

**National Climate Change and Wildlife Science Center**

**Summary Workshop Report**

**December 3 – 4, 2008**

## Executive Summary

In the FY08 appropriation, Congress included \$1.5 million for the U.S. Geological Survey (USGS) to be used for climate change research and to establish a national center. The goal was to improve the science capacity for federal agencies to respond to global warming and enhance science capacity in federal land management agencies with responsibilities for fish and wildlife. The funding was recognition of the pressing need to better understand the effects of climate change on adaptation of the nation's fish and wildlife resources. With this funding, the USGS established an Interim Steering Committee of ten federal agencies to help develop the approach for the National Climate Change and Wildlife Science Center and initiated research on relevant fish and wildlife projects.

On December 3–4, 2008, the USGS convened a workshop that brought together nearly 200 representatives from invited state and federal agencies, tribal organizations, academia and non-governmental organizations to identify research needs and priorities, devise strategies for partnerships and collaboration, and to begin to design a structure for the Center. Prior to the workshop, participants were asked to prepare to contribute their agency's or organization's perspective, capabilities, information needs and priorities, and potential collaborations. The broad draft objectives that had been developed by the Interim Steering Committee with input from the states and other interested organizations were provided to participants and are listed below. Fish and wildlife scientists engaged in climate change research were at the workshop to provide information on the current status of assessment, synthesis and forecasting efforts. The goal of the workshop was to discuss and determine the role of the Center in coordination of priority assessment, monitoring and research for the benefit of the fish, wildlife and natural resources managers facing the adaptive management challenge of adaptation of fish and wildlife in the face of climate change.

- Build Science Basis and Capacity: Assess and synthesize the current physical and biological scientific knowledge and prioritize scientific gaps in order to forecast the ecological impacts of climate change on fish and wildlife at the ecosystem, habitat, community, population and species levels.
- Develop Tools for Adaptive Management: Develop and improve tools to identify, evaluate, and, where appropriate, link together different scientific approaches and models for forecasting the impacts of climate change and adaptation on fish, wildlife and their habitats. Such tools include monitoring, predictive models, vulnerability analyses, risk assessments and decision support systems to help managers make informed decisions.
- Participate in Adaptive Management and Monitoring: Participate actively in collaborative processes with federal and state agencies and other partner organizations to develop and implement strategies to manage and monitor fish and wildlife adaptation to changing climate.

The following report is a summary of the workshop's plenary sessions and reports of the discussions from twelve breakout groups. The groups were organized to provide the broadest representation of agency and organization perspective in each group.

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**NCCWSC Plenary Session and Expert Panel Notes  
December 3 - 4, 2008**

## **Wednesday, December 3**

### ***Introductory Presentation***

#### **Dr. Susan Haseltine, Associate Director for Biology, USGS**

The National Climate Change and Wildlife Science Center Workshop was conceived from 2008 appropriation language, which included \$1.5 million assigned to initiate and run the Center. The intent of the Center is to provide information and resources to a variety of partners in fish and wildlife science and management. Needs assessed from consultation prior to the workshop included having the Center provide:

- Information on long-term change across all landscape levels (local to international)
- Synthesized information
- Adaptive management approaches

From these issues it's clear that we need to find the most effective ways to provide this information and clearly communicate it. Managers on the ground need options. A steering committee of federal agencies, states, NGOs and academics was formed to develop the workshop agenda and initiate ideas on what the Center should do. Out of those meetings came the following objectives:

- Build on current collaborations and partner approaches
- Develop a preliminary set of high-priority needs
- Develop a collaborative approach
- Strengthen our ability to forecast the future
- Build adaptive management strategies

The challenges surrounding these activities are many. They include huge voids in the science, climate change signals separated from other signals in the environment, prioritizing an array of end-points that need forecasting and creating real adaptive management practices.

The main goals of this workshop then, are to discuss the following in light of the Center and its mission:

- Build and integrate basic and applied science including modeling and adaptive management approaches
- Identify gaps in the science
- Discuss uncertainty in projecting future information in time and space
- Develop tools to create predictive models and work on vulnerability models
- Actively promote adaptive management and monitoring efforts

Each participant's role in the workshop is to contribute your perspective, information, needs and priorities in helping to refine the objectives developed by the steering committee. In offering your thoughts please consider our aim at consensus recommendations, thinking at the landscape and local scales simultaneously, thinking about leveraging individual partner's capabilities and focusing on the future, not the past. In the last break out session, we will be discussing the most effective organizational structure for the Center.

## ***Presentations on Wildlife Management and Climate Change Science***

### **Steve Williams, Wildlife Management Institute – “Challenges to Wildlife Management”**

It is important to discuss the general overview of fish and wildlife managers – what they are thinking about and what tools are they using. Decisions are usually made at one level, such as the species or population level – but never have we faced such a significant challenge as climate change. So how do we approach management of the structure and functions of all landscapes for all species at all levels?

In many cases we haven't even described the landscape, let alone had to practice management of such a wide area. Climate change has awakened policy makers and the public, but has not elicited much monetary support or direction.

Of equal importance to climate change is culture change. What will society value 50 years from now in light of pressing issues like the economy and terrorism? Will they fund fish and wildlife management? We need to change the “stay indoors” attitude.

Our greatest concern is to detect climate change in a timely manner. Therefore, the Center should address:  
Current poor tactics to measure climate change

- How we monitor species on the ground: if we can't detect white-tailed deer and Canada geese, how can we detect rare species?
- We should view climate change through the lens of natural selection – e.g. phenology, invasive species, disease ranges
- Managers need more than science and data: they need tools, analyses, strategies, forecasting methods, risk assessment methods, vulnerability analyses, adaptation and mitigation strategies

Beyond science and management, managers need partnerships across all groups/ scales, and the Center should provide a coordinated approach – trying to handle the challenge separately will overwhelm individual institutions. The Cooperative Fish and Wildlife Research System is a good example of collaboration. We need funding since good science comes at a cost. In the next few decades the best we can do might not be good enough – we'll need additional funding. The difference between political and natural resources is that policy can take years, so we need to act fast.

### **Katharine Hayhoe, Texas Tech University – “High Resolution Climate Change Projections for Impact Assessments”**

*(See PowerPoint)*

Projections of future climate change are necessary because climate today is changing in ways that cannot be predicted based on the last century. Examples of this are climate change creating more frequent and severe heat waves, reducing snow cover and sea ice, and causing glacial melting – Glacier National Park may be glacier-free by 2030.

So how do we generate these climate projections? The models we use aren't based on statistical correlations between temperature and CO<sub>2</sub> levels; rather, the models use basic physics equations to represent conservation and transfer of energy, momentum and heat between the ocean, atmosphere, and biosphere. They include changes in solar energy, human and natural emissions of greenhouse gases, and even the effects of emissions from volcanic eruptions. The models are also able to simulate major sources of natural variability within the climate system, such as El Nino events.

Climate model simulations of the past century “Earth without people” (i.e., including natural variability only) can be compared to simulations “Earth with people” (i.e., including both natural changes and human emissions) to quantify the extent to which human activities have been responsible for climate change over the past century. When

the actual observed temperature is compared to the simulation “Earth with people”, it corresponds much better than to the “Earth without people” simulation, particularly over the last 50 years (see graph).

When we talk about future climate it is important to be clear that climate models generate projections, not predictions. Projections are “if/ then” scenarios based on whether we follow a low, moderate or high levels of emissions over the coming century. But we also need regional scale projections in order to determine what the impacts of a given scenario will be on a system or place of interest. The reason for this is because local factors can create enormous differences in climate at the regional scale. Because of this, we also need to downscale the output from global climate models. There are two types of downscaling: statistical, which uses statistical relationships between historical model simulations and observations to generate future projections, and dynamical, or regional climate modeling. Each of these methods has individual strengths and weaknesses.

To effectively develop regional projections of climate change that are directly relevant to assessing climate impacts on ecosystems, scientists require information about climate-related ecological drivers from biologists. Examples of climate drivers can include degree days, changes in hydroperiod, precipitation, etc. Examples of how climate projections have been used to assess future impacts related to ecosystems and wildlife include:

- Evaluating projected changes in chilling hours in the Northeast, which determines suitable area for blueberry cultivation
- Identifying climate constraints limiting the northward expansion of pests and invasives such as kudzu or the hemlock wooly adelgid and how these are likely to shift in the future

Sample climate data that can be used for impact assessments can be downloaded from:  
[www.northeastclimatedata.com](http://www.northeastclimatedata.com) – information includes maps and raw data for the Northeast region and its states.

