

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

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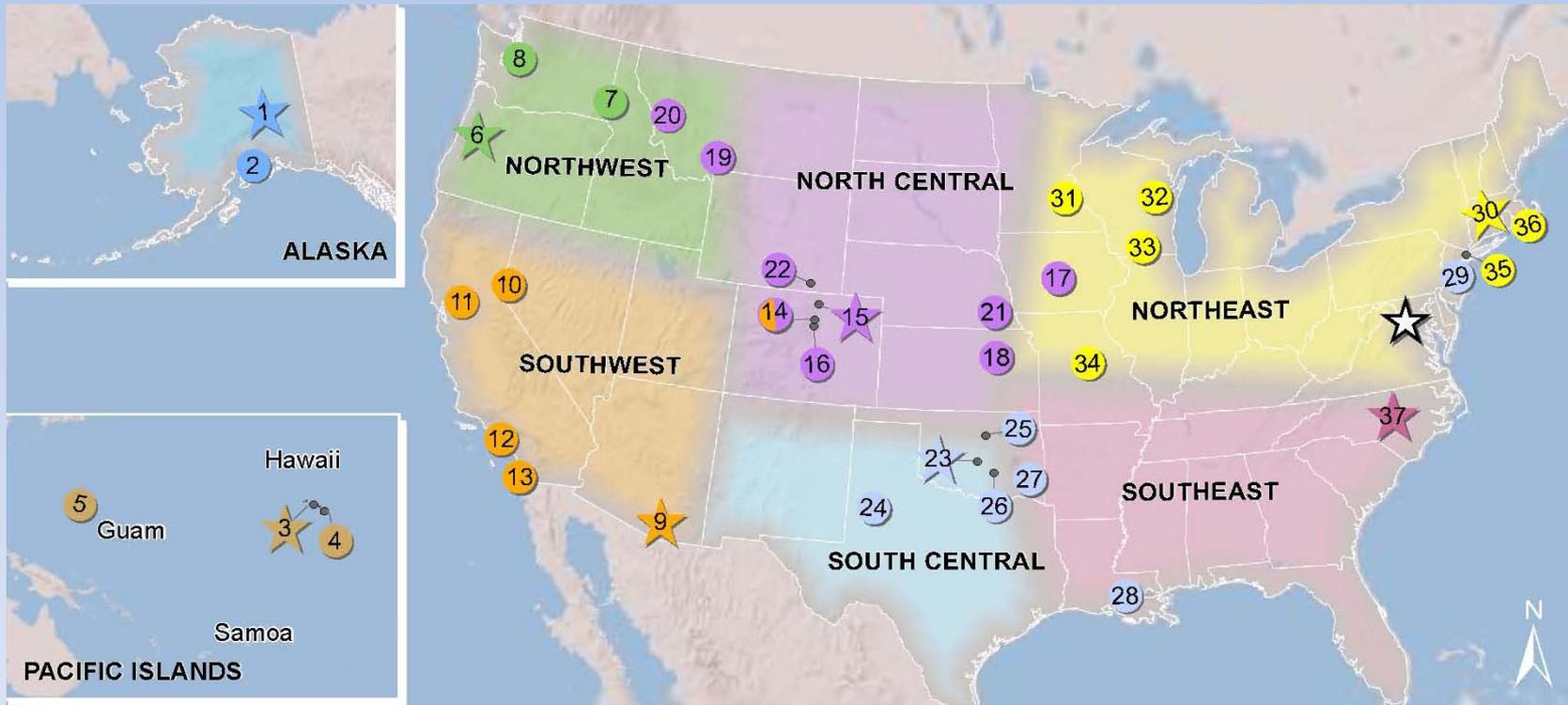
Robin O'Malley  
Policy and Partnership Coordinator  
USGS National Climate Change and Wildlife Science Center

# 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

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- **Mission**

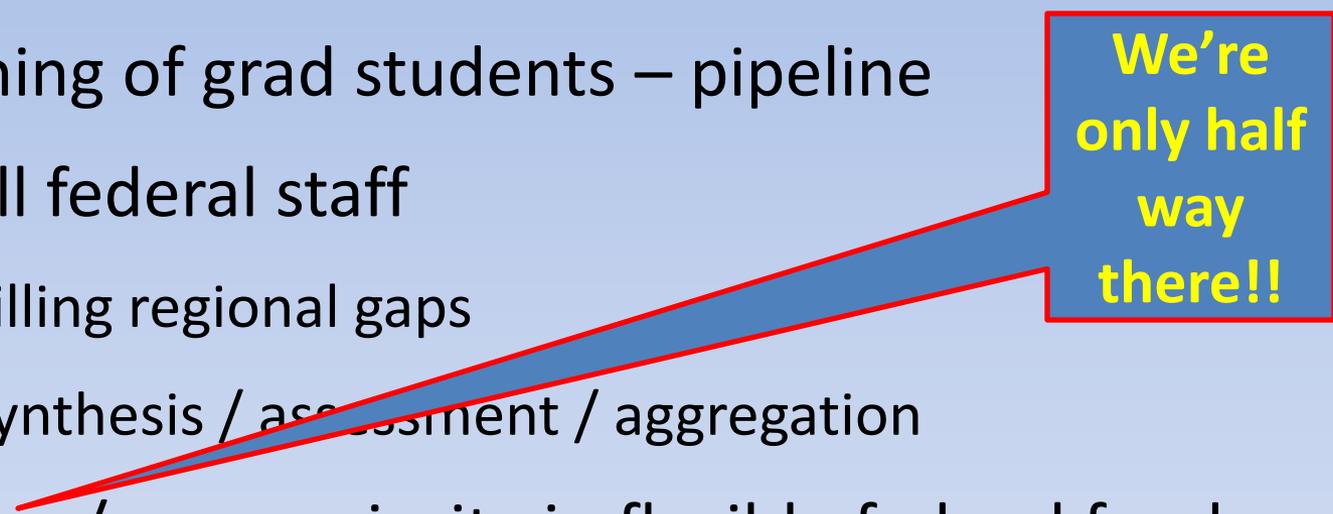
Provide **natural resource managers** with the **tools and information** they need **to develop and execute management strategies** that address the impacts of climate change on **fish, wildlife, and their habitats**

- **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

**2010**

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

**2011**

**NC:** Colorado State + U-Colorado, CO School of Mines, Iowa State, U-Montana, U-Nebraska-Lincoln, Kansas State, Montana State, and U-Wyoming.

