science Foundation data sharing efforts, and other groups that are working on conservation initiatives.

How Professional Societies Can Help

Co-Chairs Cliff Duke and Michael Hutchins both reiterated the various ways that professional societies, as networks of relevant expertise, can help to generate interest and involvement in the NCCWSC effort. Partners are encouraged to attend and present material at relevant society meetings, as well as consider their journals and peer-reviewed publications as outlets for science created through the NCCWSC process. CSCs and LCCs could also link their own conferences to relevant professional society annual meetings to reduce costs and ensure broader communication and involvement. Professional societies can also coordinate independent peer reviews, act as an independent public relations mechanism for government agencies, and advocate for NCCWSC funding.

Conclusion

Overall, partners feel that the NCCWSC enterprise is moving in the right direction, and embrace its bottom-up, cooperative nature. There are still lots of details to be worked out, particularly in regards to clarifying roles and functions, creating mechanisms to encourage cooperation, fostering interagency collaboration, and establishing solid communication networks. Some of these details will take time to develop. In summary, partners identified the following priorities for USGS and the NCCWSC:

- Identifying ways to prioritize science, and ensure that information reaches the managers who need it.
- Establishing mechanisms to involve more state agencies, NGOs, tribes, and industry to a greater extent.
- Implementing clear and frequent communication plans across the NCCWSC network, and particularly between:
 - Scientists and managers;
 - CSCs and LCCs; and
 - NCCWSC and the CSCs and LCCs.
- Clarifying the roles and responsibilities of the NCCWSC, CSCs, and LCCs – highlighting overlaps where they exist, and eliminating confusion.
- Clarifying and articulating the role of the NCCWSC and how it relates to climate science efforts underway across other organizations and agencies.
- Identifying existing mechanisms currently attempting to address climate change impacts in various sectors (such as the Climate Change and Water Working Group formed by USGS, the National Oceanic and Atmospheric Administration, the Bureau of Reclamation, and the US Army Corps of Engineers) that can be tapped by the NCCWSC.
- Monitoring the scope inversion issue; this may create management challenges, but also allows flexibility for regional and landscape centers to respond to local needs.

Climate change is an issue that crosses disciplinary boundaries and has broad-reaching effects across every part of society. It is thus incredibly important to find ways to collaborate effectively across numerous stakeholders and sectors – this is essential to engaging people and actually having an impact on resource management decisions and behavior change over time. Partners emphasized that science is an incremental process that builds on successes and failures; focusing on the end result and developing long-term goals may help us identify priorities now and envision how the NCCWSC effort can contribute to an enduring transformation of our society and environment.

An innovative aspect of the NCCWSC is its emphasis on stakeholder involvement and identifying scientific priorities from the bottom up. This approach will only work, however, with a streamlined operating system that is flexible enough to incorporate regional and local input, but robust enough to provide substantial leadership and guidance, as well as maintain an overall vision. The system that the NCCWSC is setting up now and how it is implemented is of paramount importance. All the infrastructure, operating guidelines, systems, and relationship-building that are happening now, along with building a common understanding of what climate science is out there, will be essential to helping the US respond effectively and efficiently to future issues relating to natural resources, wildlife, and climate change.

Appendix A: Agenda and List of Questions Posed to all Breakout Groups

Meeting Objectives

- Provide a “progress report” to partners about the implementation of the USGS National Climate Change and Wildlife Science Center (NCCWSC) and DOI Climate Science Centers (CSCs).
- Provide feedback on the NCCWSC and CSCs approach to science delivery and on a draft of emerging national priorities for natural resource-related climate adaptation science.
- Identify opportunities for enhancing operations of the NCCWSC and CSCs and discuss possible strategies for doing so.

Wednesday, November 30, 2011

- 8:30 am Registration and Coffee**
- 9:00 am Welcome, Introductions, and Agenda Review**
Cliff Duke, Ecological Society of America, Michael Hutchins, The Wildlife Society, and Tim Mealey, Meridian Institute
- 9:30 am Opening Remarks**
Honorable David J. Hayes, Deputy Secretary, US Department of the Interior and Suzette Kimball, Deputy Director, US Geological Survey
- 9:50 am Update on the National Climate Change and Wildlife Science Center and Climate Science Centers**
Doug Beard, Director, NCCWSC / Robin O’Malley, Policy and Partnership Coordinator, NCCWSC
- Progress on Establishing the NCCWSC and CSCs
 - Update on Funding for the NCCWSC and CSCs
 - Secretarial Order 3289 and Implications for the NCCWSC and CSCs
 - Roles of and Relationships between the NCCWSC, CSCs, and Landscape Conservation Cooperatives (LCCs)
 - Other Federal Climate Science Initiatives and How the NCCWSC and CSCs Fit within this Bigger Picture
 - Communication and Coordination with Partners
- 10:30 am Plenary Session: Questions and Discussion about DOI and USGS Update**
- 11:00am Break**
- 11:15 am Presentation of a Preliminary Outline of the National Science Plan for the NCCWSC**
- 11:45 am Plenary Session: Questions and Discussion about the Preliminary Outline of the Science Plan for the NCCWSC**
- 12:15pm Lunch**
Lunch will be provided onsite.

- 1:15 pm Overview of Approach to Breakout Groups**
Participants will be divided into breakout groups for two sessions during the meeting. For each session, participants will be divided into three groups of 15-20 people. Each breakout group will have balanced participation from federal and state government, conservation organizations, academia, and other partners. Over the course of the meeting, each breakout group will have an opportunity to address two topics related to the NCCWSC and CSCs: Science Planning and Delivery, and NCCWSC and CSC Operations and Communication with Partners.
- 1:20 pm Breakout Group Session I: NCCWSC and CSC Science Planning and Delivery**
- Are there specific strategies that will help CSC advisory committees prioritize management-relevant science needs?
 - How can the NCCWSC and CSCs foster co-development of science by scientists at the CSCs and managers who will use the science?
Are there concrete steps the NCCWSC and CSCs can take to maximize interactions between scientists and managers as questions are framed and science is developed to ensure that it is useful to managers?
 - How should the NCCWSC and CSCs foster interactions among science providers that will maximize the degree of integration/coordination and leveraging of common or related work?
 - Do you have feedback on or suggestions for the preliminary draft national science agenda for the NCCWSC? Are there things that would make it more useful to national science partners?
- 3:30 pm Break and Reconvene in Plenary**
- 3:45 pm Breakout Group Reports**
Each breakout group will provide a 10-minute report of key points and suggestions from their discussion, followed by an opportunity for questions and discussion with other participants.
- 4:45 pm Review of Day 1**
- 5:00 pm Adjourn**

Thursday, December 1, 2011

- 9:00 am Review Day 1 Outcomes and Day 2 Agenda**
- 9:15 am Breakout Group Session II: NCCWSC and CSC Operations and Communication/Collaboration with Partners**
- What should USGS and DOI do to maximize the effectiveness of the interaction between NCCWSC and CSCs? What areas of this interaction merit attention, and for these areas, what are suggested steps to address concerns?
 - What should NCCWSC and CSCs do to ensure that their outputs contribute to a wide range of adaptation efforts, while maintaining the core focus of NCCWSC and its funding on fish, wildlife, and ecosystems?

- What are effective strategies for ensuring input to CSC science agendas from nongovernmental parties and the landowner and producer / user communities?
- What topics and tasks should be addressed by the NCCWSC Federal Advisory Committee?
- What strategies and tools should the NCCWSC and CSCs use to communicate and/or collaborate with partners in addition to the Federal Advisory Committee? What topics do partners want to hear from the NCCWSC and CSCs about? How often do partners want to receive updates from the NCCWSC and CSC?