## **Virginia Burkett, USGS – “Habitat and Wildlife Responses to Climate Change”**

*(See PowerPoint)*

Global warming is affecting physical and biological ecosystems across terrestrial and marine scapes. The resilience of these ecosystems is likely to change drastically in the future. Only a 2-3 degree increase in temperature will increase risk of extinction for many of the world’s species, and we’ve already increased by 0.7 degrees (e.g. outbreaks of mountain pine beetles and threatened temperature thresholds for permafrost). Management on the ground has not been trained to deal with current climate effects on species and secondary effects from climate change.

Progress is being made, however. The scale of climate models is always improving, more and more species and ecosystems are being added to records, and scenarios are being produced for the future of biomes. Some of these current observations and future projections that have already been made include:

- Dallas is already more like Houston used to be just 20 years ago in terms of its plant hardiness zone
- Projection of shifts in optimal habitat for Eastern forest species
- Identifying the areas in California that could serve as refugia to protect native flora from extinction
- Threats from rising sea level to South Florida mangroves

The obstacles scientists face to gather/ monitor this information include:

- Interactions in nature are tough to simulate
- Climate models are better at simulating averages than extremes and large spatial areas than local scales
- Intrinsic and extrinsic thresholds are not always captured
- Uncertainty in forecasting
- Poorly developed coordination – there is no national approach. Although NOAA does have a climate services concept that could be used. We need a comparable approach for the Center to follow with partnerships sought across stakeholders

## *Question & Answer Session*

### *Question:*

Do the projections for temperature and precipitation look to be worse under the low-emissions scenario than under high-emissions scenario for the short-term?

*Answer:* (Katharine Hayhoe)

The difference between higher as compared to lower emissions is not statistically significant until about 2040, even though visually the scenarios may look different. That is primarily due to the inertia of the climate system; it takes a while for the ocean and atmosphere to respond to what we have already emitted. Also, the extent to which the scenarios differ increases over time.

### *Question:*

How is the Center going to be an organizing entity and support the science that needs to be done and get it to those who need it?

*Answer:* (Mark Myers, USGS Director)

Part of the Center's goal should be to couple physical systems to the responses of ecological systems with the aim to create seamless communication between the two. We need to prioritize this issue because there is not enough money to do everything at once. Ecosystem services should also be recognized and scientific tools developed. Above all these tools need to be relevant to management on the ground. We'd also like to hear from practitioners at this workshop about how to deal with uncertainty and which scales to focus on first.

### *Question:*

In working on flora and fauna where do we lack expertise in federal or private sectors?

*Answer:* (Virginia Burkett)

The USGS had a workshop with 100 scientists whose key recommendation for the USGS was to find expertise that was needed and what the gaps were. The Center should have such a committee helping guide a similar strategic science plan.

*Answer:* (Katharine Hayhoe)

There are two major gaps:

- A communications gap from a lack of interdisciplinary scientists. We need people who can work between fields.
- An observational data gap that makes it difficult to project. We need long-term consistent observations to be able to make effective projections and decisions about the future.

### *Question:*

Shouldn't we give information to policy makers as well as the public? Is a role of the Center to link policy-making to these issues?

*Answer:* (Sue Haseltine)

The Center should find partners to address policy makers. USGS should summarize strengths in science and forecast future management possibilities.

*Answer:* (Mark Myers)

Policy is not a formal part of the Center, but we could provide information to other partners who help us do that. It is important for this workshop to define such end points; the Center needs to be relevant for everyone – NGOs, agencies, etc.

**Thursday, December 4**

***Expert Panel***

**State Perspective: Doug Parsons, Florida Fish and Wildlife Conservation Commission, Association of Fish and Wildlife Agencies (AFWA)**

Those working for states would greatly benefit from the Center providing regional models and maps to help with local planning. The quality of these maps, however, needs to be carefully evaluated by federal expertise. It would also be useful for the Center to:

- Effectively link climate change models to biological models
- Assess vulnerability analyses and perhaps generate templates for states
- Follow Australia's example of creating hubs all over the country by giving seed money to universities to each focus on a particular theme
- Create an early warning system that keeps states connected when a climate change threshold is reached
- Outreach among states should be key to the Center's activities to keep them involved
- Create a national strategy like Australia's National Biodiversity and Climate Change Action Plan and include state wildlife action plans to better address climate change
- Research incentives and funding for offsetting carbon, particularly for adaptation, to create a valid way to use such payments

**Federal perspective: John Gross, Inventory and Monitoring Program, U. S. National Park Service (NPS)**

From the breakout sessions the consensus points seem to be that the Center should:

- Be a hub that pulls information and partners together
- Provide vulnerability assessments
- Address the issue of scale, particularly in downsizing models for management purposes
- Provide guidelines and standards for monitoring, including methods, variables and indicators
- Follow a model to format its analysis and synthesis of information (e.g. NCEAS)

Challenges and opportunities that lie in creating the Center include:

- Two-way communication between the Center and its partners, both learning from the other
- The Center, though acting within the Biological Research Discipline of the USGS, must develop cross-cultural communication and programs
- Developing a personal reward structure for scientists doing the work of the Center, including useful products such as management plans and protocol research. The typical reward system currently measured by grant money and citations may need to be altered to encourage scientists to work on these needed outputs
- Creating interoperability by integrating physical and ecosystem models
- Allocating resources effectively to include specific types of research that have been previously left out

Among other things, the Center could act as a coordinator among other organizations working on climate research, like NOAA, etc. It should also have a physical location and central staff, perhaps similar to the Heinz Center and NCEAS. The Center should consider its role of stewardship, closely following and reviewing its ongoing and completed projects.

## **Federal Perspective: Dan Ashe, Senior Advisor to the Director, U. S. Fish and Wildlife Service (FWS)**

We need to be realistic and realize that twice the amount of money allotted for the Center has been spent on the polar bear in the last year and a half. We need to urge practicality as we decide on the problem statement for the Center, which is asking what we can do to help managers take action in response to a changing climate. Managers need solid reasons to change course in their management plans for parks, refuges, etc. And they need to convince the public why they need to change course. One way to help encourage this process is to effectively link physical and biological models, particularly working on habitat and population models so we'll know how communities might change.

I do not want to see the Center become a clearinghouse – its mission should be doing, not simply archiving. If we provide good information, others will be able to distribute it. The problem of monitoring is too big to solve in the context of this Center – management agencies should deal with this particular issue as it is a management problem, not a science problem.

A management board approach should be at the foundation of the Center's operations, including shared decision-making and nested in a larger vision about how the conservation community will deal with landscape-scale issues in general. The joint venture model would work well for this strategy – allowing multiple stakeholders to work together to marry science and management.

## **Non-Governmental Organization Perspective: Michael McCracken, Chief Scientist for Climate Change, the Climate Institute**

From the perspective of climate change research, we are seeing change occurring more and more rapidly. "Adaptive management" paints too rosy a picture because it implies we can save everything. Triage management currently used in Alaska is indicative of what will be needed for the rest of the country. We need to ask how to best implement triage management and define the ecosystem services we want to protect. From a climate perspective, it's not just the average that matters, but the extremes and the rare events. The World Wildlife Fund's Climate Witness Programme provides a way for anyone anywhere to describe the changes they are seeing in their environment.

The US National Assessment was inadequate and the lessons to be learned are: (1) The goal of such assessments shouldn't be to simply put out a report, but to serve the public and (2) that such assessments must be on-going to provide stakeholders with an opportunity to get involved. Congress asked the Government Accountability Office to do an assessment of climate change on public lands because stakeholders weren't getting what they needed.

NOAA has been pushing to have a national climate service, but they don't have all of the information needed. Stakeholders want to be able to go to one place for climate information, so we need an inter-agency effort. I am hesitant to use "climate" for the Center because it doesn't include all of the other factors that climate change will affect.

The Center must also think about its credibility, to ask whether having decisions made at the government level make information more or less credible. National assessments (e.g. EPA's late 1908s assessments) have had no real affect on the ground, whereas local assessments done regionally like that at Penn State are more credible. To organize for credibility, we need to discuss uncertainty and the spectrum of degrees of confidence with which we make decisions.

## ***Question & Answer Session***

### *Question:*

What is the most important thing for the Center to focus on?

### *Answer: (Dan Ashe)*

We need to tailor our ambition to the resources on this task. State and refuge managers can most benefit from the coupling of emerging climate prediction models.

*Question:*

What are most important ways to keep communications open if not putting out white papers every four years?

*Answer:* (Mike McCracken)

We should have regional centers people can access. But these centers must be able to find enough funding so that they can answer questions that come up.