**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

**2012**

**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

## Executive Stakeholder Advisory Committee NW CSC

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

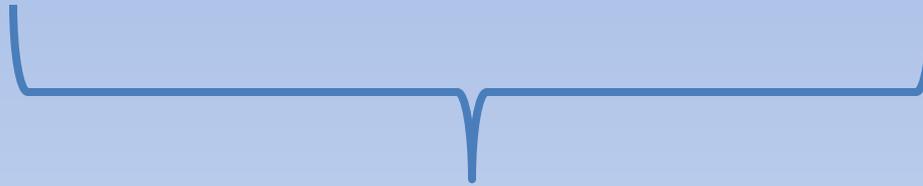
Great Basin Landscape Conservation Cooperative

North Pacific Landscape Conservation Cooperative

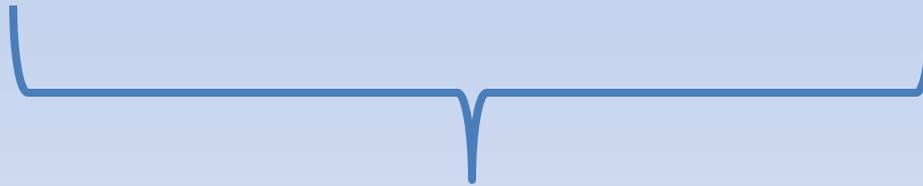
Great Northern Landscape Conservation Cooperative

