



April 2 - 4, 2013

• Denver Marriott City Center

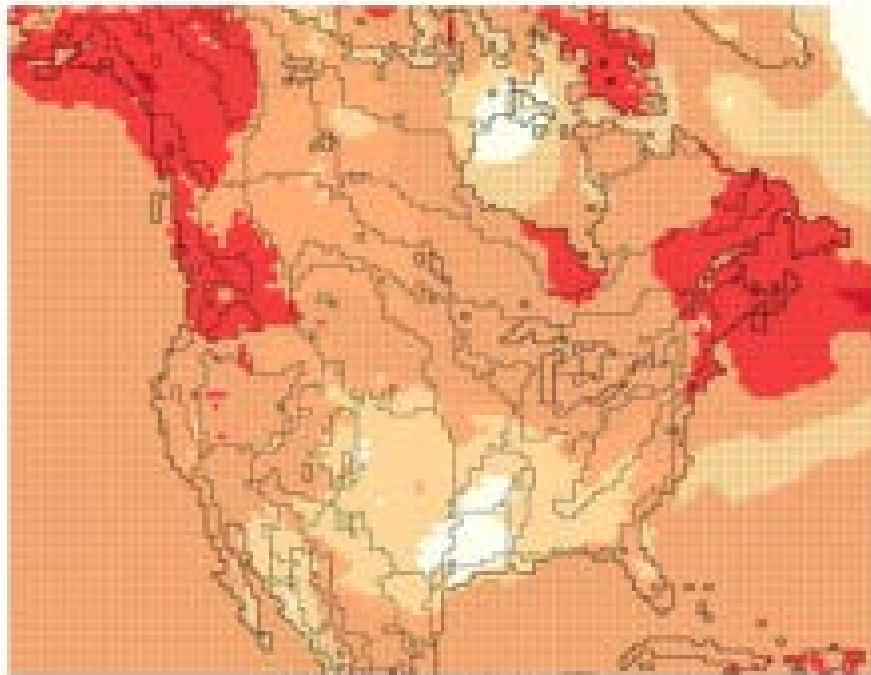
• Denver, Colorado

# Preparing for Change: A Discussion of Evaluation Tools and Techniques to Identify Research and Management Needs for Addressing Adaptation and Climate Change in Aquatic Systems

Organized by Daniel Drinan (USGS) and Doloras Savignano  
(USFWS)