11:15 am Break and Return to Plenary

11:30 am Breakout Group Reports

12:30 pm Lunch

Lunch will be provided onsite.

1:30 pm Plenary Session: Summary of Key Discussion Points & Closing Panel

The moderator and co-chairs will provide a summary of key points from the discussions and invite a panel of participants to reflect on these.

2:45 pm Next Steps and Closing Remarks

DOI and USGS will review next steps from the meeting and for the NCCWSC and CSCs.

3:00 pm Adjourn

Appendix B: List of Attendees

Catherine Allen
Climate Change Adaptation Program Analyst,
Office of Policy
US Environmental Protection Agency

Caspar Ammann
Scientist II, Climate Science and Applications
Program
National Center for Atmospheric Research

Douglas Austen
National Coordinator, Landscape Conservation
Cooperatives
US Fish and Wildlife Service

Jeff Bradley
Manager of Forest and Wood Products Policy
American Forest and Paper Association

Arpita Choudhury
Science and Research Liaison
Association of Fish and Wildlife Agencies

Dave Cleaves
Climate Change Advisor, Office of the Chief
US Forest Service

Aja Decoteau
Watershed Department Manager
Columbia River Intertribal Fish Commission

Robert Detrick
Associate Director, Geosciences
National Science Foundation

Naomi Edelson
Director, State and Federal Wildlife Partnerships
National Wildlife Federation

Patrick Gonzalez
Climate Change Scientist
National Park Service

Steven Gray
Director, AK Climate Science Center
US Geological Survey

Heidi Hadley
National Science Advisor
US Bureau of Land Management

Eric Haxthausen
Director of US Climate Change Policy
The Nature Conservancy

Paul Houser
Science Advisor
US Bureau of Reclamation

Dale Humburg
Chief Scientist
Ducks Unlimited

Stephen Jackson
Professor, Department of Botany
University of Wyoming

Suzette Kimball
Deputy Director
US Geological Survey

Mary Klein
President and CEO
NatureServe

Chet Koblinsky
Director, Climate Program Office
National Oceanic and Atmospheric
Administration

Ginny Kreitler
Senior Advisor, Energy and Environment
National Audubon Society

Josh Lawler
Associate Professor, School of Forest Resources
University of Washington

William Lellis
Deputy Associate Director, Ecosystems
US Geological Survey

Rich Leopold
Assistant Regional Director for Science
Applications, Region 3
US Fish and Wildlife Service

Noah Matson
Vice President for Climate Change and Natural
Resources Adaptation
Defenders of Wildlife

Jerry McMahon
Director, SE Climate Science Center
US Geological Survey

Holly Michael
Conservation Policy Coordinator
Oregon Department of Fish and Wildlife

Gary Morishima
Chief Executive Officer
MORI-ko, LCC

Phil Mote
Director
Oregon Climate Change Research Institute and
Oregon Climate Services

Carolyn Olson
Senior Scientist, Climate Change Program Office
US Department of Agriculture

Sarah Ryker
Deputy Associate Director, Climate and Land
Use Change
US Geological Survey

Damian Shea
Principal Investigator, SE Climate Science Center
North Carolina State University

Greg Smith
Director
USGS Patuxent Wildlife Research Center

Deanna Spooner
Coordinator, Pacific Islands Climate Change
Cooperative
US Fish and Wildlife Service

Bruce Stein
Director of Climate Change Adaptation
National Wildlife Federation

Deanna Stouder
Associate Deputy Chief, Research and
Development
US Forest Service

Alan Thornhill
Science Advisor to the Director
US Bureau of Ocean Energy Management

John Tubbs
Deputy Assistant Secretary for Water and
Science
US Department of the Interior

Bradley H. Udall
Director, CU-NOAA Western Water Assessment
RISA
University of Colorado, Cooperative Institute for
Research in Environmental Sciences (CIRES)

Margaret Walsh
Ecologist, Climate Change Program Office
US Department of Agriculture

Greg Wathen
Coordinator, Gulf Coast Plains and Ozarks LCC
Tennessee Wildlife Resources Agency

Seth Wenger
Staff Scientist
Trout Unlimited

Madeleine West
Program Director – Wildlife, Land Stewardship,
Climate Adaptation, Renewable Energy,
Outdoor Recreation
Western Governors Association

Organizing Co-Chairs and Staff

Doug Beard
Director, NCCWSC
US Geological Survey

Shawn Carter
Science Coordinator, NCCWSC
US Geological Survey

Tricia Crocker
Meetings Associate
The Ecological Society of America

Damon Yeh
Intern - Youth in Natural Resources Career
The Wildlife Society

Cliff Duke
Director of Science Programs
The Ecological Society of America

Emily Fort
Information Coordinator, NCCWSC
US Geological Survey

Michael Hutchins
Executive Director/CEO
The Wildlife Society

Timothy Mealey
Senior Partner
Meridian Institute

Jennifer Pratt Miles
Senior Mediator
Meridian Institute

Robin O'Malley
Policy and Partnership Coordinator, NCCWSC
US Geological Survey NCCWSC

Jill Petraglia Parsons
Science Programs Manager
The Ecological Society of America

Jennifer Riem
Science Programs Coordinator
The Ecological Society of America

Sarah Walen
Senior Mediator
Meridian Institute

Yanin Walker
Operations Manager
The Wildlife Society

Charlotte Weaver
Government Affairs Intern
The Wildlife Society

Appendix C: Providing Science for Climate Adaptation: NCCWSC Progress Report Prepared for the National Partners Dialogue, Fall 2011

Executive Summary

The National Climate Change and Wildlife Science Center and DOI Climate Science Centers are being implemented based on input from a wide range of partners, guidance from Secretary Salazar and the Department of the Interior's climate strategy, and with strong Congressional oversight. ***The enterprise is intended to:***

- be strongly partner-driven
- respond directly to the needs of natural and cultural resource managers for science to address ongoing and future climate change
- leverage the intellectual capabilities of the nation's academic sector and the substantial scientific talent and assets of the federal government
- provide science on a regional basis to support decision making.

The role of CSCs and the NCCWSC is to provide scientific information to support management decision making. Its scientific niche is intermediate between very large scale, often investigator-driven science that explores how earth systems function and the immediate tactical information needs of managers. Identifying key uncertainties about how systems function, spurring research to meet those gaps, synthesizing and translating information from multiple disciplines, and delivering it to users in forms (including models, decision support tools, etc.) that they can apply to decisions.

The scientific agenda for the NCCWSC and CSC enterprise is being built from the bottom up. Landscape Conservation Cooperatives (LCCs) and other management entities identify their science needs; these are reconciled at the regional CSC level to provide *regional* priorities, and these are further aggregated and distilled to identify national scale gaps and needs. At all levels, dialogue between managers and scientists ensures the questions are both relevant and scientifically tractable.

Implementation of the NCCWSC-CSC initiative is ongoing. Locations and university partner/hosts for all eight CSCs have been identified, and staffing is underway. Three CSCs have completed initial science agendas to provide the overarching framework to guide annual decisions on project funding. CSC stakeholder advisory committees are in place in two regions and being formed in all others. Informal collaboration between LCCs, CSCs, and other partners are growing daily. A national science agenda, derived from these regional agendas is in its very-initial stages. A Federal advisory committee is being chartered and will meet in 2012. Interactions between NCCWSC, CSCs, and other major entities and initiatives such as the National Climate Assessment, National Fish, Wildlife and Plants Climate Adaptation Strategy, NEON, Inc. and others are being clarified to ensure minimal duplication and maximum effectiveness.

