

Providing Science for Climate Adaptation

**The National Climate Change and Wildlife Science Center and
DOI Climate Science Centers**

Progress Report – FALL 2011

Prepared for the National Partners Dialogue

November 30-December 1, 2011

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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.

Providing Science for Climate Adaptation

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Progress Report

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DOI Science Centers and National Climate Change and Wildlife Science Center are moving forward to provide answers to key questions about how natural and cultural resources of the US will be affected by climate and other global changes, and how managers may plan for adapting to these changes.

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. 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,

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.

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.

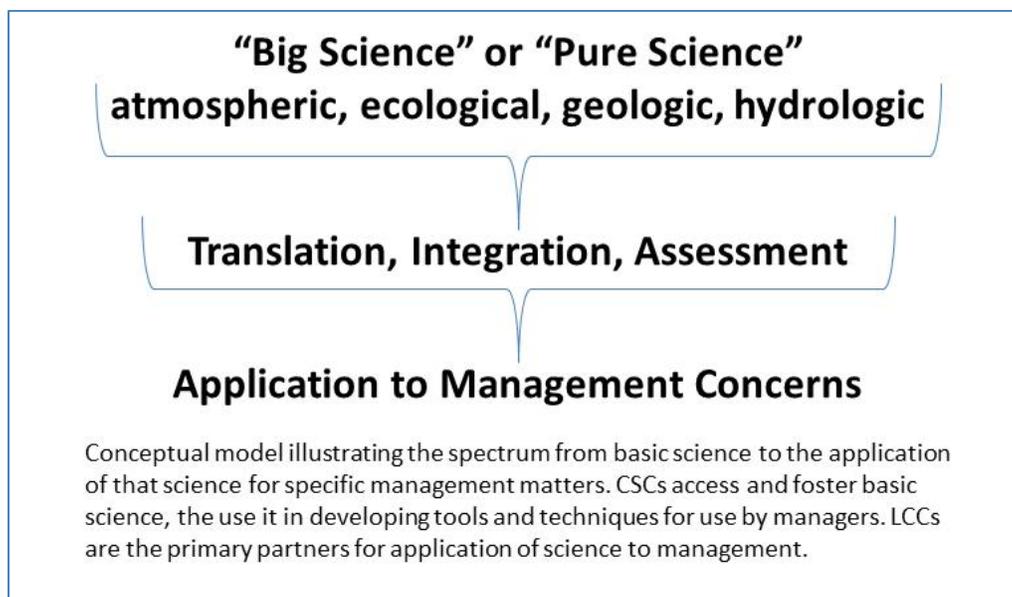
Utilize the strengths of both university and government. The scientific challenges associated with a changing climate are extraordinary, and solving these challenges will require input from a broad and rapidly changing intellectual spectrum. By establishing partnerships with key academic institutions 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.

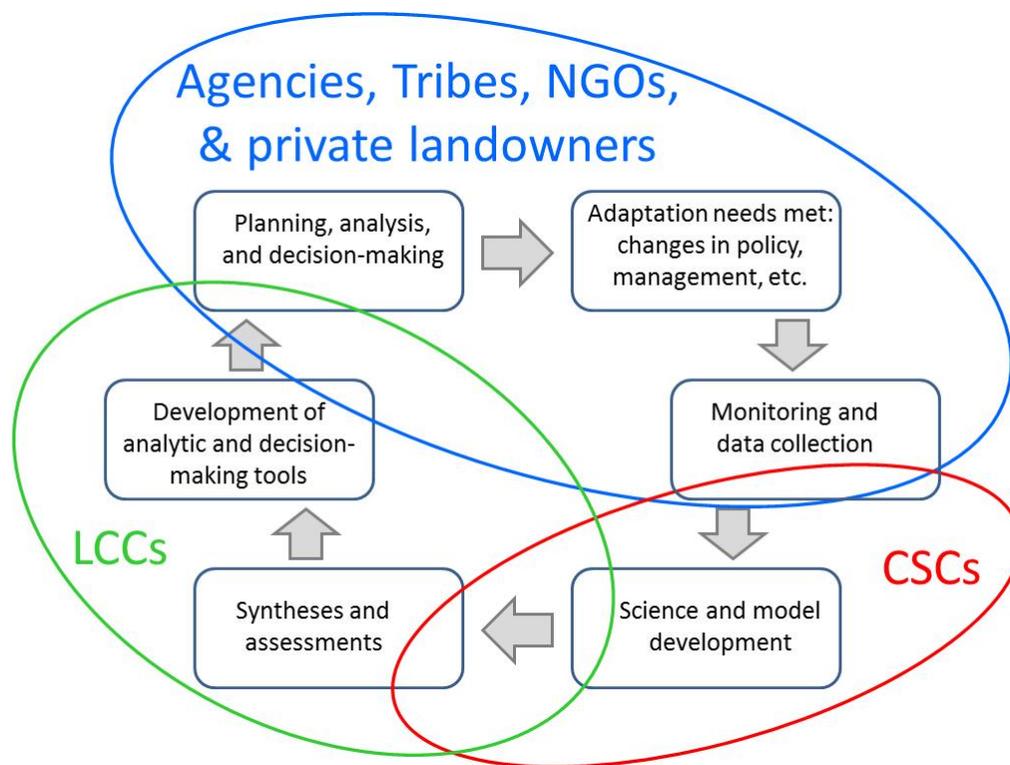
Defining a Role – The “Operating Space” for NCCWSC and CSCs