**NOTE: NO NGO or private parties**

“Big Science” or “Pure Science”  
atmospheric, ecological, geologic, hydrologic



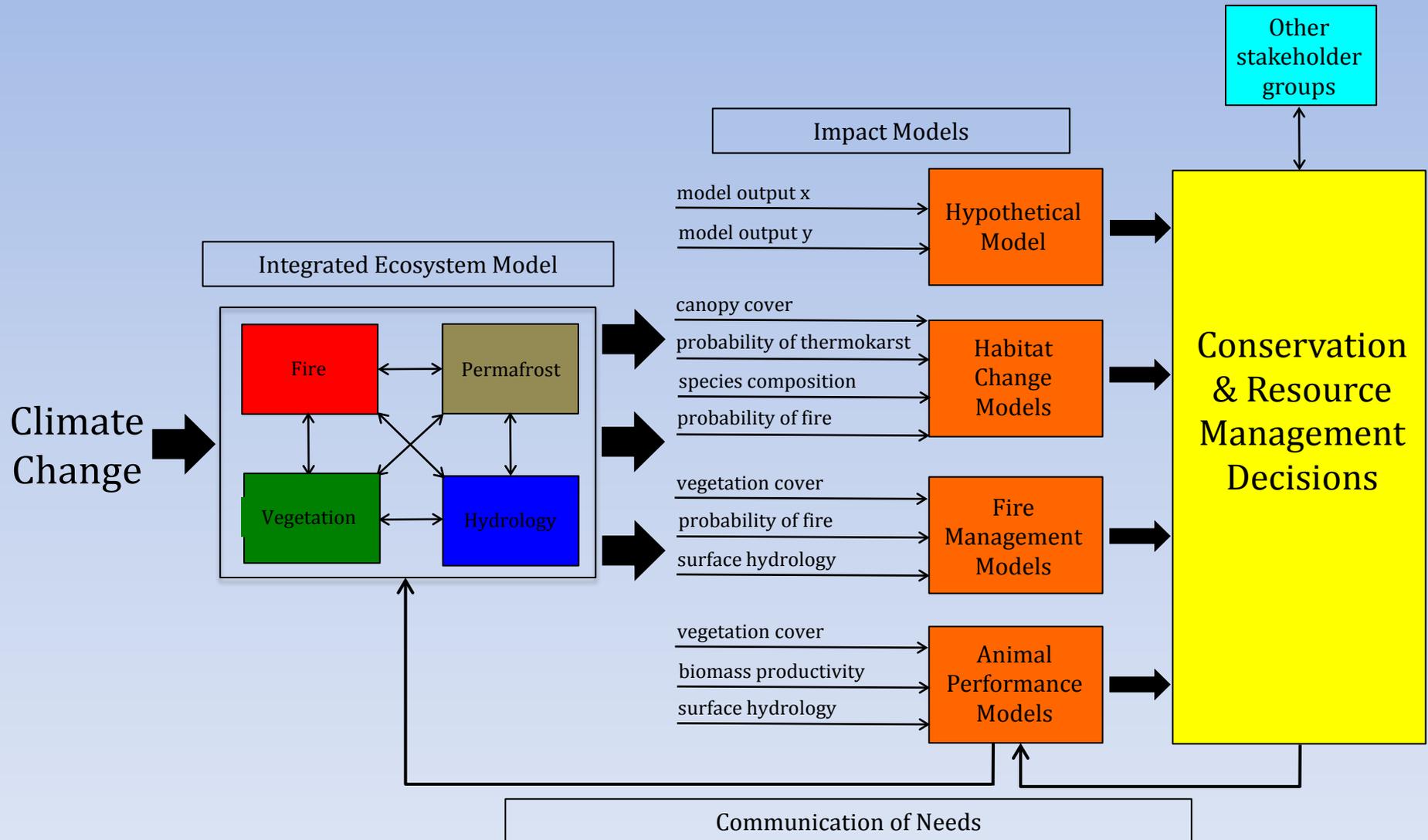
Translation, Integration, Assessment

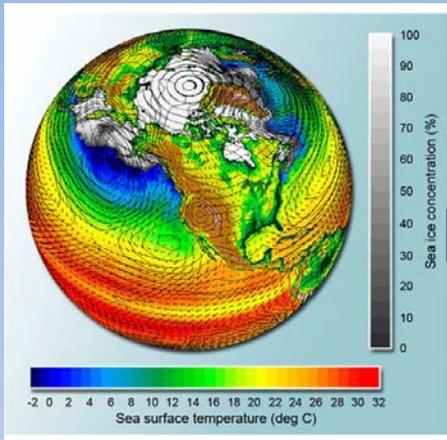


Application to Management Concerns



# IEM for Alaska Conceptual Framework





### Laysan Island Passive Inundation Scenarios with Groundwater Rise

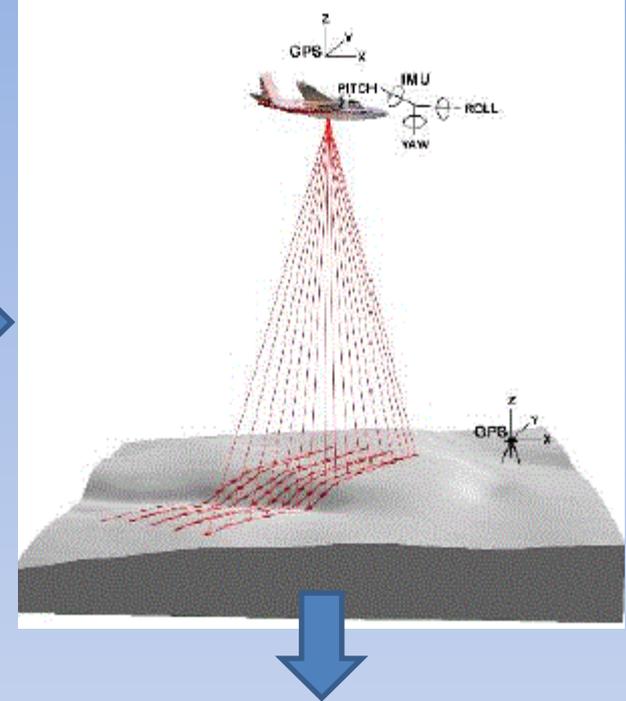
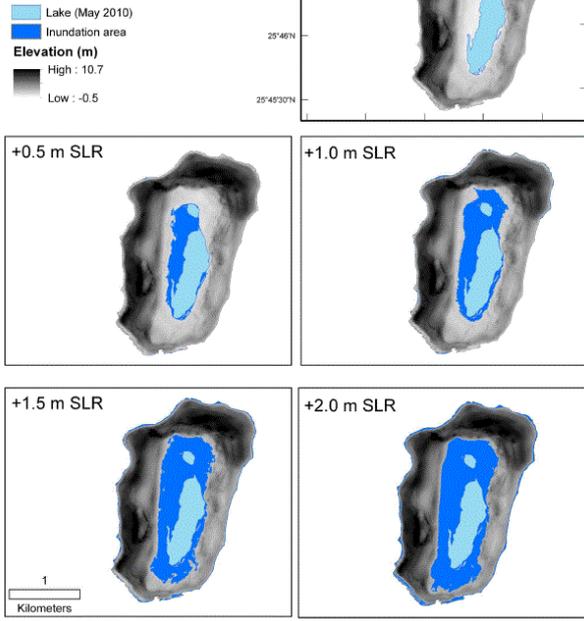


Figure 1.11. Eastern Island, Midway Atoll, land cover classification map developed using primarily unsupervised classification methods from Digital Globe QuickBird satellite imagery (March 2009). *Verbesina encaloides* distribution mapped from historical field data (Laniawe, 2004). Additional details on land cover and species composition are given in table 1.17.

## 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]

Species	Tree/shrub	<i>Casuarina equisetifolia</i>	<i>Pluchea indica</i>	<i>Tournefortia argentea</i>	Mixed shrub	Grass/ herbaceous cover	Vine/ ground cover	Wetland vegetation	Partially vegetated former runway	Bare ground	Hard pan <sup>2</sup>	Human structure (buildings only)
Black-footed Albatross		X			X	X	X	X	X	X		
Laysan Albatross		X			X	X	X	X	X	X	X	
Short-tailed Albatross		X			X	X	X		X	X		
Bonin Petrel	X	X	X	X	X	X	X					
Bulwer's Petrel										X		
Wedge-tailed Shearwater	X	X	X	X	X	X	X			X		X <sup>b</sup>
Christmas Shearwater	X	X	X	X	X	X	X		X			
Tristram's Storm-petrel	X	X	X	X	X	X	X			X		
Red-tailed Tropicbird	X	X	X	X	X	X			X			X <sup>b</sup>
White-tailed Tropicbird		X										
Masked Booby						X	X		X	X	X	
Brown Booby						X	X		X	X		
Red-footed Booby	X	X	X	X	X							
Great Frigatebird	X		X	X	X							
Little Tern						X	X			X		
Gray-backed Tern							X		X	X	X	
Sooty Tern						X	X		X	X		
Brown Noddy	X	X	X	X	X	X	X		X	X		
Black Noddy	X	X	X	X	X							X <sup>b</sup>
White Tern	X	X		X	X							X
Laysan Teal	X	X <sup>c</sup>	X	X	X	X	X					
Laysan Finch	X		X	X	X	X	X	X <sup>d</sup>				
Nihoa Finch	X		X	X	X	X	X					
Nihoa Millerbird*	X		X	X	X	X	X					