Key Facts About NCCWSC and CSCs

- NCCWSC was established by Congress in 2008 to provide scientific information to assist managers of the Nation's fish, wildlife, and their habitats in responding to climate change.

- Climate Science Centers were originally planned as “hubs” of NCCWSC, but their mission was expanded by Secretary Salazar; they are now Department of the Interior Climate Science Centers, managed by USGS NCCWSC.
- There are eight such centers. Five have been formally established (Alaska, Southeast, Northwest, Southwest, North Central); the remainder await fiscal year 2012 appropriations.
- CSCs and Landscape Conservation Cooperatives (LCCs) are envisioned as two integral parts of a climate science and conservation planning enterprise. LCCs are the primary partner of CSCs.
- LCC-identified science needs will form the core of the science agendas at CSCs; LCCs and other management entities will be represented on CSC stakeholder committees, and CSCs will be represented on LCC steering committees.
- CSCs will take steps to ensure that science conducted in response to these needs is managed so that outputs are of maximum use to the original intended users.
- Each CSC stakeholder committee will include representation from the region’s natural and cultural resource managers as well as regional scientific partners. These committees will **establish priorities** for needed science, and **match and leverage scientific responses** to ensure the most efficient use of limited government funds.
- CSCs are Federal-university collaboratives; USGS will have a small staff at each CSC and can access scientific capabilities and expertise across the university or consortium. Federal-university research collaboration will be encouraged.
- CSCs will support moderate numbers of graduate students and post-doctoral researchers, both to support needed research and to build a “pipeline” for training future employees.
- Based on LCC and other expressed scientific needs, each CSC will develop a strategic *science agenda* with a five-plus year horizon, and annual project funding plans. Stakeholders will be engaged in both levels of decision making.
- Based on the eight regional CSC science agendas, NCCWSC will develop a national scale agenda for climate science to support natural resource adaptation. Key research needs will be communicated to agencies that support scientific research for consideration as priorities.
- USGS and the Department of the Interior are working toward the establishment of a Federal advisory committee to provide input and guidance to the NCCWSC and CSC enterprise. An initial meeting is planned in 2012.

USGS and The Department of the Interior are committed to the success of this enterprise as a partnership effort. The National Partnership Dialogue is an important element in calibrating past and future efforts.

Introduction

At geographic scales ranging from local to national, the enterprise consisting of the National Climate Change and Wildlife Science Center and the eight regional DOI Climate Science Centers brings together scientists and managers, conducts research and other scientific activities to address key priorities related to the adaptation of natural and cultural resources to climate change, and delivers that information to those who must manage these resources in a time of change.

This progress report describes this enterprise – its key framing principles, its history and development, structure and intended goals. It is being written in late 2011, as the enterprise approaches full implementation of the core ideas identified in an extensive and stakeholder-heavy consultation process in 2008 and 2009:

- a network of eight regional centers ("hubs")
- a scientific focus on the impacts of projected climate change on fish, wildlife, ecosystems and other natural and cultural resources
- heavy emphasis on the science needs of land and resource managers, and
- extensive science-management dialogue and stakeholder engagement at multiple geographic scales.

With the convening of the National Partners Dialogue in Washington DC in Fall 2011, and the convening of a Federal advisory committee, scheduled for early 2012, NCCWSC is seeking input on its implementation of this ambitious vision.

Mandate and Core Principles

In 2008, amid mounting observations of changes in drought, wildfire, precipitation, and temperature, and projections that these trends would continue, Congress established the National Climate Change and Wildlife Science Center¹. The aim was to provide a focus for scientific activities that would enable resource managers to predict and cope with these changes.

The National Climate Change and Wildlife Science Center now manages a network of five (soon to be eight) regional Department of the Interior Climate Science Centers (CSCs) and an expanding portfolio of scientific activities intended to inform management of natural and cultural resources.

This enterprise has been shaped by the following principles:

- **Meet the scientific needs of resource managers.** NCCWSC and CSCs receive their scientific direction from consultations with those whose work involves decisions about natural and cultural resources. Landscape Conservation Cooperatives are primary partners, along with other federal, state, tribal, local, and nongovernmental partners.
- **Foster partnerships aggressively.** Effectively responding to landscape-scale changes requires ongoing engagement of multiple management partners (e.g., federal and state) as well as collaboration among science providers to ensure efficient use of resources. These partnerships require conscious development and dedicated resources.
- **Maximize resources for science.** NCCWSC and CSCs have been implemented in ways that minimize staff and facilities costs and devote the maximum amount of funding to science.
- **Utilize the strengths of both university and government.** The scientific expertise required to address climate change is growing and changing rapidly, and strong government-university collaborations enable the public to access state-of-the-science tools and expertise.
- **Focus on ecosystems, not jurisdictions.** Management of natural resources can only truly be effective if it is based on a rich understanding of the full setting, context, and extent of a species, habitat, or other ecological element.

Meet the scientific needs of resource managers. The NCCWSC/CSC enterprise is designed to respond to the scientific needs identified by resource managers. Thus, the scientific agenda for the collective efforts of NCCWSC and CSCs is not driven by an *a priori* national science agenda. Rather, this science agenda is being built up from the bottom, beginning with the needs identified by Landscape Conservation Cooperatives (LCCs) and other land, water, wildlife and other natural and cultural resource managers.

¹ Consolidated Appropriations Act of 2008, P.L. 110-161. In this bill, the center was referred to as the National Global Warming and Wildlife Science Center.

These landscape-level needs are reviewed by the CSC and its Stakeholder Advisory Committee (SAC) – which has strong management representation – to identify key regional priorities. CSC funds are directed to these needs, in order of priority as defined by the partners. Regional priorities are similarly reconciled to build a higher level national-scale agenda, with input from a national-level federal advisory committee, to be convened in early 2012. This committee will provide a vehicle for management partners to have substantive input to a national agenda and to communicate any concerns about the need for improved coordination or communication.

Foster partnerships aggressively. The scientific work of the NCCWSC and CSCs is embedded within partnerships that identify priorities, leverage resources, and ensure regional and national integration. The core partnerships for the CSC network are those with Landscape Conservation Cooperatives (LCCs) and other management entities. As noted previously, science needs identified by these managers will drive CSC scientific activities. In addition, the actual *delivery* of scientific information must involve partnerships between scientists and managers to ensure the maximum utility and applicability of the results. CSC scientists are committed to working directly with managers to ensure useful outcomes.

LCCs identify needed science, and have some of their own resources to acquire scientific support. Thus, CSCs and LCCs – and other science providers in a region – will collaboratively allocate needed scientific activities among various providers, matching tasks to resources and mandate to efficiently use public funds. CSCs are also partnerships between the federal government and universities, ensuring that the most appropriate scientific expertise is available and extending the reach of existing federal capabilities. Finally, NCCWSC and the CSCs are involved in many *internal* partnerships – leveraging the capabilities of USGS scientists and capabilities to deliver needed results.

Maximize Resources for Science. In a time of fiscal restraint, NCCWSC and the CSCs are being implemented carefully to ensure maximum availability of funds for science. As part of the federal-academic partnerships, office space for CSCs is being provided at little or no cost. Administrative support (purchasing, budget/fiscal management, etc.) being purchased from nearby USGS facilities, rather than employing new full time CSC staff for these tasks.