*Comment:*

The Center should have a vision that links it to the Intergovernmental Panel on Climate Change's reporting process. This vision should include asking what species are at risk, how they're affected by climate change, and how we can ameliorate the affects. The Center should be able to address these knowledge gaps.

*Answer:* (Mike McCracken)

To build credibility, the Center needs to gather experts to facilitate efforts to get at these questions.

*Answer:* (Dan Ashe)

In our management of fish and wildlife we should rethink what we mean by "vulnerability". We shouldn't focus on only endangered species, we need to get ahead of curve and focus on species that aren't endangered yet.

*Question:*

Who are the clients of the Center? Are they only those resource managers with limited scientific skills and capabilities?

*Answer:* (Tim Mealey, the Meridian Institute)

The client-provider relationship is not mutually exclusive to "partnerships". The Center could have partnerships and work for its clients.

*Question:*

Should the Center focus on a particular time frame (30, 100 years)?

*Answer:* (Dan Ashe)

We need to do things now.

*Question:*

Can McCracken talk more about how the national assessment was structured and what a good model might be to follow?

*Answer:* (Mike McCracken)

I don't think a national assessment is the only model. Though if that model were used, the meeting should be no more than one day because stakeholders won't commit to more than that.

*Question:*

What about monitoring?

*Answer:* (Dan Ashe)

The best monitoring job at the FWS has been in waterfowl. We're accountable there because there's legislation surrounding it and we have biologically-driven objectives (population levels). Resource managers need to recognize that monitoring isn't important if the objective isn't biologically-driven.

*Answer:* (John Gross)

We should use condition-based management. That includes setting a hard objective for a model to maintain funding and setting standards for which indicators to measure.

## *Review of Workshop*

### **Tim Mealey, the Meridian Institute**

- There were remarkable commonalities in all report-out presentations
- There was also a lot of the use of the word “we” – that’s good because we need ownership
- The degree to which the Center and its mission are science-driven or management-driven isn’t clear yet
- We need to identify national partners that would bring particular strengths/ skills to the project (i.e. The Nature Conservancy)
- The USGS has facilities that could be tapped, like its Earth Resources Observation Systems
- Cooperation must be central to the Center’s existence/ approach
- Products of the workshop will include:
  - Quick overview
  - Broad overview
  - Final Report – which will go out to all involved in this workshop
  - There will be four follow-up meetings in 2009 to discuss the outcomes of the workshop and to create a final protocol for Center

## *Closing Remarks*

### **Dr. Susan Haseltine, USGS**

- Many good ideas for the Center came out of this workshop, but of course we can’t be all things to all people
- We do need to link downscale physical models with biological systems on the ground to make management recommendations
- There was consensus on doing things in partnership with other organizations, particularly important since hitting the top priorities will not be a small task
- The conservation community needs to move forward with reputable science to ensure credibility
- We will need both a national and a local effort
- Monitoring and an early warning system would be a good idea
- NCEAS model for the Center is intriguing but daunting
- A huge task lies before us but we are starting to zero in on the important issues the Center should focus on

# NCCWSC Breakout Group Report Out Summaries

December 3 - 4, 2008

Participants attended breakout groups to discuss the following topics/issues/questions:

- **Insights on NCCWSC Objectives -- Are NCCWSC objectives appropriate, or how should they be changed? (Three different sessions on three different objects)**
  - Objective One: Build Science Basis and Capacity
  - Objective Two: Develop Tools for Adaptive Management
  - Objective Three: Participate in Adaptive Management and Monitoring
  
- **What should be the basic organizational approaches for advancing the mission and objectives of the NCCWSC?**

The following summaries are organized first by topic questions and then by breakout group number to facilitate review of these summaries. The first topic is further divided into the specific objectives discussed. In some breakout sessions more than one objective was covered. Comments recorded in these groups are listed for both objectives.

## *Insights on NCCWSC Objectives*

### **Objective One: Build Science Basis and Capacity**

#### *Group One*

#### **Report Out One**

#### **Objective One: Build Science Basis and Capacity**

- Focus of Center should be biotic components. Biologists/ecologists need to define what they want from physical scientists.
- Climate change has direct effects on species – we need to understand the profound affects it might have on complex species interaction.
- Data and informatics: one potential role of the Center relates to the dearth of observational data. Storage and archiving data, retrieval of data and derived products. The Center’s role isn’t defined in this case – what about using NBII as an example?

- Gap analysis: what observations are missing and how can we fill them. We need to better define what data we want.
- How can we better identify gaps in long-term historical records? Phylogenetics might be able to recreate some historical data. This hasn't come up very often – this Center should explore it more.
- Client analysis: who are the clients of the analysis? Primary and secondary? What are the needs of those clients? If we're talking about data, then the primary clients are scientists, not managers.
- Assessments: we need to identify vulnerability. What are the criteria/ process for assessing vulnerability? Implementation could be at state or county level, park or region . . . criteria for vulnerability and application of that are probably best separated.
- Potential services or products of the Center should include 1) coordination, 2) data access and IT infrastructure, 3) expertise and consulting, and technical support and 4) develop management plans and procedures for monitoring as well as standard protocols for observational data.

## *Group Two*

### **Report Out One**

#### **Objective One: Build Science Basis and Capacity**

The Center should:

- Look at whole ecosystems - not just at populations.
- Raise awareness about importance of monitoring. Specifically to articulate it to the public, for funding, etc.
- Examine existing databases to understand how to use them to monitor impacts and identify gaps – what databases are missing? How should we populate existing ones?
- Develop framework and identify priorities for a national monitoring system. That includes all stakeholders – agencies, NGOs, etc.

Determine best practices collaboratively. What do we need everyone to do to address problem?

## *Group Three*

### **Report Out One**

#### **Objective One: Build Science Basis and Capacity**

The Center should:

- Be a clearinghouse knowledge network
- Project a paradigm shift, to look at future rather than past

- Leverage funds
- Include research, information on plants, oceans, paleo-ecology, which should be geo-spatially referenced
- Establish a sub-committee, gather data, identify data gaps, and develop standards
- Develop a pilot project to elucidate the process and function of the Center – how it would translate information to policy makers and managers on the ground
- Conduct research with focus on mechanisms
- Focus on outreach

### *Group Four*

#### **Report Out One**

##### **Objective One: Build Science Basis and Capacity**

The Center should:

- Amass geospatial data. Since such data is most efficient when data is localized perhaps Center could be the go-to place to find existing data.
- Be a clearinghouse for metadata and land use cover data.
- Center could produce synthetic reports – like IPCC, but national in scope.
- Cultivate future managers and scientists.
- Provide additional research on how to better vulnerability tools and expand existing monitoring networks.
- Evaluate remote-sensed data to determine whether it's good enough for current needs.
- Improve current distribution models to deal with complex ecological problems, allowing for future predictions.
- Develop physiological process models for species – might be better than climate models.
- Encourage habitat-based research, not just species-based.
- Include academics and their research in process.
- Have a vision and strategic plan – this will draw in partners and funding.

## *Group Five*

### **Report Out Two**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

- Data and information
  - User-driven info
  - Define monitoring priorities
  - Capacity for complex modeling – interoperability
  - Incorporate more ecological and human complexities into models
  - Synthesize information (risk assessment and vulnerability) and recommend priorities
- Tools
  - Clearinghouse products – data, papers
  - Web-based models for accessibility
  - Develop new generation of tools to advance the science in light of current, projected changes
- Activities
  - Communicate and translate science to managers and policymakers
  - Training (adaptive management)
  - Staff scientists – consulting and tech support
  - Partnerships across disciplines
  - Feedback related to performance

## *Group Six*

### **Report Out Two**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

#### *(PowerPoint)*

- Science synthesis
  - Assess science and management needs
    - Coordinate & convene stakeholders
  - Assess data repositories for
    - Climate modeling
    - Movement of species & habitats
    - Model integrations
    - Vulnerability assessments
    - Wildlife sensitivity
  - Develop access to databases

- Find gaps in knowledge
- Prioritize what's needed
- Planning Tools
  - Adaptive Management (one tool among others)
  - Risk Assessment
  - Scenario Planning
  - Structured Decision Process
  - Vulnerability Assessment
  - Provide technical assistance for land mgmt agencies
    - E.g., for climate models
      - Provide comparisons between models
    - Link climate & biological models
- Inventory and Monitoring
  - Multiple scales needed
  - Priority setting
    - Scoping of needs
    - Technical feasibility
      - Consider appropriate metrics for distribution, abundance, demographic drivers
  - Biological monitoring
    - Identify goals and objectives
  - Also non-biological monitoring
    - Land use, hydrology, etc.
  - Serve coordinating function across jurisdictions to develop standards for monitoring
    - Recognize importance of strong standardization

## *Group Seven*

### **Report Out Two**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

##### *(PowerPoint)*

The Center should:

- Focus its projections on adaptation for the next 30 years, including:
  - Mapping habitat, species and human populations shifts
  - Identifying barriers to animal and habitat movement
  - Address lands management (e.g., private lands: partnerships or acquisitions)
- Improving relationships between USGS and State and federal agencies.
- Provide expertise to states and agencies to include climate change impacts in action plans.
- Include biological monitoring in existing restoration projects.