# 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

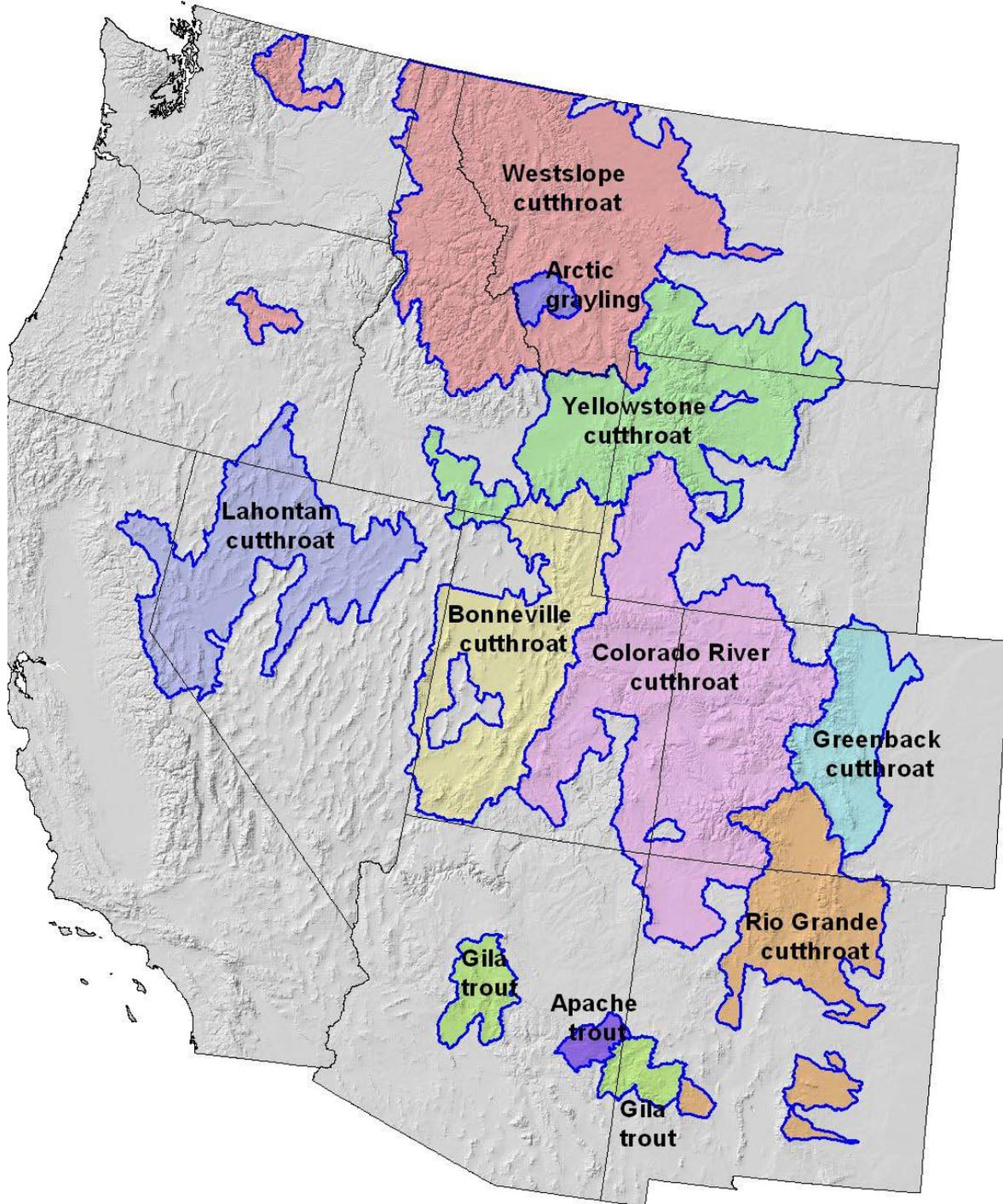


Secondary Identification and/or Statement of Cooperation

## The Potential Influence of Changing Climate on the Persistence of Western Trout and Grayling

By A. L. Haak, J. E. Williams, D. Isaak, A. Todd, C. Muhlfeld, J. L. Kershner, R. Gresswell, S. Hostetler and H. M.

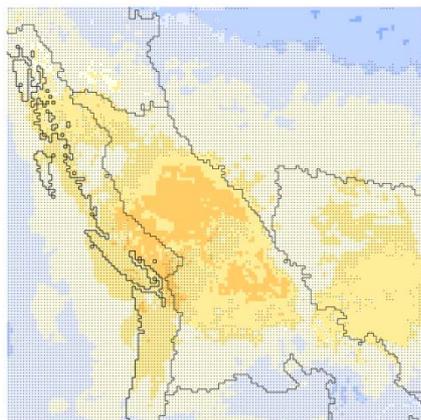
Neville



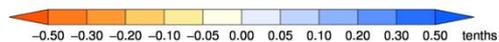
# July conditions

## 2060-2069 minus 1990-1999

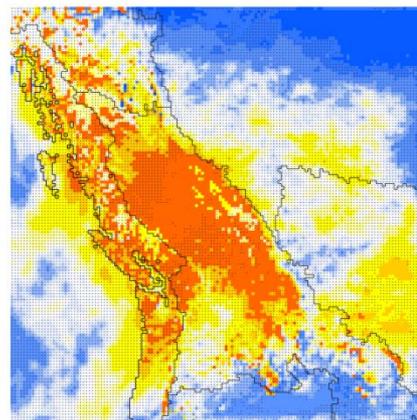
### cloud cover



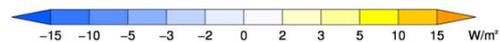
July Total Cloud (t-test  $\alpha = 0.10$ )  
GFDL 2060-2069 minus 1990-1999



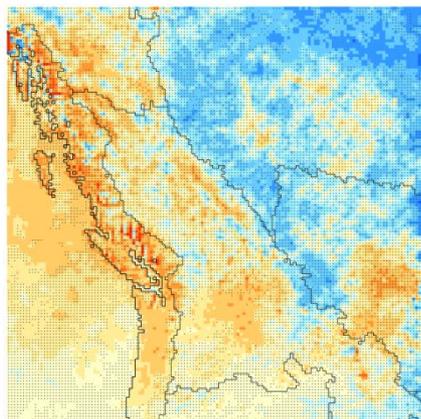
### solar radiation



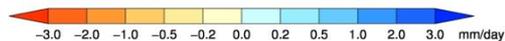
July Net Solar (t-test  $\alpha = 0.10$ )  
GFDL 2060-2069 minus 1990-1999



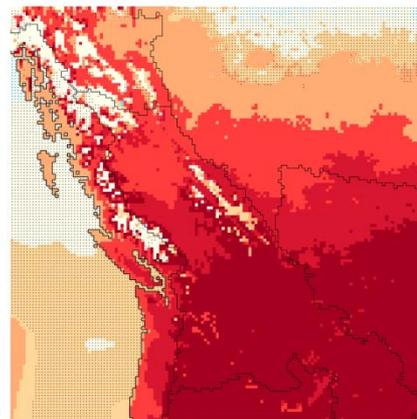
### precipitation



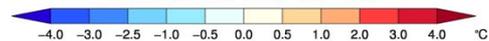
July Total Precipitation (t-test  $\alpha = 0.10$ )  
GFDL 2060-2069 minus 1990-1999