Beyond basic management and administration, hiring of new scientific staff is being undertaken strategically, and only after it is clear that the needed expertise does not reside in the relevant region. And scientific activities are increasingly being coordinated to maximize the benefit from each investment – in such important and expensive assets such as downscaled climate projections – as well as in specific projects. A key role for the CSC’s stakeholder advisory committees will be to provide a venue for leveraging of scientific assets in this way.

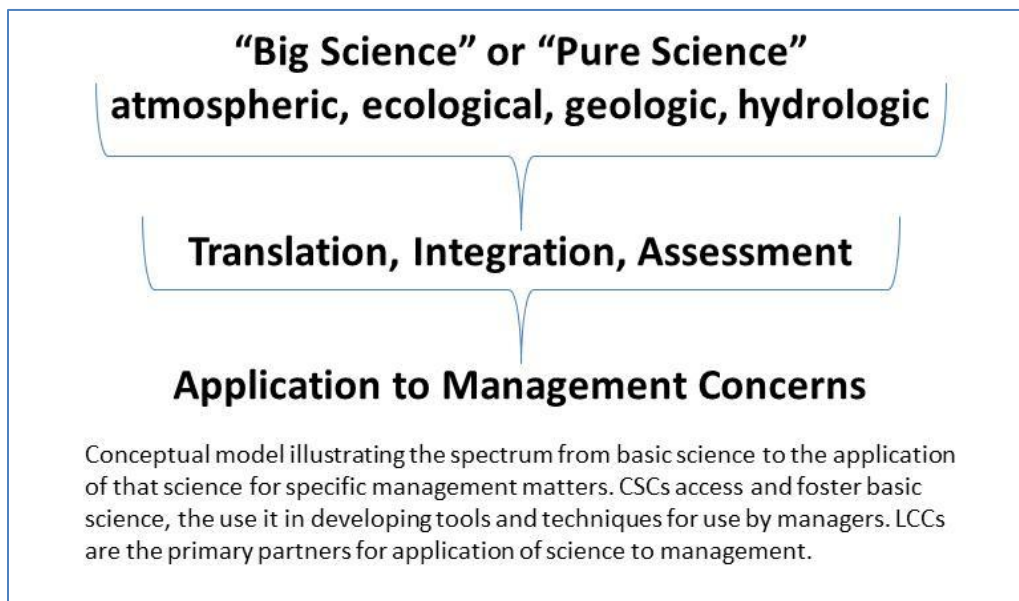
Utilize the strengths of both university and government. The scientific challenges associated with a changing climate are extraordinary, and solving these challenges will require input from a broad and rapidly changing intellectual spectrum. By establishing partnerships with key academic institutions and consortia, USGS and DOI have greatly expanded the operational capacity to answer key questions and deliver the results directly to managers. In this regard, Cooperative Fish and Wildlife Research Units were a key model for the CSCs.

Focus on ecosystems, not jurisdictions. It is now a truism of conservation science and practice that management of natural resources must involve multiple jurisdictions, ownerships, and management responsibilities. The scale of many existing problems demands such cross-jurisdictional action – and the science to support landscape scale action. A changing climate simply reinforces and strengthens the necessity of landscape-to-regional scale science and action. The effects of climate change are expected to play out at large regional scales, with similar influences across broad regions. With this in mind, the guidance to CSCs is that the science they undertake should be bounded by ecological limits – the extent

of a species range, watershed divides, vegetation coverages – rather than administrative boundaries or jurisdictional lines.

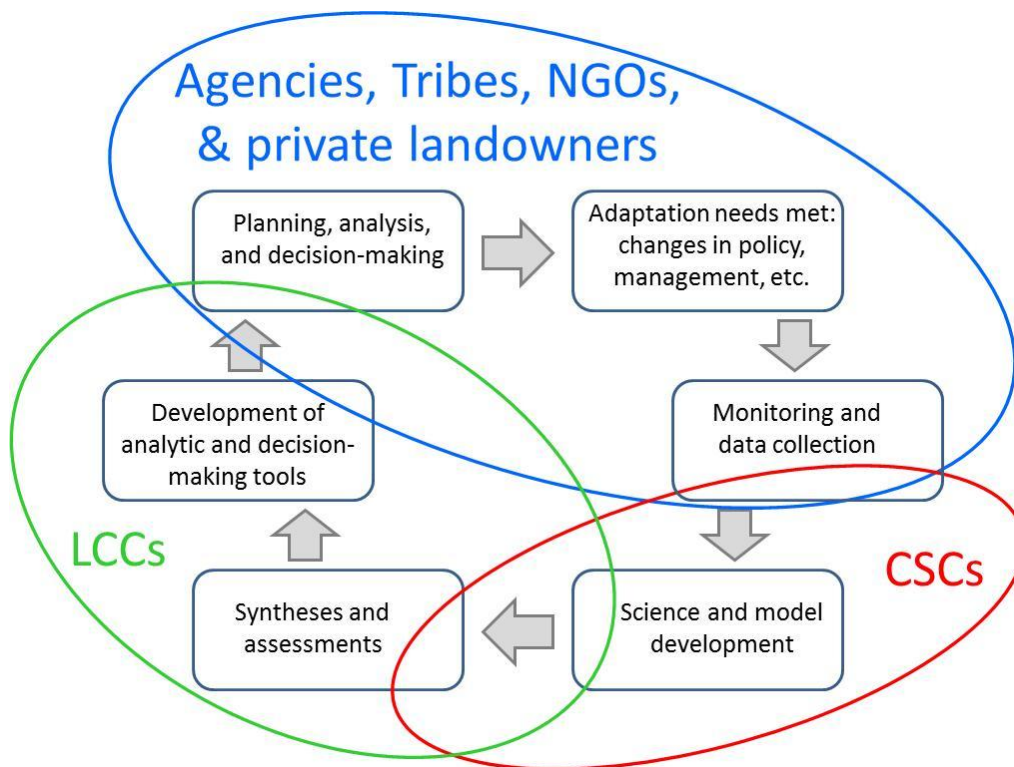
Defining a Role – The “Operating Space” for NCCWSC and CSCs

The roles of NCCWSC and CSCs are driven by their mandate to support the scientific needs of managers. Their role can be viewed as part of a continuum that begins with very high level science, which provides basic understandings about how atmospheric and ecological systems operate and interact. This basic knowledge must be synthesized and aggregated and often incorporated into decision support tools, and can be complemented and made more useful by effective translation and support for application by managers on the ground. In this view, NCCWSC and CSCs conduct new science or assemble results from others work, develop models or other application-oriented tools, and work with managers to ensure appropriate application. The Joint Fire Science Program² is an excellent model for the kind of management-oriented science and delivery effort envisioned for CSCs and NCCWSC.



