National Climate Change and Wildlife Science Center and DOI Climate Science Centers Science to Support Adaptation

Robin O’Malley
Policy and Partnership Coordinator
USGS National Climate Change and Wildlife Science Center
AGENDA

• Climate Science Center – 101

• New Federal Advisory Committee
NCCWSC and CSCs in Brief

• **NCCWSC**
  - national HQ for CSC network
  - national-level research and synthesis

• **CSC**
  - eight federal-university collaboratives
National Climate Change & Wildlife Science Center

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

• Focus on climate change adaption & impacts
Key CSC Characteristics

- University/federal joint venture – access capabilities feds don’t have
- Training of grad students – pipeline
- Small federal staff
  - Filling regional gaps
  - Synthesis / assessment / aggregation
- $4-5 m/year, majority in flexible federal funds
- Will build significant cyber infrastructure network
- Guided by management-driven questions

We’re only half way there!!
Alaska: University of Alaska / Fairbanks (at Anchorage)
NW: Oregon State, U-Washington, U-Idaho
SE: North Carolina State University

SW: U-Arizona + Univ. of California – Davis, UCLA, Univ. of Colorado, Desert Research Institute (Nevada) & Scripps Institution

NE: U-Massachusetts-Amherst, with College of Menominee Nation, Columbia University, Marine Biological Laboratory, U-Minnesota, University of Missouri at Columbia. University of Wisconsin at Madison
SC: U-Oklahoma + Texas Tech University, Louisiana State University, The Chickasaw Nation, The Choctaw Nation of Oklahoma, Oklahoma State University, and NOAA’s Geophysical Fluid Dynamics Laboratory
Pacific: University of Hawaii-Manoa with U-Hawaii-Hilo, and University of Guam
Co-Chair-- US Geological Survey
Co-Chair—Affiliated Tribes of Northwest Indians (ATNI);
Swinomish Indian Tribal Community;
Columbia River Intertribal Fish Commission
Environmental Protection Agency
US Bureau of Reclamation
US Forest Service – National Forest System, R&D
State of Montana
State of Oregon
State of Washington
National Park Service
Natural Resource Conservation Service
Bureau of Land Management
US Forest Service
US Army Corps of Engineers – Witt Anderson / Rebecca Weiss
Bonneville Power Administration
National Oceanic and Atmospheric Administration
Fish and Wildlife Service
Federal Highway Administration
Great Basin Landscape Conservation Cooperative
North Pacific Landscape Conservation Cooperative
Great Northern Landscape Conservation Cooperative

NOTE: NO NGO or private parties
“Big Science” or “Pure Science”
atmospheric, ecological, geologic, hydrologic

Translation, Integration, Assessment

Application to Management Concerns
IEM for Alaska Conceptual Framework

Integrated Ecosystem Model

Fire
Permafrost
Vegetation
Hydrology

Climate Change

Impact Models

model output x
model output y

Hypothetical Model

canopy cover
probability of thermokarst
species composition
probability of fire

Habitat Change Models

vegetation cover
probability of fire
surface hydrology

Fire Management Models

vegetation cover
biomass productivity
surface hydrology

Animal Performance Models

Communication of Needs

Conservation & Resource Management Decisions

Other stakeholder groups
CSC Research – Invasive Species

- Golden alga – TX
- Cheatgrass
- Prairie pothole bird communities
- Community conditions that foster invasives
Advisory Committee on Climate Change and Natural Resource Science

STATUS
• Chartered September 2012; not yet activated
• Federal Register call for nominations – Fall/Winter
• Recommended member list under review

MEMBERSHIP
• DOI, Other Federal, State, Tribal, NGO, Private, Academic
• Twenty-five members
“... advises the Secretary ... on the establishment and operations of the USGS National Climate Change and Wildlife Science Center and the DOI Climate Science Centers.”

- contents of a national strategy identifying key science priorities
- nature, extent, and quality of relations with and engagement of key partners
- effectiveness of mechanisms to [identify] key priorities from management partners and to deliver results in useful forms.
- Maintaining high scientific standards
- Coordinate with any LCC-FAC
Cross-FAC “Next Steps”

- Keep lines of communication open
- Share info on national strategy / plan as it develops
- ........
Thank you

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Table 1.8. Known avifauna nesting habitat by land cover class identified from satellite imagery on the low-lying Northwestern Hawaiian Islands. [See appendix 3 for details on nesting behavior]

<table>
<thead>
<tr>
<th>Species</th>
<th>Tree/shrub</th>
<th>Casuarina equisetifolia</th>
<th>Pluchea indica</th>
<th>Tournefortia argentea</th>
<th>Mixed shrub</th>
<th>Grass/herbaceous cover</th>
<th>Vine/ground cover</th>
<th>Wetland vegetation</th>
<th>Partially vegetated former runway</th>
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<th>Human structure (buildings only)</th>
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Assumptions....

1. Climate change is occurring

2. Current policy actions are inadequate (and too late) to avoid continuing change over decades to centuries

3. Thus, human and natural systems must adapt

4. Effective adaptation will require science, observations, and tools that do not presently exist

5. Effective adaptation will be enabled by landscape and regional level partnership action on both science and management
And some implications (or lessons...)