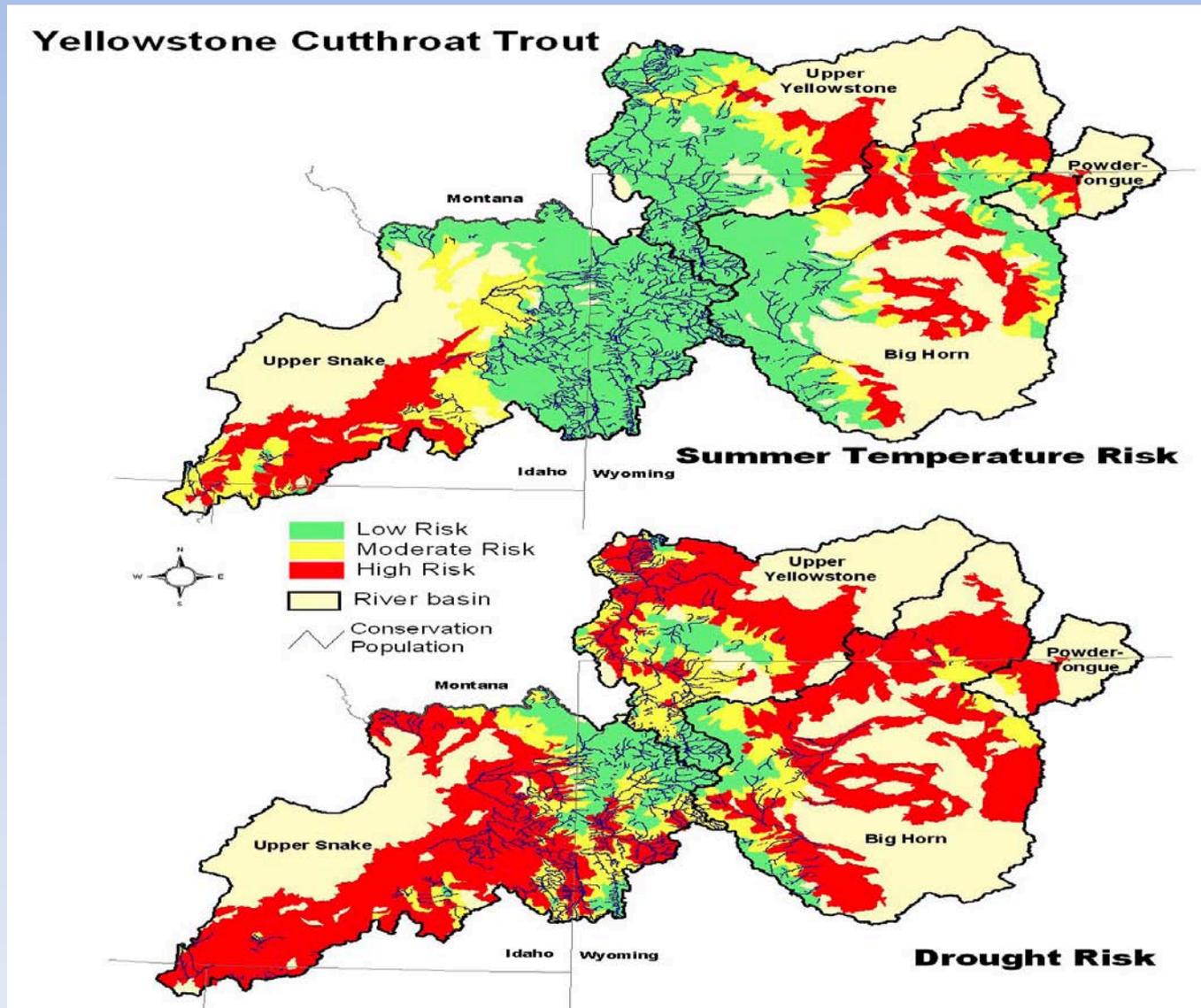
### ground temperature



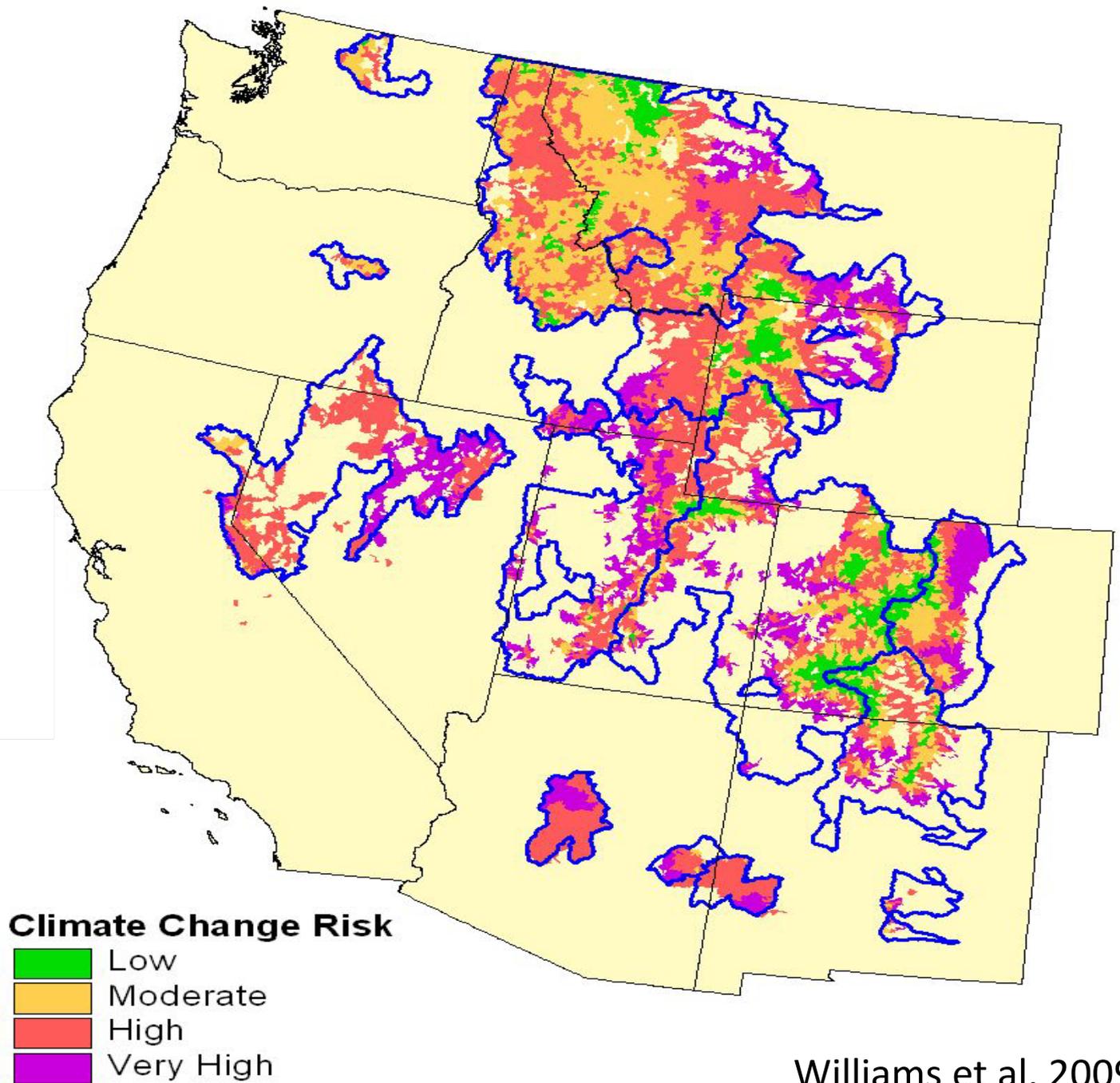
July Ground Temperature (t-test  $\alpha = 0.10$ )  
GFDL 2060-2069 minus 1990-1999