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 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

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

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

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

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 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 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.

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

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.

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

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.

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 and 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 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 invites 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.

⁷ Each CSC Stakeholder Advisory Committee will include tribal representatives.

- ***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.

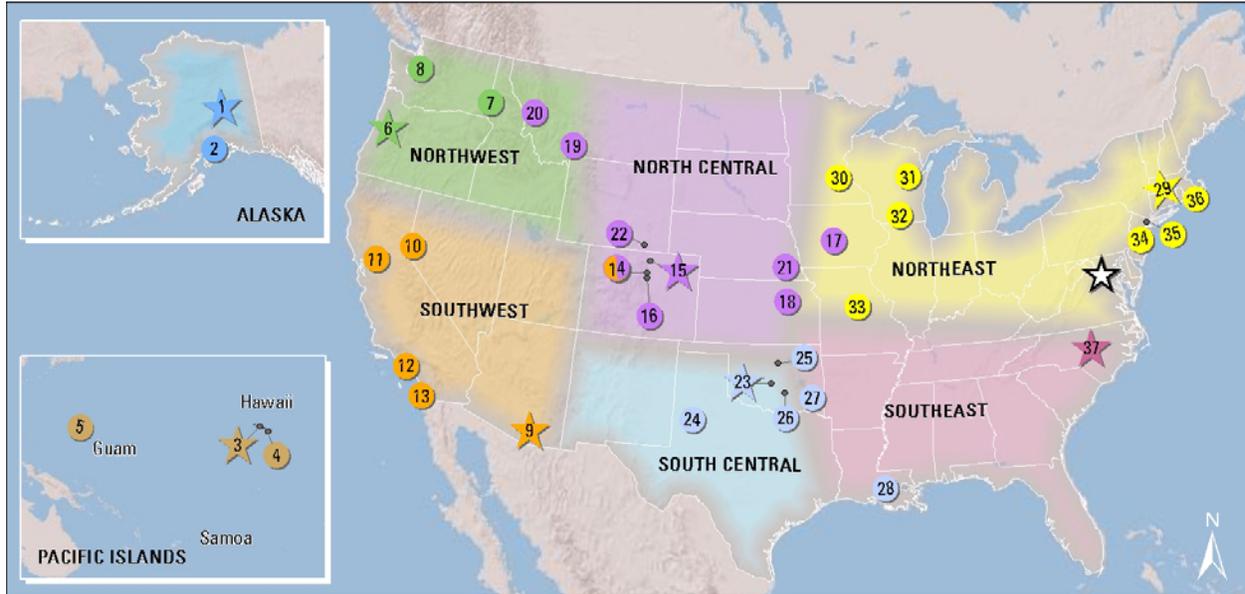
Again, this list is illustrative. NCCWSC and CSCs are moving forward to build collaborative relationships to ensure the right science gets done efficiently and effectively, and the right people get and can use the results.

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
- ★ 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 align="center">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 align="center">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 align="center">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 align="center">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 align="center">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 align="center">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 align="center">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 align="center">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 align="center">National Climate Change and Wildlife Science Center Director: Dr. Douglas Beard USGS Headquarters, Reston Virginia http://nccwsc.usgs.gov</p>			