A second way of describing the role for Climate Science Centers involves the development and implementation of adaptation plans – management strategies designed to assist ecosystems or components cope with the effects of changing climate. This continuum involves CSCs as sources of scientific information and tools, Landscape Conservation Cooperatives as venues where science and management intersect, enabling development of multi-party landscape-scale plans based on strong scientific foundations, and, finally, the efforts of federal, state, tribal, local, private and nongovernmental partners with direct management and implementation authority and resources. These three parties have obvious strengths and areas of special expertise, but the entire enterprise requires close collaboration between the various entities to ensure success

² See <http://www.firescience.gov>



Scientific Focus of The National Climate Change and Wildlife Science Center and Climate Science Centers

The initial five year strategic plan for NCCWSC and the CSC included five key themes for the enterprise’s scientific focus:

- Use and create high resolution climate modeling information and derivative products in order to produce key information that is needed to forecast ecological and population response at national, regional, and local levels.
- Integrate physical climate models with ecological, habitat, and population response models.
- Forecast fish and wildlife population and habitat changes in response to climate change.
- Assess the vulnerability and risk of species and habitats to climate change.
- Develop standardized approaches to modeling and monitoring techniques, to facilitate the linkage of existing monitoring efforts to climate models and ecological/biological response models.

NCCWSC has intentionally not elaborated on this strategic agenda. Rather, the development of an overall science agenda for NCCWSC and the CSC enterprise is being managed as a bottom-up affair, beginning with LCC Science Assessments, which will tier to regional Science Agendas at each CSC, and eventually tiering to a national agenda. Only three CSCs have completed initial Science Agendas.

There will be a presentation at the National Partners Dialogue that will describe the “zero-order” draft of this strategy. Also see text box (next page).

Initial Scientific Themes for a National Science Agenda for CSCs and NCCWSC

The following are very preliminary themes identified from the initial CSC science agendas available as of Summer 2011. (These include agendas from the Southeast, Northwest, and Alaska CSCs). More detailed materials will be available at the National Partners Dialogue.

- **Downscaling: Downscaling and derivative products of coupled Atmosphere-Ocean General Circulation Models (AOGCMs) specifically for fish and wildlife management applications at a regional and/or local scale.**
- **Forecasting and Scenario Development: The development of regional ecological or biological response models with direct application adaption planning and management.**
- **Vulnerability Assessment, Risk Assessment, and Uncertainty Analysis: Identifying, quantifying, or evaluating the degree to which natural or cultural resources are likely to be affected by changing climatic conditions. Vulnerability assessments should consider, sensitivity, exposure, and adaptive capacity of the resources in question to climate change.**
- **Monitoring Protocol Development: Protocols and sample designs are needed for landscape-level monitoring of climate-sensitive indicators.**
- **Development of Best Practices for Regional Analysis: Develop and distribute guidance and training that highlights accepted practices in downscaling, ecological modeling, uncertainty analysis, vulnerability assessment, etc.**
- **National Synthesis: *Generate and assess hypothesized climate impacts based upon sponsored research.***
- **Adaptation Research, Evaluation of Management Strategies.**

NCCWSC hopes and believes that the agenda created in the management-driven process will be of utility in several ways. Its primary role will be to assist NCCWSC is designing its national science strategy – projects undertaken at the national level to complement or knit together or contribute to regional science. A second role, however, will be to communicate to those agencies with national science assets and programs the most important and large scale questions arising as the natural and cultural resource management community confronts climate change – with the express intent of enlisting these agencies to assist in answering these large / difficult questions. This process of engagement is in its early stages, and it is likely that the roster of scientific questions will evolve over time. The periodic updating of the national science agenda will allow this evolution to be communicated to science agencies.

History and Development

As this report is written, the concept of a national asset designed to provide scientific support for decisions about managing for climate impacts on the nation’s fish and wildlife, and their ecosystems is about four years old, the framework of eight regional centers is just over two years old, and decisions about the location of the eight CSCs are, in some cases, only weeks old. This is truly a work in progress.

2008 – First Steps. In the Fiscal Year 2008 appropriations act³, Congress provided \$1.5 million for establishment of what was then called the National Global Warming and Wildlife Science Center, which became NCCWSC.

With this initial seed funding, USGS identified and funded five demonstration projects that illustrated the nature of the science to be undertaken by the new Center⁴. In addition, it began a stakeholder consultation process that drove the eventual structure and function of the new entity. This process was

³ Consolidated Appropriations Act of 2008, P.L. 110-161.

⁴ See http://nccwsc.usgs.gov/documents/NCCWSC_2008_Project_Accomplishments.pdf

chaired by the Ecological Society of America and The Wildlife Society, ably assisted by the Meridian Institute, a public policy facilitation organization. A major national meeting in December 2008 was followed by four regional listening and strategy development meetings, capped by a smaller, final national meeting in July 2009⁵.

This process identified key elements of the new National Climate Change and Wildlife Science Center. These include:

- Small headquarters and a network of eight regional centers (called “hubs” at the time).
- Extensive partner involvement in decision making – such as the concept of a stakeholder committee to shape the agenda for each CSC.
- A science program focused on bridging the distance between atmospheric science and conservation action: conducting research, synthesizing and aggregating research findings, developing tools for managers, and helping to effectively manage and enable access to the extensive data needed for both science and decision making.

2009-2010 – A Broader Mission and the First CSCs. Fiscal years 2009 and 2010 brought significantly increased resources -- \$10.0 million and \$15.0 million, respectively, enabling serious implementation to begin.

Because Climate Science Centers were in the planning and early startup stages, NCCWSC undertook a national level request for proposals to begin scientific activities in support of climate adaptation planning. A total of 23 individual research projects (generally 3 years in duration) were funded, addressing a wide range of geographic areas and ecosystems, and focusing on both broad questions of ecosystem response as well as on specific aquatic and terrestrial species. See http://nccwsc.usgs.gov/projects_FY09.shtml.

In addition, in September 2009, Interior Secretary Salazar signed Secretarial Order 3289 (SO3289), which, among other things, recognized CSCs as *assets of the entire Department of the Interior (DOI)*, with a mission to provide science to support adaptation decision making for all natural and cultural resources within the purview of DOI.

SO3289 raised concerns that the expansion of the CSC mission might result in dilution of the effort devoted to fish and wildlife and their habitats, as CSCs were asked to address broader concerns of DOI bureaus. USGS believes this concern is less problematic than it may seem, for several reasons. First, effectively addressing fish and wildlife concerns demands an *ecosystem approach*, in which a full range of ecological context and setting are considered. This approach can and indeed should be a basic element in a wide range of natural and cultural resource management decisions, meaning that the core science undertaken by CSCs is in fact applicable to a wider range of concerns. Second, the decision making process of CSCs is managed such that USGS NCCWSC funds – which are appropriated to address fish, wildlife, and ecosystems – will be applied only to science activities consistent with the appropriations mandate. In practice – acknowledging a very short history – USGS has not been presented with science demands that would go beyond the breadth of NCCWSC’s funding.

The broader departmental mandate can also result in provision of resources matching the mandate. For example, the National Park Service is currently recruiting social scientists to be stationed in at least two and perhaps three CSCs, increasing the CSCs’ intellectual breadth and capacity, and supporting NPS decision making on cultural and related resources. USGS and the Bureau of Reclamation (BOR) are

⁵ A report of this process and its recommendations can be found at <http://nccwsc.usgs.gov/documents/TWS-ClimChgReportFINAL.PDF>

currently working on an agreement to enable BOR funds to access the scientific expertise at CSC host universities, again enabling the CSC to contribute to addressing issues arguably beyond the mandate of appropriated NCCWSC funds. The Environmental Protection Agency has also agreed to station a scientist at the Northwest CSC, to address, and preliminary discussions have been held with the US Forest Service on a similar arrangement.