- Develop a national monitoring strategy across all agencies (protocols for how to collect relevant data for indicator species and their habitats).
- Create networks for implementing strategy.
- Create an Early Warning System:
  - Step 1: create system (tipping points)
  - Step 2: create an action plan for responding to triggers/ thresholds
  - Step 3: generate options for policy actions and management response (provide guidance for decision-makers)

## *Group Eight*

### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

- The Center should:
  - Identify data and priorities
  - Synthesize that data into an initial gap analysis and recommend data/ tools for filling those gaps
  - Identify ecological tipping points
  - Iterative structure – what analysis/downscaling/monitoring do we need
  - Interaction with the modeling community – Center should couple and link models, but not do basic research
  - Keep a balance between national and local priorities
  - Adaptive management (AM) –
    - support AM rather than do it
    - be a resource about how AM can improve with climate change models
  - Leverage research projects
  - Be a liaison with other advisory programs
  - Broad and interdisciplinary
  - Create IPCC-like document about baseline wildlife
  - OMB analysis – accountability of the Center
  - Technical transfer should be the core of the mission
- The Center should not:
  - Be a warehouse
  - Be an archive
  - Do parochial work
  - Work already being done by others
  - Attempt to be everything to everyone
- Issue that must be resolved:
  - Who's at the table? Federal agencies, organizations, etc?
  - Will the Center do research or farm it out? What kind? Field/Desk?
  - What's the delivery mechanism?
  - Will it provide training?
  - How will it fit with other similar organizations?

## *Group Nine*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

- Spend the next few years on designing the Center:
  - What are big questions and problems?
  - Should identify data and tools needed for management
  - Scale needs to be ecosystem and locality-based
  - Design of monitoring is critical – need to make sure that we have data/ models to answer long-term climate change questions
  - Set priorities for synthesis and assessments through partnerships
  
- Two possible designs for the Center
  - Hub and spoke system:
    - Training
    - Expert panels on various subject matter
    - Research funding
    - Communications
    - Tool development
    - Advisory panel
    - Synthesis reports
    - Collaborations with field managers
  
  - Knowledge Center:
    - Conduct analysis of research
    - Keeps database
    - Agencies consult and assist this database through a web portal

## *Group Ten*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

- Center should answer three main questions for managers:
  - What are the likely effects of climate change?
  - What does it mean for ecological systems?
  - What should managers do?

- Related activities:
  - Synthesize current climate models and leverage what's already there
  - Focus outputs of climate models to be used in ecological models
  - Develop a standardized approach to vulnerability analysis
- Filters – focus activities so not spread too thin:
  - Constrain geographically
  - Impact themes: fire, flood, invasives, etc.
  - Species/key processes of concern
- The Center should NOT:
  - Be a clearinghouse, or at least not a comprehensive one
  - Do basic science – avoid things not related to management
  - Do stand-alone projects

## *Group Eleven*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

#### *(PowerPoint)*

#### Build Science Basis and Capacity for the NCCWSC

- The NCCWSC needs to consist of an interdisciplinary team of biologists, statisticians, modelers, social scientists, GIS, landscape modelers, etc. to be a resource to respond to agency manager's issues brought to them.
  - Team members are truly interdisciplinary in their scientific capability and experience. Then use a team structure that actually rewards them for doing interdisciplinary work.
- Ideally, the team should be physically located at the same site.
- Under the leadership and direction of a core of permanent team members partnering agencies contribute personnel to the team on a 2-3 year rotational basis to build capacity, enhance interagency communications, and represent various agency perspectives.
  - NOAA, FWS, USFS, NPS, NASA, TNC, NRCS, ARS, CDC, NIH, state agencies, etc.
- Capacity building through technology
  - Identify and promote the use of micro-technology monitoring tools to:
  - Minimize cost of deploying and maintaining long-term monitoring stations;
  - Maximize data collection.
  - Promote interactive use of Geographic Information Systems to foster interactivity of analytical tool development.
  - Use cutting-edge video conferencing capabilities to enhance frequent real-time interactive communication and promote cooperation.

- Synthesize data to identify gaps in knowledge and communicate in white papers.
- Develop metrics for ecosystem function (species to trophic level interactions) (and services: values for human use) and vet against other agencies.

## *Group Twelve*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

*(PowerPoint)*

Rewrote the workshop objectives:

- Objective 1  
Assess status of current knowledge and prioritize needs for research:
  - Identify the shared, common needs among the partners
  - Including issues about scaling climate models to regional and local levels
- Objective 2  
Facilitate (re: climate-change science)
  - General communication, collaboration and dissemination of information of common importance
  - Reductions in diseconomies of scale
  - Identification of ongoing, common information needs
  - Deliberations and actions regarding filling information gaps
  - Ad hoc committees/teams, focused workshops
  - Funding research (basic, applied, multiscale, multidisciplinary) that has been identified as critical
  - Linkages among specific scientists, land managers, organizations, etc., to enable effective use of CC-science-based information
- Objective 3  
Rather than just participate in adaptive management and monitoring, the Center will take an adaptive role
- Objective 4
  - Improve existing and, if necessary, develop new ones ... (implications of efficiency)

#### **Objective Two: Develop Tools for Adaptive Management**

## *Group One*

### **Report Out Two**

#### **Objective Two: Develop Tools for Adaptive Management**

## **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

- Act as a broker between agencies, industry and NGOs. It must identify and play to the strengths of each of those groups creating mutually beneficial partnerships. USGS should not take the lead in all activities (as it would in a client-provider relationship).
- Focus on developing information for managers on climate change – transferring science into effective language. This should include risk assessments and scenario planning. How do parks/ refuges really use data? Should provide tool kits and workshops, which will allow the Center to connect with states.
- Address multiple scales, local to national, etc.
- Provide users with access to tools (preferably web-based for manager-types). Examples: ESRI conference model and NatureServe's network of Ecological Integrity and Assessment (EIA).

*Group Two*

## **Report Out Two**

### **Objective Two: Develop Tools for Adaptive Management**

### **Objective Three: Participate in Adaptive Management and Monitoring**

*(PowerPoint)*

- The Center should facilitate management and science teams to do thorough national reviews of priority issues. These issues may be new or already identified by CCSP etc. Reviews would:
  - Include assessments
  - Identify existing capabilities, data, models that can be used to address the issue
  - Identify appropriate scales
  - Identify gaps and needs
  - Support regional-level solutions/tools/results
- Examples of Issues:
  - Implications of a national energy plan
  - Sea level rise
  - Water availability
- Examples of collaborations:
  - Joint Fire Sciences
  - Joint Ventures
- Outputs - Facilitate
  - Downscaling of climate models with variables that can be used for management, e.g., forest structure
  - Establish best practices
    - Common monitoring protocols
  - Communication

- Seminars on the hill
- Tools
  - Triage
- Ecosystem Services

### *Group Three*

### **Report Out Two**

#### **Objective Two: Develop Tools for Adaptive Management**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

- Include plants/ fish in the Center's name and mission
- Not use adaptive management in Center's objectives, but instead use tools for decision support
- Have a small core staff that's flexible based on the Center's needs, but avoid salary issues
- Not have its own building but dedicated office space
- Integrate with other disciplines in USGS and at other agencies
- Not act as a data repository with everyone dumping their data onto it, but a registry of data and metadata for other climate change databases. Two possible databases: (1) database of data generated by the Center (2) metadata of other databases – get a panel of experts to identify these.
- Set data standards for new monitoring data and use the database to set standards so long-term data stays consistent.
- Consider possibilities of how projects could be processed:
  - Requests for proposals and Center selects proposals
  - Center-selected projects by a board of directors
  - Combination of above (RFPs in particular areas of concern)
  - Venture partnerships
- Produce white papers on hot-button topics like assisted migration
- Prioritize research:
  - Getting climate modelers and ecologists together
  - Using predictive tools to assess the merit of new ideas like assisted migration
  - Management evaluation of those tools
  - Vulnerability analysis
- Use NCEAS or the Heinz Center as a model