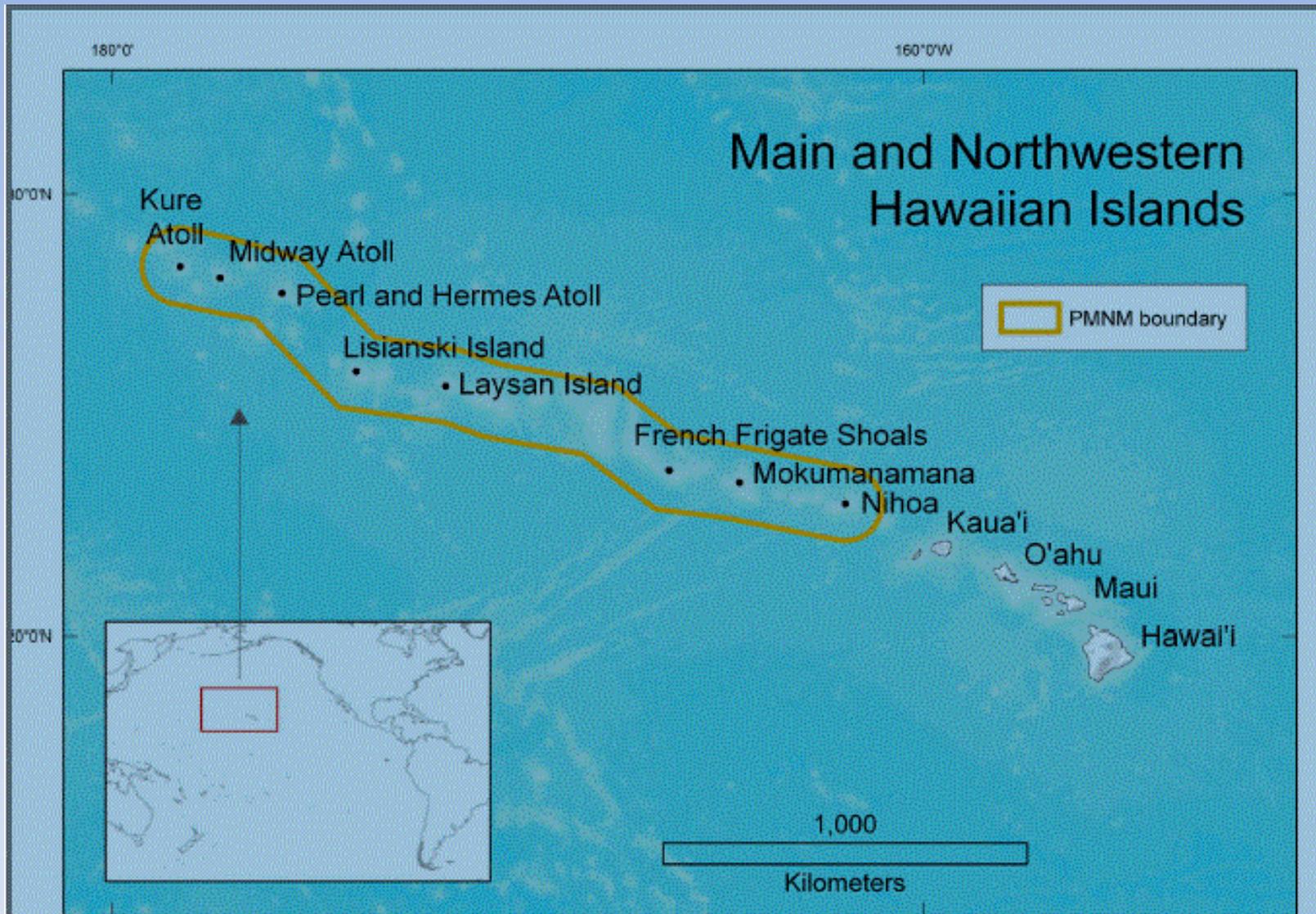


# Drought and Summer Temperature Risk



# Composite Climate Change 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.

# National Climate Change & Wildlife Science Center

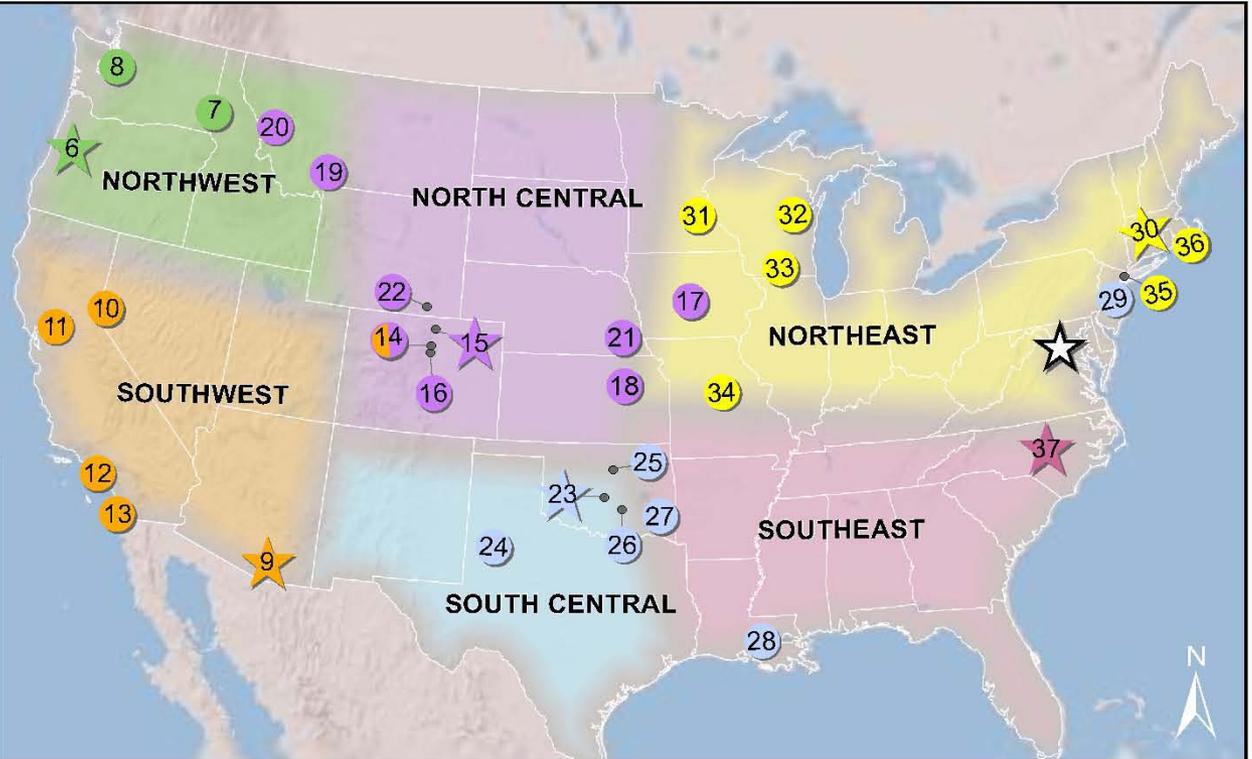
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- **Mission**