In Fiscal Year 2010, USGS began the process of establishing CSCs with the identification of the University of Alaska as the location for the first CSC, and initiated competitive selection of host institutions for four additional Centers. The Alaska, Northwest, and Southeast Centers were formally established in September 2010, with Fiscal Year 2010 funds. Implementation of the Southwest and North Central CSCs was delayed by the late passage of appropriations legislation for Fiscal Year 2011, and these centers were established in June 2011. In October, Secretary Salazar announced the locations for the remaining three CSCs – in the Northeast, South Central, and Pacific Islands regions, completing the planned suite of eight regional DOI Climate Science Centers (see box at end of report).

The CSC host selection process emphasized two key criteria – the strength of both climate and ecosystem impact science capabilities the university could provide access to, and demonstrated orientation to delivering science for natural resource decision making. Proposals were reviewed by a Technical Review Panel with representation from all Interior Department bureaus as well as the US Forest Service and National Oceanic and Atmospheric Administration, with USGS as a non-voting chair. The resulting host institutions and consortia provide an extremely strong and deep source of scientific capabilities, across a wide range of subject areas that complement and extend USGS and other government science assets.

2009 and 2010 also saw the hiring of key headquarters / NCCWSC staff, moving from a skeleton crew of detailees to a small core of permanent staff.

2011 – Implementation and Planning. With establishment of the initial suite of CSCs, efforts turned to development of the core institutional elements needed to make these centers successful. NCCWSC is building CSCs with several key elements:

- **Strong linkages to partners, especially LCCs.** Each CSC will include a formal advisory committee, with representation from their region’s Landscape Conservation Cooperatives, other management entities, and other government science providers in the region. This “Stakeholder Advisory Committee” (SAC) will provide broad input on a strategic level (see more on planning below) and on the specific annual work plans of the CSC. This formal mechanism is being augmented by strong informal links between the CSC staff and partners. At present, only two Stakeholder Advisory Committees have been established, and one of these (the Alaska Climate Change Executive

Membership on the Executive Stakeholder Advisory Committee for the Northwest Climate Science Center
(March 30, 2011 inaugural meeting)

Affiliated Tribes of Northwest Indians (ATNI) – Co-chair
 US Geological Survey – Co-chair
 Great Basin LCC
 Great Northern LCC
 North Pacific LCC
 Swinomich Indian Tribal Community
 Columbia River Intertribal Fish Commission
 State of Washington
 State of Montana
 State of Oregon
 National Park Service
 Bureau of Reclamation
 Bureau of Land Management
 US Fish and Wildlife Service
 Environmental Protection Agency
 US Forest Service
 Natural Resources Conservation Service
 US Army Corps of Engineers
 Bonneville Power Administration
 National Oceanic and Atmospheric Administration
 Federal Highway Administration
 University of Washington-observer
 Oregon State University-observer

Roundtable, ACCER) was established prior to the advent of CSCs. Agencies or entities represented at the first Northwest CSC Executive Stakeholder Advisory Committee are listed in the table below. (See box) In most cases, the SAC will be chaired by the relevant USGS Regional Executive.

- **Transparent science planning – both strategic and tactical.** On a roughly five-year basis, each CSC will develop a “regional science agenda” that is intended to identify the key scientific questions arising from the challenges faced by natural and cultural resource managers in the region. This plan will necessarily be broader than the agenda for NCCWSC funds⁶, facilitating a broad regional dialogue about priorities and how to efficiently meet these science needs, leveraging CSC funds and scientists with those of other agencies / science providers. Tiering from this strategic view of the management-driven science needs, each CSC will develop an annual funding plan, identifying its funding targets as part of the larger regional dialogue.

In addition, USGS has hired permanent CSC directors for three Centers (see table) and is recruiting for these positions at the two Centers established in June 2011, with selection expected before the end of 2011. NCCWSC (“headquarters”) is at near-final configuration, with four senior staff, one post-doctoral researcher, and administrative support.

Finally, as the new CSCs are gaining their footholds, the initial, nation-wide FY2009 research funding projects are nearing completion. In FY12 and beyond, these funds (and future budget increases) will largely be allocated to CSCs to be directed to regionally-identified high priority topics, rather than being directed through national RFPs.

Climate Science Centers – Basic Structure and Operations.

- **University-government joint enterprise.** A CSC is comprised of a small Federal staff, aligned with key principal investigators from the host university / consortium. Administrative arrangements enable funding to flow to scientists in any part of the university / consortium.
- **Stakeholder Advisory Committee (SAC).** As described above, stakeholders from both management and science perspectives will be engaged in setting priorities and identifying efficient ways to meet identified needs. Legal constraints preclude formal membership by nongovernmental parties on this committee, but each CSC will solicit input from nongovernmental organizations, landowner groups, etc.
- **Strategic science agenda and annual science plan.** As noted above, each CSC will develop a long range (5-10 year) strategic agenda, and will develop its annual plans based on this larger perspective.
- **Commitment to co-development.** The framing of science questions and the conduct of the research itself is not viewed by CSCs as “their” job – rather it is a joint enterprise with the management entities that demanded the information and will use it in their work. CSCs are committed to ensuring that this vital translation and assistance approach is a part of every project.

⁶ As noted, NCCWSC funding is intended by Congress to be applied to fish, wildlife and ecosystems.

Advisory Mechanisms for CSCs and NCCWSC

As part of its commitment to partnership-drive science, DOI and USGS are establishing a number of advisory mechanisms to ensure that partners have the formal access they desire as the program evolves.

CSC Stakeholder Advisory Committee – established at each CSC, with representation from both regional management entities and science providers. Function is to both reach agreement on regional science priorities and to leverage the assets of regional science providers to effectively provide the needed knowledge. At present, these committees may include only federal, state, tribal and other governmental representatives, to comply with the Federal Advisory Committee Act.

Advisory Committee on Climate Change and Natural Resources Science – DOI is in the process of establishing a formal Federal advisory committee to provide guidance an input to the overall NCCWSC and CSC enterprise. Federal, state, tribal, nongovernmental and other partners will be included. Expected date of first meeting is mid-2012.

Science Implementation Panels – Identified in early plans as committees of practicing scientists that could assist reviewing proposed projects for funding and assist in ensuring engagement of the appropriate scientific assets in the region, regardless of institution. At present, USGS is considering whether these roles are best played by a formal committee or not. A decision on how these functions will be handled is forthcoming

How NCCWSC and CSCs Relate to Other Programs and Partners

The following short notes illustrate the breadth and nature of the interactions between CSCs, the National Climate Change and Wildlife Science Center and many other federal, state, and other partners. This is not, and cannot be a complete list – new linkages are forged daily and weekly.

- **Native American / Indian Tribes:** NCCWSC has entered into an agreement with the National Congress of American Indians for advice and guidance on identifying and recruiting tribal representatives for CSC Stakeholder Advisory Councils⁷, and on the conduct of government to government consultation on the Centers. Two tribes and one tribal college are formal partners in CSCs.
- **National Climate Assessment (NCA):** USGS and NCCWSC are strongly supportive of the NCA. NCCWSC is leading the biodiversity and ecosystem services component, and several CSCs has initiated activities in support of NCA. However, the majority of funds from both NCCWSC and CSCs will be directed to activities identified by LCCs and other management partners.
- **US Forest Service:** The FS is a major land management partner of DOI, and shares many landscapes and issues. Forest Service representatives will be on regional CSC stakeholder bodies, helping to set priorities and to identify common research activities, and on the federal advisory committee being established for NCCWSC and the CSCs. The two agencies initiated joint projects in the Northwest and Southeast regions, focusing on aquatic resources as key common concerns for both agencies. FS has provided a full time liaison position to NCCWSC and other DOI programs.
- **NEON:** While both NEON and CSC/NCCWSC are in relatively early stages of development, initial conversations have identified two areas for future collaborations. The first is related to NEON's data collection / monitoring components, where NEON may play a role in rationalizing regional monitoring activities. The second relates to NEON's continental-scale approach. As CSCs identify

⁷ Each CSC Stakeholder Advisory Committee will include tribal representatives.

regional and national issues, collaboration with NEON in exploring large scale questions is a natural partnership.