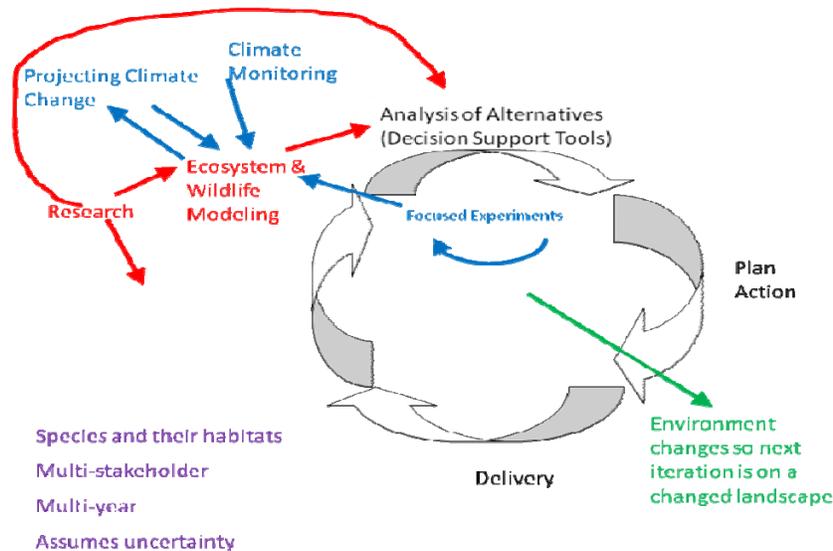
Group Four

Report Out Two

Objective Two: Develop Tools for Adaptive Management

Objective Three: Participate in Adaptive Management and Monitoring

(PowerPoint)



- Analysis of Alternatives
  - Decision support tools – facilitate management approaches with a social dimension – ethical, policy, economics, genetics, etc.
  - Assistance in formulation and stakeholder involvement – social and economic
- Plan Action
  - Assistance in planning and monitoring
- Delivery
  - This is a role the Center would not play
- Monitoring
  - Genetics – understand natural history of a species – is the gene pool important to preserve – managed relocation – risk assessments
  - Biological data management – models need adequate data sets and Center can coordinate (currently not digital, different protocols)
  - Local data that can be rolled up to national and global
- Research
  - Along with specific agency/partner needs, the Center should identify research needs that a single agency/partner cannot or would not address

- Identify current land holding and determine if they are the right holdings, what connectivity the holdings have, and what acquisitions should be made
- Modeling
  - Wildlife and ecosystem health – including interactions as species move or are moved
  - Improved wildlife models
  - Continued support of improved climate change models
- Communication
  - Establish a network to connect expertise and facilitate coordination to serve the needs of the natural resource managers
  - Facilitate communication and workshops
  - Engage non-traditional partners (Energy, etc)
  - Coordinated education and outreach
  - Local, Regional, National, Global
- Additional Activities
  - Case studies of relevant partnerships that have worked
  - Examples of models that have worked
  - High visibility pilot projects (near term, high opportunity for success)
  - Develop a strategy to include climate in Strategic Habitat Conservation Plans under development and already developed
- Overarching
  - Vision exciting enough to bring partners to the table
  - Develop rewards and vested interest
  - Plan and an implementation plan
  - Filling in the matrix across ecosystems, areas, regions
  - Address current management needs and research for the future – balance

## *Group Five*

### **Report Out One**

#### **Objective Two: Develop Tools for Adaptive Management**

The Center should:

- Be an inventory of existing tools and baseline data collection and gather what is available at the national, local, and regional level (NEON)
- Be a clearinghouse and develop of scientific tools specifically for what managers need
- Develop communications in an adaptive management context for policy makers and managers on the ground
- Bring core partners together to discuss how to relate together in an organizational sense, including identifying overlaps in function, gaps, etc. Then set priorities aligned with all groups involved. This needs to be done before we can consider searching for new funding
- Partner across discipline boundaries. Figure out how to connect with the socioeconomic realm, as well as shaping information on adaptive management for law and policy

- Communicate and translate information to land managers within its partnerships
- Provide courses for policy makers and land managers to take together to improve current techniques
- Have clearly defined monitoring objectives, standards and protocols

## *Group Six*

### **Report Out One**

#### **Objective Two: Develop Tools for Adaptive Management**

*(PowerPoint)*

- Center Focus:
  - Clarify title of objective--what's meant by Adaptive Management? Or is it Wildlife Adaptation to Climate Change?
  - Overlap between this objective & others, e.g., monitoring
  - Scoping of available tools & needs of management community: Gap analysis/ needs assessment of information and tools
  - Serve as clearinghouse for information/tools/models
  - Find balance in developing new tools (innovation) and enhance existing tools (continuity)
    - e.g., develop predictive models for species distribution changes; determining thresholds of system change
  - Integrate training into application of tools; make tools more "user friendly" for managers
  - Presents opportunity for broad application of tools at landscape levels and across jurisdictional boundaries
    - USGS in good position to facilitate since not land management agency
- Partnerships and Challenges
  - True partnership among organizations rather than a client-provider relationship between agencies; interface between science "developers" and science "users," i.e., management agencies
  - Consider non-traditional partnerships, e.g., towns, communities, academics
  - Center can help coordinate activities among agencies at various levels, e.g. monitoring?
    - Commitment for long-term is important
    - Not stifling innovation
  - Need commitment of resources
  - Address funding relationship up-front
- Information Streams
  - Regional & local downscaling of climate models
  - Integration of climate model results with population models
  - Help to characterize new data needs
    - Identifying population thresholds
    - Identifying population drivers/limiters
  - Integrate with social disciplines

## *Group Seven*

### **Report Out One**

#### **Objective Two: Develop Tools for Adaptive Management**

- We need to re-define the question we're asking to focus on developing tools relevant to land managers

The Center should:

- Link physical data to biological response
- Grade the current tools and range of climate scenarios. Which are most useful to land managers?
- Link scientific and conservation communities – there is still a gap between managers and scientists
- Analyze vulnerability assessments and improve spatial mapping of animal and human geography
- Act as a clearinghouse
- Most important: to provide transformational change and two-way communication and data sharing between scientists and management communities

## *Group Eight*

### **Report Out One**

#### **Objective Two: Develop Tools for Adaptive Management**

The Center should:

- Be trans-disciplinary, across all agencies and levels. This would present challenges, however, in getting people to share data, change methods and match funding levels
- Work for the common good, not just the agencies of the Dept of the Interior
- Focus on being more than a clearinghouse (which sounds too passive). It needs to operate at the scale where decisions get made (FWS, Co-Op units, etc)
- Not necessarily focus on data archiving - perhaps model standardization like IPCC
- Link climate projection models with species models to be able to detect how ecosystems are reacting to changes
- Help managers decide which tools/ information best suits their needs, particularly in long-term research

## *Group Nine*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

- Spend the next few years on designing the Center:
  - What are big questions and problems?
  - Should identify data and tools needed for management
  - Scale needs to be ecosystem and locality-basedDesign of monitoring is critical – need to make sure that we have data/ models to answer long-term climate change questions
  - Set priorities for synthesis and assessments through partnerships
  
- Two possible designs for the Center
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## *Group Ten*

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#### **Objective Two: Develop Tools for Adaptive Management**

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## *Group Eleven*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

#### *(PowerPoint)*

##### Build Science Basis and Capacity for the NCCWSC

- The NCCWSC needs to consist of an interdisciplinary team of biologists, statisticians, modelers, social scientists, GIS, landscape modelers, etc. to be a resource to respond to agency manager's issues brought to them.
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  - Identify and promote the use of micro-technology monitoring tools to:
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- Synthesize data to identify gaps in knowledge and communicate in white papers.
- Develop metrics for ecosystem function (species to trophic level interactions) (and services: values for human use) and vet against other agencies.

##### Develop Tools for Decision Management Systems

- Interagency development of common monitoring and assessment protocols.

- Promote and sponsor the development of a biologically driven sub-regional climate model that can work at the federal, state, and local levels that wildlife resource managers can use. This should be a generic tool available online with the capability to be customized.
- Center not to be responsible for developing tools, but identifying critical gaps for applying tools in context of climate change, and then promoting and sponsoring research to fill the gaps but not develop the tools themselves. Such as:
  - The continued downscaling of climate model/simulation outputs, both spatially and temporally
  - Research that decreases model uncertainties, thereby increasing confidence in projections.
- Locate, compile, and assess existing decision support models used by wildlife resource managers and serve to the public.
- Web based instruction for land managers and public in:
  - How various decision support model outputs can be useful to communities/managers/users not currently aware of them;
  - How to attach management objectives and decisions to what climate models are telling us;
  - What do you do if refuges will not be there in 20 years?
  - Or to understand what will be there in 20 years and manage for that;
  - Use of Adaptive Management concepts and applications;
  - Types of climate change decision management resources available and when, why, and how to use them; programs for K-12 education.