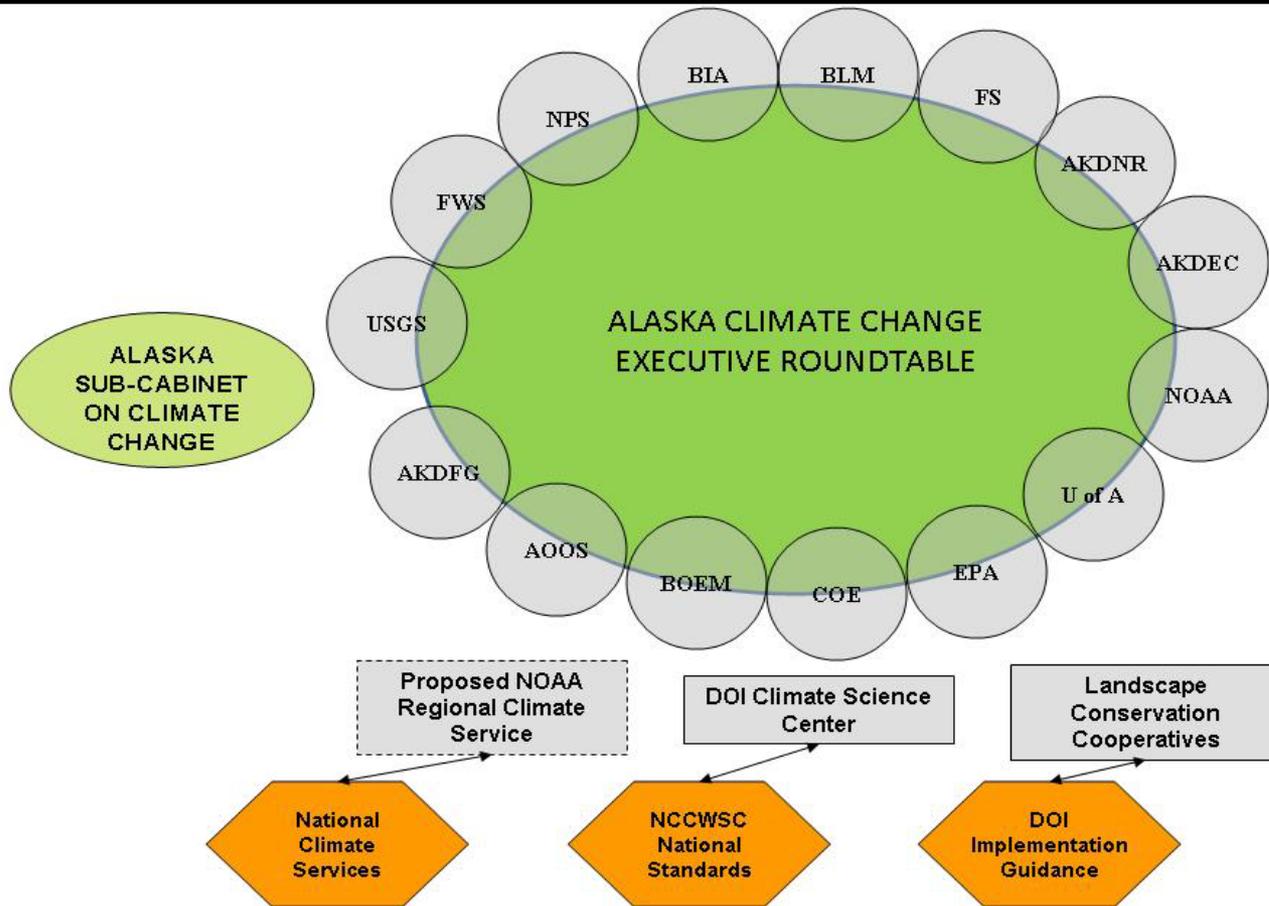
Provide **natural resource managers** with the **tools and information** they need **to develop and execute management strategies** that address the impacts of climate change on **fish, wildlife, and their habitats**

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





# ALASKA CLIMATE CHANGE EXECUTIVE ROUNDTABLE AND NEW TOOLS FOR COLLABORATIVE ACTION ON CLIMATE CHANGE



# 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

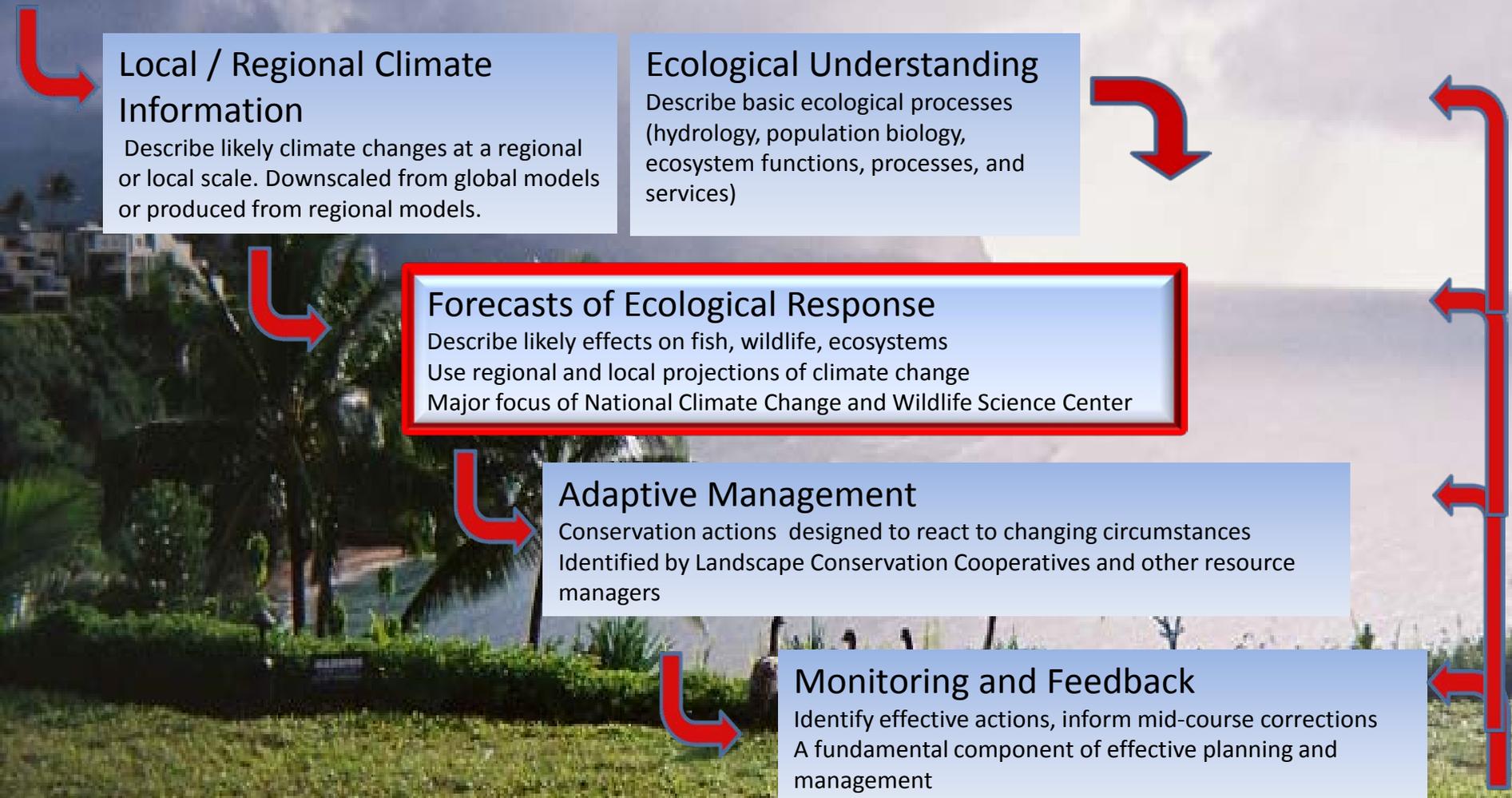
Describe likely effects on fish, wildlife, ecosystems  
Use regional and local projections of climate change  
Major focus of National Climate Change and Wildlife Science Center