- **National Oceanic and Atmospheric Administration:** NOAA is a major science and management partner of DOI, and shares many issues and concerns. DOI and the Department of Commerce have entered into an MOU pledging collaboration on climate science and services. Several CSCs were (intentionally) co-located with or have common Principal Investigators with NOAA Regional Integrated Science and Assessment programs (RISA), to leverage common interests and minimize duplication. Work is underway on collaborative work related to downscaling and regional projection, and assessment of the networks providing science at the regional level.
- **Landscape Conservation Cooperatives:** LCCs are the primary partners of CSCs and the NCCWSC. Their identification of conservation priorities and resulting science needs will form the core of the science agenda for each CSC. Both groups will invite the others' participation on relevant stakeholder and priority-setting bodies. CSCs have made a strong commitment to working closely with LCCs and management entities on the framing of research plans, conduct of the work, and delivery of the result (and ensuring our university partners do as well).
- **State governments:** States are primary natural resource management partners with DOI. CSCs will invite state participation on their stakeholder committees, in addition to states' engagement with LCCs. CSCs are also frequently associated with Cooperative Fish and Wildlife Research Units, and there are already multiple examples of joint activities.
- **National Fish, Wildlife and Plants Climate Adaptation Strategy (NFWPCAS)** –Staff from USGS (although not CSCs) are contributing significantly to the NFWPCAS, and NCCWSC has been involved at the Steering Committee level. This strategy should serve as a common reference for federal, state, and other partners concerned with adaptation.

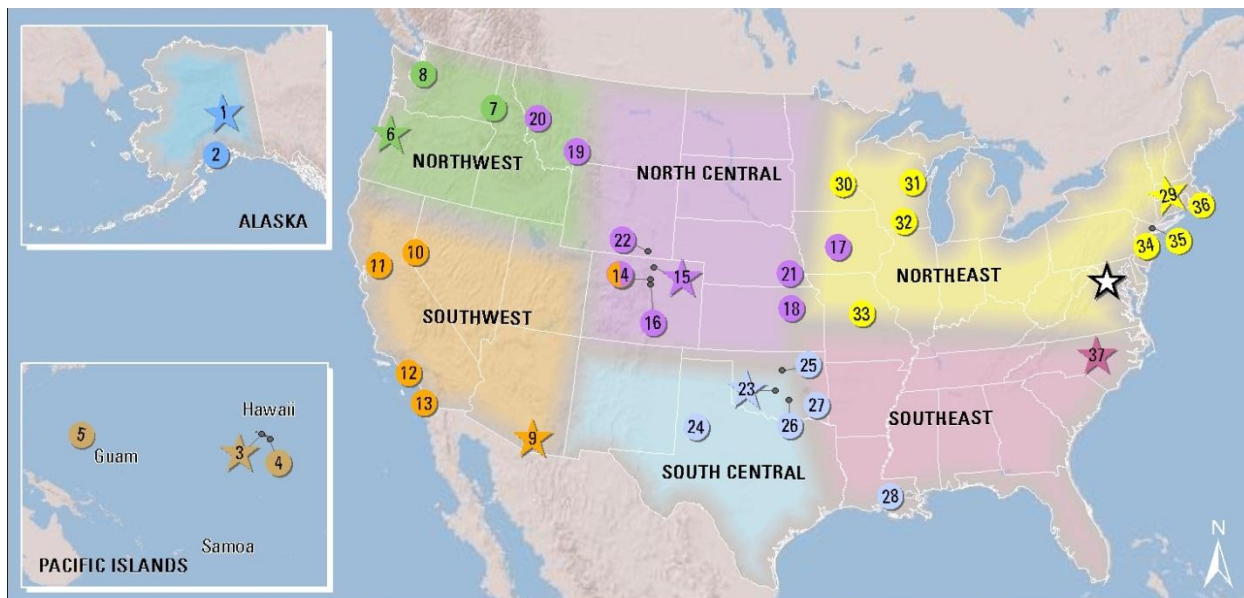
Again, this list is illustrative. NCCWSC and CSCs are moving forward to build collaborative relationships to ensure the right science gets done efficiently and effectively, and the right people get and can use the results.

A Partnership Driven Enterprise

The enterprise consisting of Landscape Conservation Cooperatives, Climate Science Centers, and the National Climate Change and Wildlife Science Center is committed, in its structure and operations to a partnership-driven model.

At each geographic scale – LCCs at a “landscape” scale, CSCs at the regional level, and NCCWSC at the national scale – will be guided by interlocking stakeholder entities. LCCs have Steering Committees with broad membership, which will include representation from the relevant CSC. Each CSC has a stakeholder body, which although limited in formal membership, will solicit input from a wide range of partners, and will include formal membership from LCCs and other managers. USGS is establishing a Federal advisory committee, which will include federal, state, tribal, NGO, academic, and private interests.

This structure is intended to ensure that the enterprise focuses on the right scientific questions in the right places, and delivers the answers in an effective and efficient manner. The National Partners Dialogue is intended as a key opportunity for partners to provide feedback on realizing this important goal.



Base from ESRI, 2009
 Albers Equal Area Conic Projection
 North American Datum of 1983

EXPLANATION

- ★ National Climate Change and Wildlife Science Center
- ★ (with number) CSC Lead Institutions
- ② CSC Institutions
- Alaska CSC
 - 1. University of Alaska - Fairbanks
 - 2. University of Alaska - Anchorage
- Pacific Islands CSC
 - 3. University of Hawaii at Manoa
 - 4. University of Hawaii at Hilo
 - 5. University of Guam

- Northwest CSC
 - 6. Oregon State University
 - 7. University of Idaho
 - 8. University of Washington
- Southwest CSC
 - 9. University of Arizona
 - 10. Desert Research Institute (Nevada)
 - 11. University of California - Davis
 - 12. University of California - Los Angeles
 - 13. Scripps Institute of Oceanography
 - 14. University of Colorado

- North Central CSC
 - 14. University of Colorado
 - 15. Colorado State University
 - 16. Colorado School of Mines
 - 17. Iowa State University
 - 18. Kansas State University
 - 19. Montana State University
 - 20. University of Montana
 - 21. University of Nebraska - Lincoln
 - 22. University of Wyoming
- South Central CSC
 - 23. University of Oklahoma
 - 24. Texas Tech University
 - 25. Oklahoma State University
 - 26. Chickasaw Nation
 - 27. Choctaw Nation of Oklahoma
 - 28. Louisiana State University

- Northeast CSC
 - 29. University of Massachusetts Amherst
 - 30. University of Minnesota
 - 31. College of Menominee Nation
 - 32. University of Wisconsin - Madison
 - 33. University of Missouri Columbia
 - 34. NOAA Geophysical Fluid Dynamics Laboratory
 - 35. Columbia University
 - 36. Marine Biological Laboratory
- Southeast CSC
 - 37. North Carolina State University

Figure 1. Locations of the U.S. Geological Survey National Climate Change and Wildlife Science Center (NCCWSC) and Department of the Interior (DOI) Climate Science Center (CSC) lead institutions and consortia partners.