## *Group Twelve*

### **Report Out Two**

#### **Objective One: Build Science Basis and Capacity**

#### **Objective Two: Develop Tools for Adaptive Management**

*(PowerPoint)*

Rewrote the workshop objectives:

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- Objective 3  
Rather than just participate in adaptive management and monitoring, the Center will take an adaptive role
- Objective 4  
Improve existing and, if necessary, develop new ones ... (implications of efficiency)

### **Objective Three: Participate in Adaptive Management and Monitoring**

#### *Group One*

#### **Report Out Two**

#### **Objective Two: Develop Tools for Adaptive Management**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

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#### *Group Two*

#### **Report Out Two**

#### **Objective Two: Develop Tools for Adaptive Management**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

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  - Establish best practices
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  - Communication
    - Seminars on the hill
  - Tools
    - Triage
  - Ecosystem Services

### *Group Three*

### **Report Out Two**

#### **Objective Two: Develop Tools for Adaptive Management**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

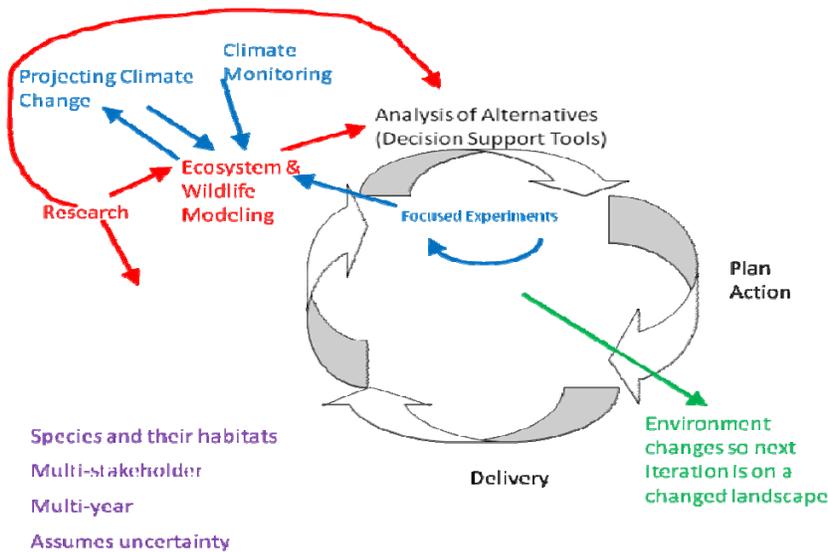
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  - Venture partnerships
- Produce white papers on hot-button topics like assisted migration
  - Prioritize research:
    - Getting climate modelers and ecologists together
    - Using predictive tools to assess the merit of new ideas like assisted migration
    - Management evaluation of those tools
    - Vulnerability analysis
  - Use NCEAS or the Heinz Center as a model

*Group Four*

**Objective Two: Develop Tools for Adaptive Management**

**Objective Three: Participate in Adaptive Management and Monitoring**  
(PowerPoint)



- Analysis of Alternatives
  - Decision support tools – facilitate management approaches with a social dimension – ethical, policy, economics, genetics, etc.
  - Assistance in formulation and stakeholder involvement – social and economic
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  - Wildlife and ecosystem health – including interactions as species move or are moved
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  - Establish a network to connect expertise and facilitate coordination to serve the needs of the natural resource managers
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- Overarching
  - Vision exciting enough to bring partners to the table
  - Develop rewards and vested interest
  - Plan and an implementation plan
  - Filling in the matrix across ecosystems, areas, regions
  - Address current management needs and research for the future – balance

## *Group Five*

### **Report Out Two**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

- Data and information
  - User-driven info
  - Define monitoring priorities
  - Capacity for complex modeling – interoperability
  - Incorporate more ecological and human complexities into models
  - Synthesize information (risk assessment and vulnerability) and recommend priorities
- Tools
  - Clearinghouse products – data, papers
  - Web-based models for accessibility
  - Develop new generation of tools to advance the science in light of current, projected changes
- Activities
  - Communicate and translate science to managers and policymakers
  - Training (adaptive management)
  - Staff scientists – consulting and tech support
  - Partnerships across disciplines
  - Feedback related to performance

## *Group Six*

### **Report Out Two**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

#### *(PowerPoint)*

- Science synthesis
  - Assess science and management needs
    - Coordinate & convene stakeholders
  - Assess data repositories for
    - Climate modeling
    - Movement of species & habitats
    - Model integrations
    - Vulnerability assessments
    - Wildlife sensitivity
  - Develop access to databases

- Find gaps in knowledge
- Prioritize what's needed
- Planning Tools
  - Adaptive Management (one tool among others)
  - Risk Assessment
  - Scenario Planning
  - Structured Decision Process
  - Vulnerability Assessment
  - Provide technical assistance for land mgmt agencies
    - E.g., for climate models
      - Provide comparisons between models
    - Link climate & biological models
- Inventory and Monitoring
  - Multiple scales needed
  - Priority setting
    - Scoping of needs
    - Technical feasibility
      - Consider appropriate metrics for distribution, abundance, demographic drivers
  - Biological monitoring
    - Identify goals and objectives
  - Also non-biological monitoring
    - Land use, hydrology, etc.
  - Serve coordinating function across jurisdictions to develop standards for monitoring
    - Recognize importance of strong standardization

## *Group Seven*

### ***Report Out Two***

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

##### ***(PowerPoint)***

The Center should:

- Focus its projections on adaptation for the next 30 years, including:
  - Mapping habitat, species and human populations shifts
  - Identifying barriers to animal and habitat movement
  - Address lands management (e.g., private lands: partnerships or acquisitions)
- Improving relationships between USGS and State and federal agencies.
- Provide expertise to states and agencies to include climate change impacts in action plans.
- Include biological monitoring in existing restoration projects.

- Develop a national monitoring strategy across all agencies (protocols for how to collect relevant data for indicator species and their habitats).
- Create networks for implementing strategy.
- Create an Early Warning System:
  - Step 1: create system (tipping points)
  - Step 2: create an action plan for responding to triggers/ thresholds
  - Step 3: generate options for policy actions and management response (provide guidance for decision-makers)

## *Group Eight*

### **Report Out Two**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

#### **Objective One: Build Science Basis and Capacity**

- The Center should:
  - Identify data and priorities
  - Synthesize that data into an initial gap analysis and recommend data/ tools for filling those gaps
  - Identify ecological tipping points
  - Iterative structure – what analysis/downscaling/monitoring do we need
  - Interaction with the modeling community – Center should couple and link models, but not do basic research
  - Keep a balance between national and local priorities
  - Adaptive management (AM) –
    - support AM rather than do it
    - be a resource about how AM can improve with climate change models
  - Leverage research projects
  - Be a liaison with other advisory programs
  - Broad and interdisciplinary
  - Create IPCC-like document about baseline wildlife
  - OMB analysis – accountability of the Center
  - Technical transfer should be the core of the mission
- The Center should not:
  - Be a warehouse
  - Be an archive
  - Do parochial work
  - Work already being done by others
  - Attempt to be everything to everyone
- Issue that must be resolved:
  - Who's at the table? Federal agencies, organizations, etc?
  - Will the Center do research or farm it out? What kind? Field/Desk?
  - What's the delivery mechanism?
  - Will it provide training?
  - How will it fit with other similar organizations?