## 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

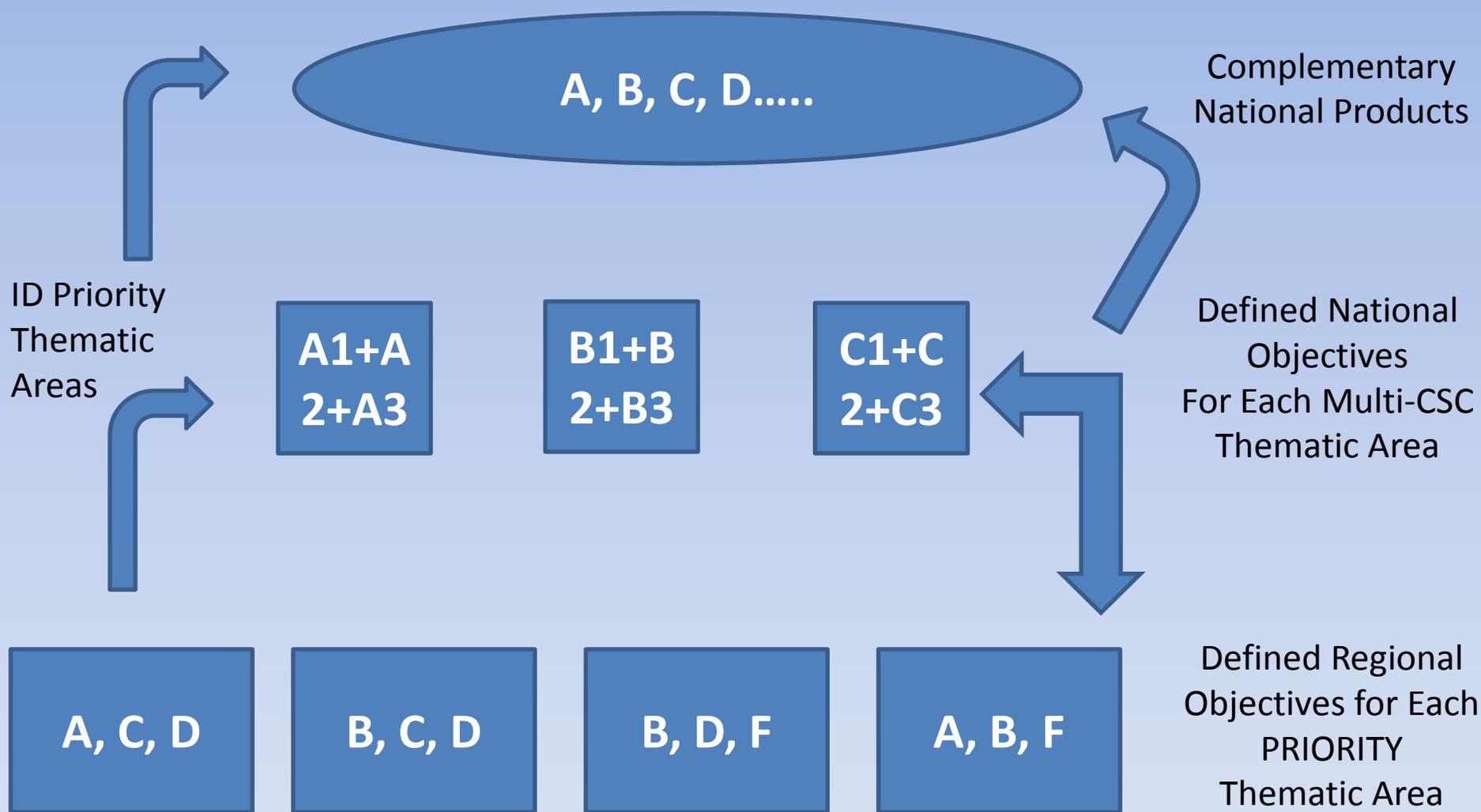


# Integrated Science & Management Priority Setting



## Northwest Climate Science Center FY 2011 Science Funding Allocations June 30, 2011

Science Projects	Principal Investigators/Organizations	Priority*	Funding
Disentangling the effects of climate and landscape change on bird population trends in the western U.S. and Canada	Matthew Betts (OSU), Susan Shirley (OSU), and Joan Hagar (USGS)	<b>NPLCC</b>	\$74,640
Identification and laboratory validation of temperature tolerance for macroinvertebrates: Developing vulnerability prediction tools	Robert Black (USGS)	<b>NCCWSC</b>	\$100,000
Range-wide climate vulnerability assessment for threatened bull trout	Jason Dunham (USGS), Stephen Zylstra (USFWS), and Tim Mayer (USFWS)	<b>NPLCC, GNLCC</b>	\$100,000
Contribution of landscape characteristics and vegetation shifts from global climate change to long-term viability of greater sage-grouse	Steven Knick (USGS) and Sara Oyler-McCance (USGS)	<b>NCCWSC</b>	\$50,000
Toward next generation downscaling for hydrologic prediction in the Pacific Northwest (using Multivariate Adaptive Constructed Analogs – Variable Infiltration)	Dennis Lettenmaier (UW), John Abatzoglou (UI), and Philip Mote (OSU)	<b>NW CSC</b>	\$74,811
Uncertainty and extreme events in future climate and hydrologic projections for the Pacific Northwest: providing a basis for vulnerability and core/corridor assessments.	Jeremy Littlele, Alan Hamlet, Nathan Mantua, and Eric Salathe (UW)	<b>NPLCC, GNLCC</b>	\$150,000
Climate change threats to fish habitat connectivity: Growth and predation	Alec Maule, Patrick Connolly, Matthew Mesa, Jill Hardiman, and James Hatten (USGS)	<b>GNLCC, NCCWSC</b>	\$89,500



# 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.**

# Phased Development

- Infrastructure** Select CSC partners, develop administrative processes, hire key staff, develop relations with LCCs and other partners, develop initial science plans
- Strategic Science** 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
- 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