Climate Science Center Locations, Partners, and Leadership			
<p>Alaska Climate Science Center</p> <p>USGS Director: Dr. Steven Gray Investigator (PI): Dr. Scott Rupp</p> <p>Host: University of Alaska Fairbanks (in Anchorage) University Principal www.doi.gov/csc/alaska</p>	<p>Northwest Climate Science Center</p> <p>USGS Director: Dr. Gustavo Brisbal University PI: Dr. Phil Mote (OSU)</p> <p>Host: Oregon State University (OSU), with University of Washington, University of Idaho www.doi.gov/csc/northwest</p>	<p>Southwest Climate Science Center</p> <p>USGS Interim Director: Dave Busch University PI: Dr. Jonathan Overpeck (UA)</p> <p>Host: University of Arizona (UA), with University of Colorado, University of California Davis, University of California Los Angeles, Desert Research Institute, and Scripps Institution www.doi.gov/csc/southwest</p>	<p>North Central Climate Science Center</p> <p>USGS Interim Director: Jay Hestbeck University PI: Dr. Dennis Ojima (CSU)</p> <p>Host: Colorado State University (CSU), with University of Colorado, Colorado School of Mines, Iowa State University, University of Montana, University of Nebraska-Lincoln, Kansas State University, Montana State University, and University of Wyoming www.doi.gov/csc/northcentral</p>
<p>Southeast Climate Science Center</p> <p>Director: Dr. Gerard McMahon University PI: Dr. Damian Shea</p> <p>Host: North Carolina State University www.doi.gov/csc/southeast</p>	<p>North East Climate Science Center</p> <p>USGS Interim Director: Rachel Muir University PI: Dr. Richard Palmer</p> <p>Host: University of Massachusetts, with College of Menominee Nation, Columbia University, Marine Biological Laboratory, University of Minnesota, University of Missouri at Columbia. University of Wisconsin at Madison www.doi.gov/csc/northeast</p>	<p>South Central Climate Science Center</p> <p>USGS Interim Director: Allison Shipp University PI: Dr. Berrien Moore</p> <p>Host: University of Oklahoma, with Texas Tech University, Louisiana State University, The Chickasaw Nation, The Choctaw Nation of Oklahoma, Oklahoma State University, and NOAA's Geophysical Fluid Dynamics Laboratory www.doi.gov/csc/southcentral</p>	<p>Pacific islands Climate Science Center</p> <p>USGS Interim Director: Loyal Mehrhoff, USFWS University PI: Dr. Charles Fletcher</p> <p>Host: University of Hawaii-Manoa, with University of Hawaii-Hilo and University of Guam www.doi.gov/csc/pacific</p>
<p>National Climate Change and Wildlife Science Center</p> <p>Director: Dr. Douglas Beard</p> <p>USGS Headquarters, Reston Virginia http://nccwsc.usgs.gov</p>			

Appendix D: Selection of Slides Presented at the National Partners Dialogue

From Doug Beard's Presentation Updating Partners on the Status of the NCCWSC and DOI CSCs

National Climate Change & Wildlife Science Center

- **Mission**

Provide **natural resource managers** with the **tools and information** they need **to develop and execute management strategies** that address the impacts of climate change on **fish, wildlife, and their habitats**

- **Focus on climate change adaption & impacts**

"Adjustment in natural or human systems in response to actual or expected climatic change effects, to moderate harm or exploit beneficial opportunities"



NCCWSC Science Priorities

- Assessments of current climate change information
- Understand climate from natural effects on plants/animals
- Synthesize forecasting of adaptation to climate change
- Quantify species and habitat vulnerability
- Develop clearinghouse & network capacity for data
- Develop management tools



DOI Climate Science Centers

A New Paradigm

- Linking Physical, Biological, and Social Science
- Scenario/Forecasts of Future Possibilities
- Link Research, Modeling, Synthesis, and Monitoring in a Landscape/System Perspective
- Science Collaboration/Resource Management Collaboration
- Stakeholders set priorities/Provide Review & Feedback
- Share Data and Information



From Shawn Carter's Presentation on a Preliminary Outline of the NCCWSC Science Plan

Our Guiding Principles for Scientific Research

- Be inspired by and responsive to the needs of the land management community
- Place priority on evaluation, translation, and synthesis of climate impact research findings
- Promote rigorous, objective, and integrated research that advances **fundamental understanding** of climate impacts to natural resources
- Disseminate results broadly and foster professional scrutiny, critique, and learning
- Seek out and promote institutional efficiencies and leveraging opportunities in climate impact research

Goal 1: Assess and synthesize our state of knowledge about climate change impacts to all lands and waters

- Determine priority gaps in scientific understanding of climate change impacts.
- Predict fish and wildlife population changes in response to climate change.
- Assess the vulnerability of species and habitats to climate change.

Goal 2: Work with resource managers to develop adaptation methods that minimize climate change impacts to the Nation's fish, wildlife, and habitats.

- Generate predictive modeling and decision-support capability to address climate impacts to land, water, biological, and ecosystem resources.
- Develop or refine landscape-level protocols that link existing monitoring efforts to models of climate and ecological and biological response.
- Develop data management policies and practices to ensure that NCCWSC-generated data and research results are shared and interoperable with other climate initiatives.

*Goal 3: Foster research that investigates the **interactions** between climate and the physical, biological, and chemical forces that **influence ecosystem structure & function and the goods and services** they provide.*

- Link physical climate models with biological and ecological responses at management-relevant temporal-spatial scales and ecological endpoints.
- Refine, apply, and interpret watershed and ecosystem process models that directly inform climate change adaptation strategies.
- Coordinate the intercomparison ecosystem and ecosystem service modeling platforms

General Research Themes

- National Synthesis of Climate Impacts to Fish, Wildlife, and Associated Ecosystems
- Development of Best Practices for Regional Analysis
- Forecasting and Scenario Development
- Vulnerability Assessment, Risk Assessment, Uncertainty Analysis
- Downscaled Derivative Products
- Ecosystem Processes, Services, and Resilience
- Integrated Monitoring Design and Protocols
- “Adaptation Research”, Evaluation of Adaptation Strategies

Governance – CSC Stakeholder Advisory Committees

- ❖ DOI, other feds, states, tribes, local governments.
- ❖ NGOs, private landowners, etc. cannot be formal members
- ❖ Roles:
 - Agree on a regional science plan (~5-10 years), based on management-derived needs, with ordered priorities.
 - Agree on annual project selection
- ❖ Chaired by USGS REX
- ❖ Meets at least annually; identify forward priorities, review past products
- ❖ Science plan must address
 - ❖ Science/research priorities
 - ❖ Monitoring priorities
 - ❖ Information management—strategies, systems, sources
 - ❖ Scientific resources and skills (gap analysis)

CSCs and Tribes – Engagement To Date

- Commitment to include tribal members on CSC Stakeholder Advisory Committees
 - NW CSC – co-chaired by ATNI / Swinomish Chairman
- Commitment to government to government consultation
 - NCAI advising on who and how
- College of Menominee Nation – formal partner in NE CSC
- Chickasaw Nation and Choctaw Nation of Oklahoma – formal members of SC CSC
 - USGS supporting full-time tribal sustainability officer
- Seeking tribal members for Federal Advisory Committee
- Tribal members invited to National Partners Dialogue