## *Group Nine*

### **Report Out One**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

- Facilitate a national database
- Take inventory of the current monitoring resources finding out what is available and accessible
- Identify gaps and overlap
- Need to provide information at the land manager scale
- Set and apply best practices
- Follow a partner, not client model in working with stakeholders

## *Group Ten*

### **Report Out One**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

*(PowerPoint)*

- Need to consider adaptation versus adaptive management (AD)

The Center should:

- Primarily provide technical support
- Secondarily inform and participate with managers in AD (strategic focus)
- Synthesize management alternatives and options for wildlife/land management regarding climate change
- Synthesize/generate monitoring structure and designs and strategies
- Generate and respond to wildlife/PLANT climate change needs
- Identify and fill gaps in expertise and information
- Be the interface between researchers and managers (data in / results out and up / down among modelers and managers)
- Highlight the unique role of the Center regarding AD

## *Group Eleven*

### **Report Out One**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

- Develop standards for monitoring protocol
- Be a data clearinghouse involved in collection and synthesizing information
- Take a landscape level/ ecosystem approach; could broker collaborative efforts by leveraging lots of resources and pulling multiple databases together
- Broker communication between scientists, agencies and managers overcoming different ways of doing business
- Evaluate common projections, but also consider uncertainty and risks involve with these models – need to project out 30-50 years and link to biological communities
- Work with facilitating managers on the ground

## *Group Twelve*

### **Report Out One**

#### **Objective Three: Participate in Adaptive Management and Monitoring**

The Center should:

- Play a major role in facilitation
- Rely heavily on partners to provide data available at different spatial scales
- Provide information annotated with short descriptive summaries
- Link with ongoing efforts like NPII, NEON, and NPN
- Create a newsletter to update stakeholders on climate change efforts, alerts, and provide living web pages
- Facilitate inter-agency concerns related to climate change
- Be proactive and collaborative on issues on national concern by providing workshops, podcasts, and webcasts. And bring experts together to tackle specific problems such as indicator species, habitat variables, define ecological integrity

***What should be the basic organizational approaches for advancing the mission and objectives of the NCCWSC?***

*Group One*

***Report Out Three***

**Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**

The Center should:

- Have a phased-in approach
- Perhaps model itself after the Joint Fire Science Program model
- Consider a multi-agency governing board
- Recruit research proposals (RFPs)
- Leverage existing projects and show early milestones – focus on outcomes and outputs
- After 2-3 years re-evaluate and grow staff and outreach

*Group Two*

***Report Out Three***

**Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**

- If the Center's objective is to directly support resource management then it should consider following the joint venture and Joint Fire Science Program models (though Center's focus will have a wide, long-term focus unlike both of these models).
- Create inter-agency management and advisory boards that would have decision-making power:
  - Have core group and rotate the others
  - Make decisions at the national scale and then appoint ad hoc groups to tackle regional issues
  - Help leverage funds by bringing in resources from various agencies
- The Center should focus on short-term projects that will support long-term needs and projects.
- Work with existing teams on climate change issues to best exploit resources.

### *Group Three*

#### **Report Out Three**

#### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**

The Center should:

- Create near-term products (i.e. work with current projects, like vulnerability assessments, to show quick outcomes)
- Hire core staff
- Establish an advisory committee of non-federal agencies and states
- Create strategic plans (five-year, ten-year)
- Develop a communication plan
- Continue its steering committee which should be interagency and non-government
- Integrate feedback from the NCCWSC workshop participants

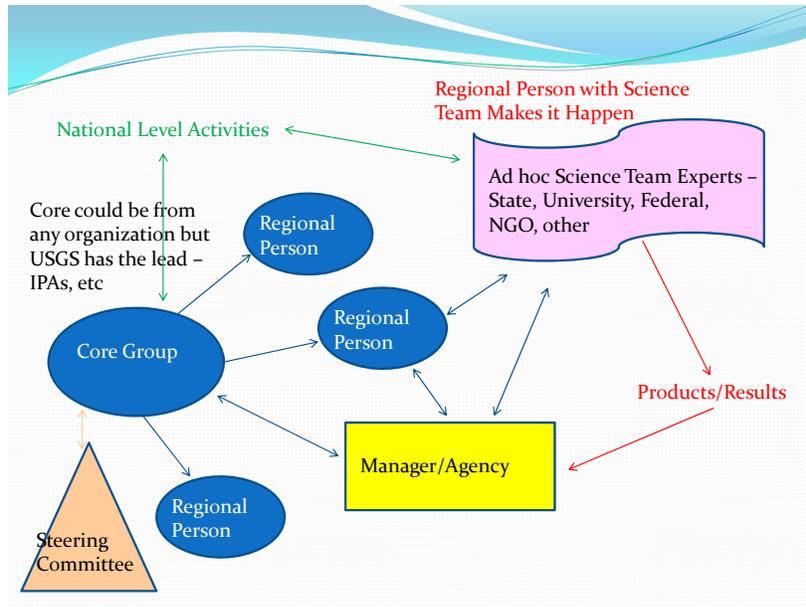
### *Group Four*

#### **Report Out Three**

#### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**

*(PowerPoint)*

- Center's organization:
  - Not a brick and mortar building
  - Small core group of individuals
  - Coordinator who knows what is happening and how to connect others to address a need (could be in the core group or at the regional level)
  - Dynamic team of scientists as needed
    - State
    - University
    - Federal
    - NGOs
    - Other



- Steering Committee:
  - Priority-setting
  - Decision-making body
  - Rotating chairs of partners (USGS more equal than others because the final responsibility sits with the Director of the USGS)
- Phased Approach:
  - Establish core team
  - Vision and plan development
  - Establish steering committee
  - Establish regional contacts – phase them in gradually increasing number of regions

## Group Five

### Report Out Three

#### Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC

The Center should:

- Identify core partners (international to local)
- Consider the joint venture model
- Establish ad-hoc committees for specific functions under a governing board
- Use a problem-solving approach to guide the Center's mission
- Prioritize its core functions:

- facilitate funding process and leveraging funds from other sources
- inter-agency funding arrangements
- aligning existing programs and functions

## *Group Six*

### **Report Out Three**

#### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**

- Should apply a phased-in approach starting with these questions to determine the Center's structure:
  - What are the objectives?
  - Who are clients and partners?
- A joint venture model might work. The Center could be the hub with existing entities as spokes – like university co-op units.
- The three main goals in establishing the Center:
  - Credibility: with the public/ states/ Congress
  - Leveraging funds: co-ops are attractive for this purpose
  - Create strong ties to local partners and stakeholders
- Establish core staff, perhaps in existing infrastructure for institutional memory
- Use virtual tools to connect with the “spokes”

## *Group Seven*

### **Report Out Three**

#### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**

##### *(PowerPoint)*

- Organizational structure will/ should depend on the stated objectives of the Center
- Mechanisms for on the ground input and engagement (expert workshops, subcommittees)
- Need to create:
  - Management Board: group of Center staff combined with various federal volunteers that focuses on internal issues such as:
    - Policy decision making
    - Priority setting
    - Identifying gaps
    - Oversight and accountability
    - Informing existing funding mechanisms
    - Smaller group (e.g., <10); rotates

- Advisory Board: volunteer group that focuses on technical/science issues; identifies gaps, communicates with wildlife managers and is:
  - Externally connected and informed
  - A larger group than Management Board and rotates
- Examples of such boards include Wetlands Council, AFWA, National Integrative Drought Information System