- Conservation science has to be landscape oriented and climate science regionally oriented
- Interactions between science and management are crucial
  - For priority setting
  - Co-development, translation, delivery
- Partnerships take care and feeding (not ancillary duties)
- Need to make THIS the normal way of doing business
The Potential Influence of Changing Climate on the Persistence of Western Trout and Grayling

By A. L. Hebble, J. E. Williams, D. Issac, A. Todd, C. Mulfield, J. L. Kershner, R. Scottwell, S. Hosteller and H. M. Neville
July conditions
2060-2069 minus 1990-1999

- **cloud cover**
- **solar radiation**
- **precipitation**
- **ground temperature**
Drought and Summer Temperature Risk

Yellowstone Cutthroat Trout

Summer Temperature Risk

- Low Risk
- Moderate Risk
- High Risk
- River basin
- Conservation Population

Drought Risk
Figure 1.2. Map of the Hawaiian Archipelago with the main Hawaiian Islands (Kaua‘i to Hawai‘i) and Papahānaumokuākea Marine National Monument (PMNM; 362,061 square kilometers), the largest conservation area in the United States.
Mission

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

Focus on climate change adaption & impacts
ALASKA CLIMATE CHANGE EXECUTIVE ROUNDTABLE
AND NEW TOOLS FOR COLLABORATIVE ACTION ON CLIMATE CHANGE

ALASKA SUB-CABINET ON CLIMATE CHANGE

ALASKA CLIMATE CHANGE EXECUTIVE ROUNDTABLE

Proposed NOAA Regional Climate Service
DOI Climate Science Center
Landscape Conservation Cooperatives
National Climate Services
NCCWSC National Standards
DOI Implementation Guidance
Connecting Climate Change to Resource Management

Global Climate Models
Describe likely climate changes at a very large scale
Produced by agencies, universities, and research centers

Local / Regional Climate Information
Describe likely climate changes at a regional or local scale. Downscaled from global models or produced from regional models.

Ecological Understanding
Describe basic ecological processes (hydrology, population biology, ecosystem functions, processes, and services)

Forecasts of Ecological Response
Describe likely effects on fish, wildlife, ecosystems
Use regional and local projections of climate change
Major focus of National Climate Change and Wildlife Science Center

Adaptive Management
Conservation actions designed to react to changing circumstances
Identified by Landscape Conservation Cooperatives and other resource managers

Monitoring and Feedback
Identify effective actions, inform mid-course corrections
A fundamental component of effective planning and management
## Northwest Climate Science Center FY 2011 Science Funding Allocations

**June 30, 2011**

<table>
<thead>
<tr>
<th>Science Projects</th>
<th>Principal Investigators/Organizations</th>
<th>Priority*</th>
<th>Funding</th>
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<tbody>
<tr>
<td>Disentangling the effects of climate and landscape change on bird population trends in the western U.S. and Canada</td>
<td>Matthew Betts (OSU), Susan Shirley (OSU), and Joan Hagar (USGS)</td>
<td>NPLCC</td>
<td>$74,640</td>
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<tr>
<td>Identification and laboratory validation of temperature tolerance for macroinvertebrates: Developing vulnerability prediction tools</td>
<td>Robert Black (USGS)</td>
<td>NCCWSC</td>
<td>$100,000</td>
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<td>Range-wide climate vulnerability assessment for threatened bull trout</td>
<td>Jason Dunham (USGS), Stephen Zylstra (USFWS), and Tim Mayer (USFWS)</td>
<td>NPLCC, GNLCC</td>
<td>$100,000</td>
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<td>Contribution of landscape characteristics and vegetation shifts from global climate change to long-term viability of greater sage-grouse</td>
<td>Steven Knick (USGS) and Sara Oyler-McCance (USGS)</td>
<td>NCCWSC</td>
<td>$50,000</td>
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<td>Toward next generation downscaling for hydrologic prediction in the Pacific Northwest (using Multivariate Adaptive Constructed Analogs – Variable Infiltration)</td>
<td>Dennis Lettenmaier (UW), John Abatzoglou (UI), and Philip Mote (OSU)</td>
<td>NW CSC</td>
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<td>Uncertainty and extreme events in future climate and hydrologic projections for the Pacific Northwest: providing a basis for vulnerability and core/corridor assessments</td>
<td>Jeremy Littlel, Alan Hamlet, Nathan Mantua, and Eric Salathe (UW)</td>
<td>NPLCC, GNLCC</td>
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<td>Climate change threats to fish habitat connectivity: Growth and predation</td>
<td>Alec Maule, Patrick Connolly, Matthew Mesa, Jill Hardiman, and James Hatten (USGS)</td>
<td>GNLCC, NCCWSC</td>
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ID Priority Thematic Areas

A, B, C, D

A1+A2+A3

B1+B2+B3

C1+C2+C3

Defined Regional Objectives for Each Thematic Area

Defined National Objectives for Each Multi-CSC Thematic Area

Complementary National Products

A, C, D

B, C, D

B, D, F

A, B, F
National Science Strategy –
What do we want to accomplish ??

Science Focal Areas

1. Assess and synthesize our state of knowledge about climate and land use change impacts to natural and cultural resources.

2. Perform vulnerability assessments of species and ecosystems.

3. Understand the social-ecological impacts of climate and land use change.

4. Understand the interactions between climate and the physical, biological, and chemical forces that influence the structure and functioning of ecosystems and the goods and services they provide.
<table>
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<tr>
<th><strong>Phased Development</strong></th>
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<tr>
<td><strong>Infrastructure</strong></td>
<td>Select CSC partners, develop administrative processes, hire key staff, develop relations with LCCs and other partners, develop initial science plans</td>
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<tr>
<td><strong>Strategic Science</strong></td>
<td>Move from individual and highly responsive to strategic, multi-year, multi-project science programs focused on a limited number of high priorities, and with clearly defined endpoints, with elements at CSC, multi-CSC, and national levels</td>
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</table>

Increase greatly the link between decisions and science.
A new model

- Collaborative priority setting
- Strong management linkages
- Translational science
- Collaborative science planning
- Nimble design, flexible resources
- Collaboration is an assigned task