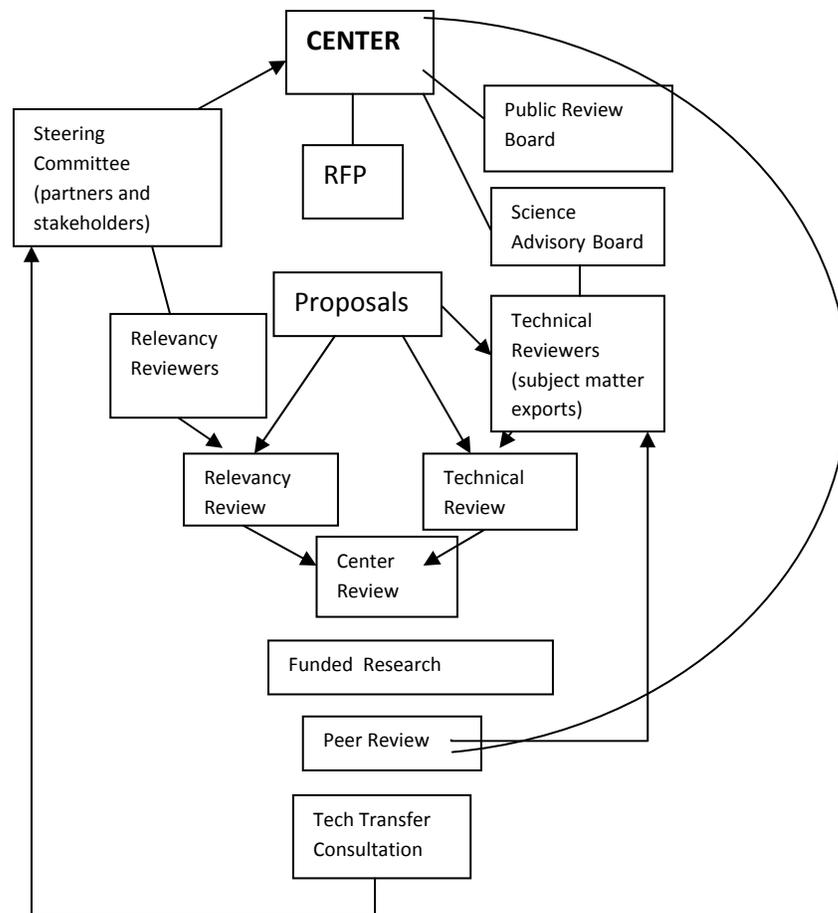
*Group Eight*

**Report Out Three**

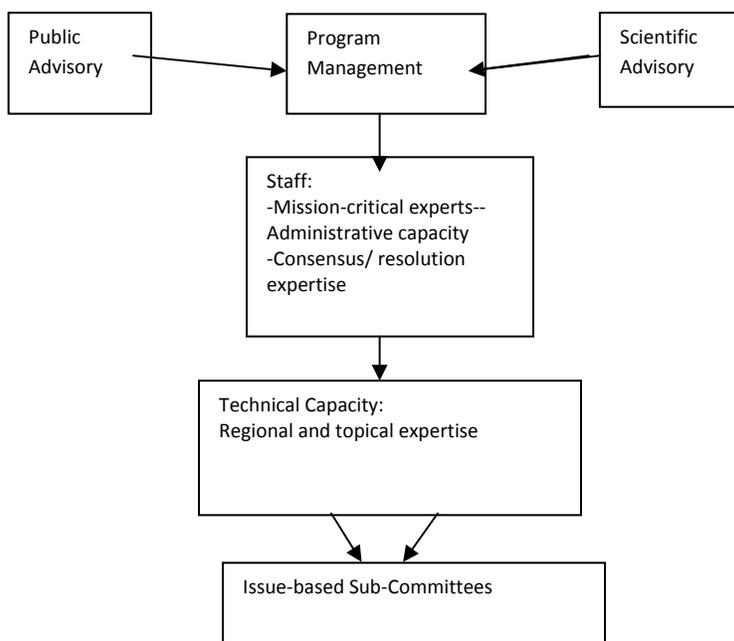
**Organizational Approaches for Advancing the Mission and Objectives of the NCCWS**

*(PDF Document)*

**Flow Chart One**



## **Flow Chart Two**



## *Group Nine*

### **Report Out Three**

#### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWS**

The Center should:

- Used a phased-in approach
- Identify management challenges
- Assess user needs (federal agencies, states, other) that include:
  - data and information for monitoring and research
  - tools for assessments
- Test a prototype assessment for:
  - a multi-agency/regional or ecosystem
  - one of the more challenging climate change problems

- Implement a national program
- Model to follow:
  - Geissler Model (USGS BRD scientist): the Center acts as a hub (with 3-4 science program managers) and connects with management needs, the state of the science, synthesis of the science and RFP and USGS scientists. Research and monitoring go into the Center and synthesis is the product – like NEON.

### *Group Ten*

#### **Report Out Three**

##### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWS**

The Center should:

- Have a small focused staff at the national level that work with regional teams (e.g. universities, NGOs).
- Continue the interim steering committee with current representatives to draft the Center’s vision, mission, and strategic plan and include NGO partners and others at quarterly meetings.
- Be a physical location (e.g. university) which would create identity and allow access to partners, face to face meetings, and reduce the Center’s carbon footprint.

### *Group Eleven*

#### **Report Out Three**

##### **Organizational Approaches for Advancing the Mission and Objectives of the NCCWS**

The Center should:

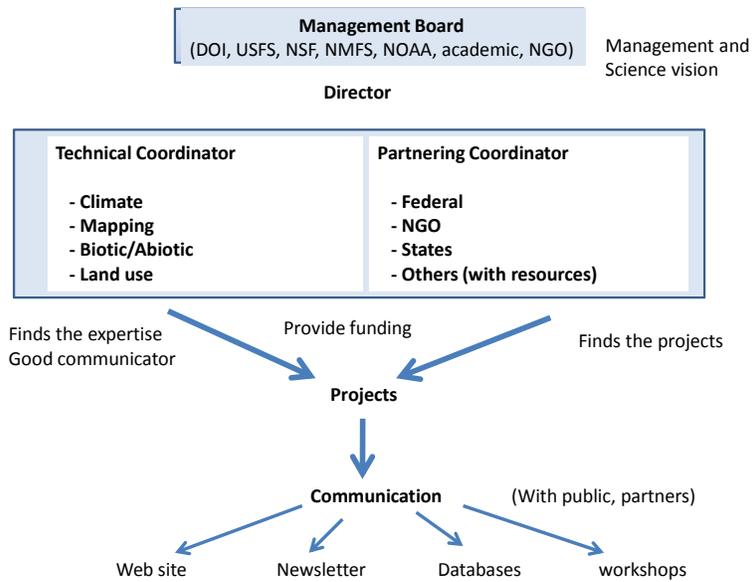
- Be physically located in convenient place (i.e. Boulder, CO)
- Should have management partners
- Follow a hub and spoke model
- Consider the following organizational models: NADIS, Heinz, NOAA Climate Center, NSF
- Have a core group of 3-5 staff
- Focus its work on coupling biological and physical models

Group Twelve

**Report Out Three**

**Organizational Approaches for Advancing the Mission and Objectives of the NCCWS**

*(PowerPoint)*



**Addendum 1--Workshop Agenda**

# Agenda

## National Climate Change and Wildlife Science Center Workshop

December 3-4, 2008

The National Conference Center, Lansdowne, Virginia

- 8:00 a.m.      **Welcome & Opening Remarks – The Honorable Lynn Scarlett,**  
  
                    **Deputy Secretary of the Interior**
- 8:20 a.m.      **Agenda Review – Tim Mealey, Meridian Institute**
- 8:30 a.m.      **Presentation on the NCCWSC Purpose, Overarching Objectives and**  
                    **Organizational Structure – Dr. Susan Haseltine,**  
  
                    **Associate Director for Biology, U. S. Geological Survey**
- 9:00 a.m.      **Presentations on Science and Wildlife Management Dimensions**  
  
                    **Challenges to Wildlife Management**  
  
                    Dr. Steve Williams, Wildlife Management Institute
- High Resolution Climate Change Projections for Impact Assessments**  
  
                    Dr. Katharine Hayhoe, Texas Tech University
- Habitat and Wildlife Response to Climate Change**  
  
                    Dr. Virginia Burkett, U. S. Geological Survey
- 10:00 a.m.     **Plenary Q&A Session**

- 10:25 a.m.      **Overview of the Breakout Group Sessions and Process**
- 10:30 a.m.      **BREAK**
- 10:45 a.m.      **Breakout Session 1 – First Round of Discussion of NCCWSC Objectives**
- 12:30 p.m.      **LUNCH**
- 1:30 p.m.      **Remarks by The Honorable Dirk Kempthorne, Secretary of the Interior**
- 1:50 p.m.      **Breakout Group Reports from Session 1**
- 2:45 p.m.      **Breakout Session 2 – Second Round of Discussion of NCCWSC Objectives**
- GROUP BREAKS**
- 5:30 p.m.      **Adjourn for the Day, Reception Follows**
- RECEPTION hosted by the Ecological Society of America - All workshop participants and invited guests 6:00 p.m. – 8:00 p.m.**
- 6:15 p.m.      **Remarks by Dr. Mark Myers, Director of the U. S Geological Survey**

## **Day 2: Thursday, December 4, 2008**

- 8:00 a.m. Breakout Session 3 – Third Round of Discussion of NCCWSC Objectives**
- 9:00 a.m. BREAK**
- 9:15 a.m. Breakout Group Reports from Session 2 & 3 and Overarching Insights on NCCWSC Objectives**
- 11:00 a.m. Panel of Climate Change Science and Wildlife Management Experts Respond to Breakout Group Reports**
- Dan Ashe** – Senior Advisor to the Director, U. S. Fish and Wildlife Service
- John Gross** – Inventory and Monitoring Program, U. S. National Park Service
- Doug Parsons** – Florida Fish and Wildlife Conservation Commission, Association of Fish and Wildlife Agencies
- Michael MacCracken** – Chief Scientist for Climate Change, the Climate Institute
- 12:15 p.m. LUNCH**
- 1:15 p.m. Breakout Session 4 – Organizational Approaches for Advancing the Mission and Objectives of the NCCWSC**
- 2:15 p.m. BREAK**
- 2:30 p.m. Breakout Group Reports on Organizational and Phased Approaches**
- 3:30 p.m. Overview of Workshop Results – Tim Mealey, Meridian Institute**
- 3:40 p.m. Closing Remarks – Dr. Susan Haseltine, Associate Director for Biology, USGS**
- 4:00 p.m. ADJOURN**