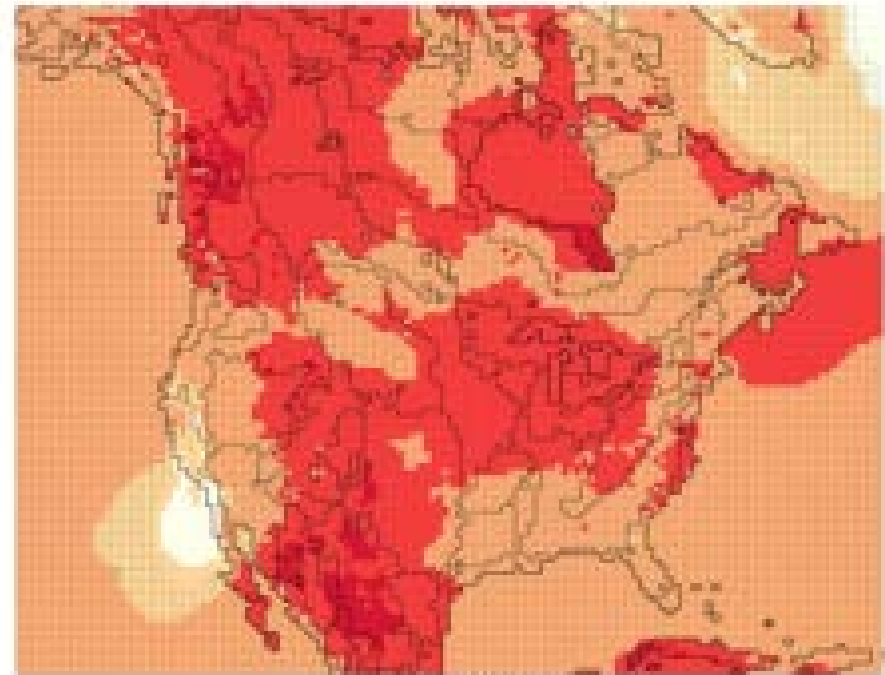
Moderated by Gary Whelan

# Key Climate Projections and Assumptions



**January Air Temperature**

Projected Change Based on the ECHAM5 Global Climate Model  
Resolution 50 km

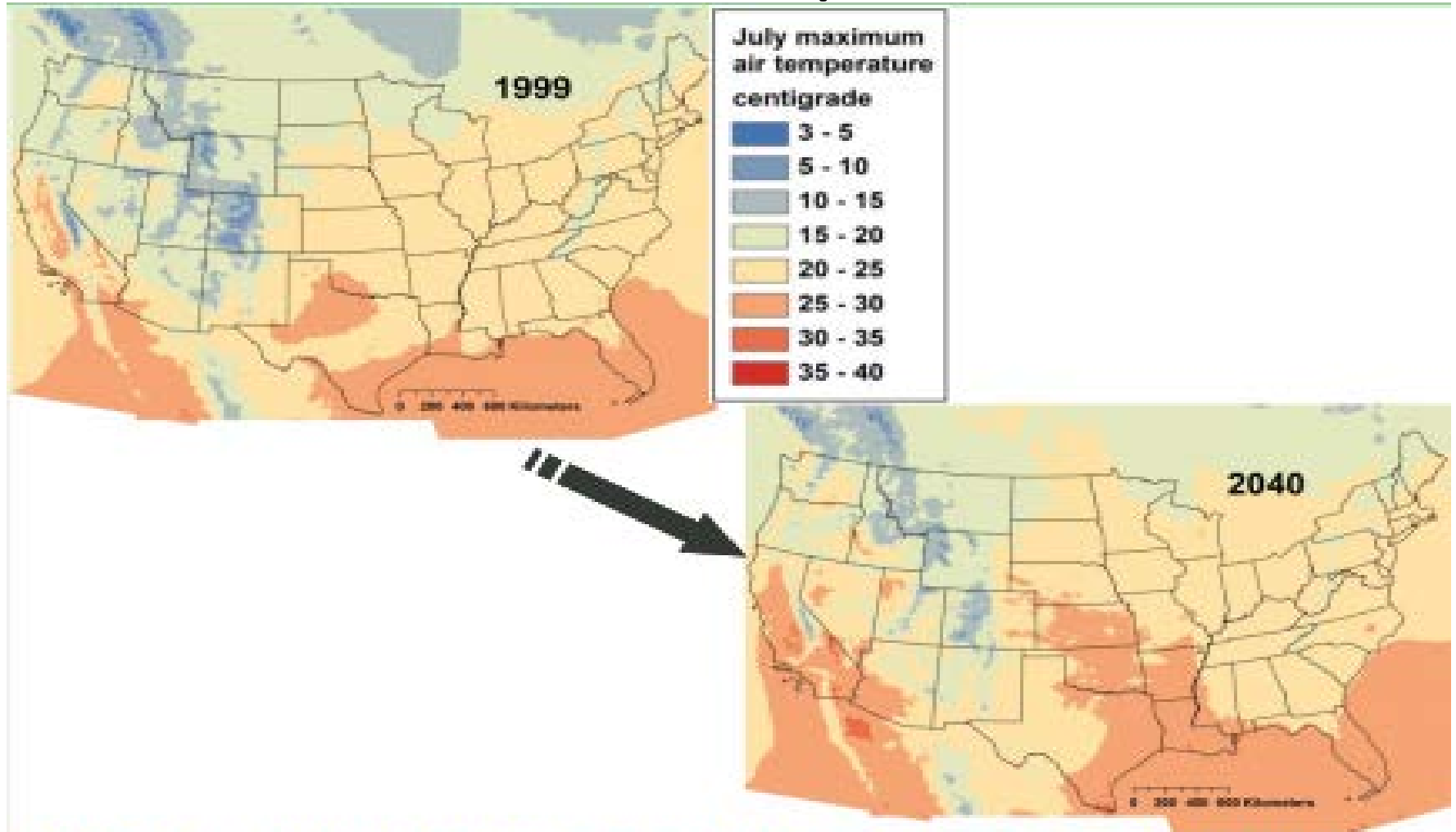


**July Air Temperature**

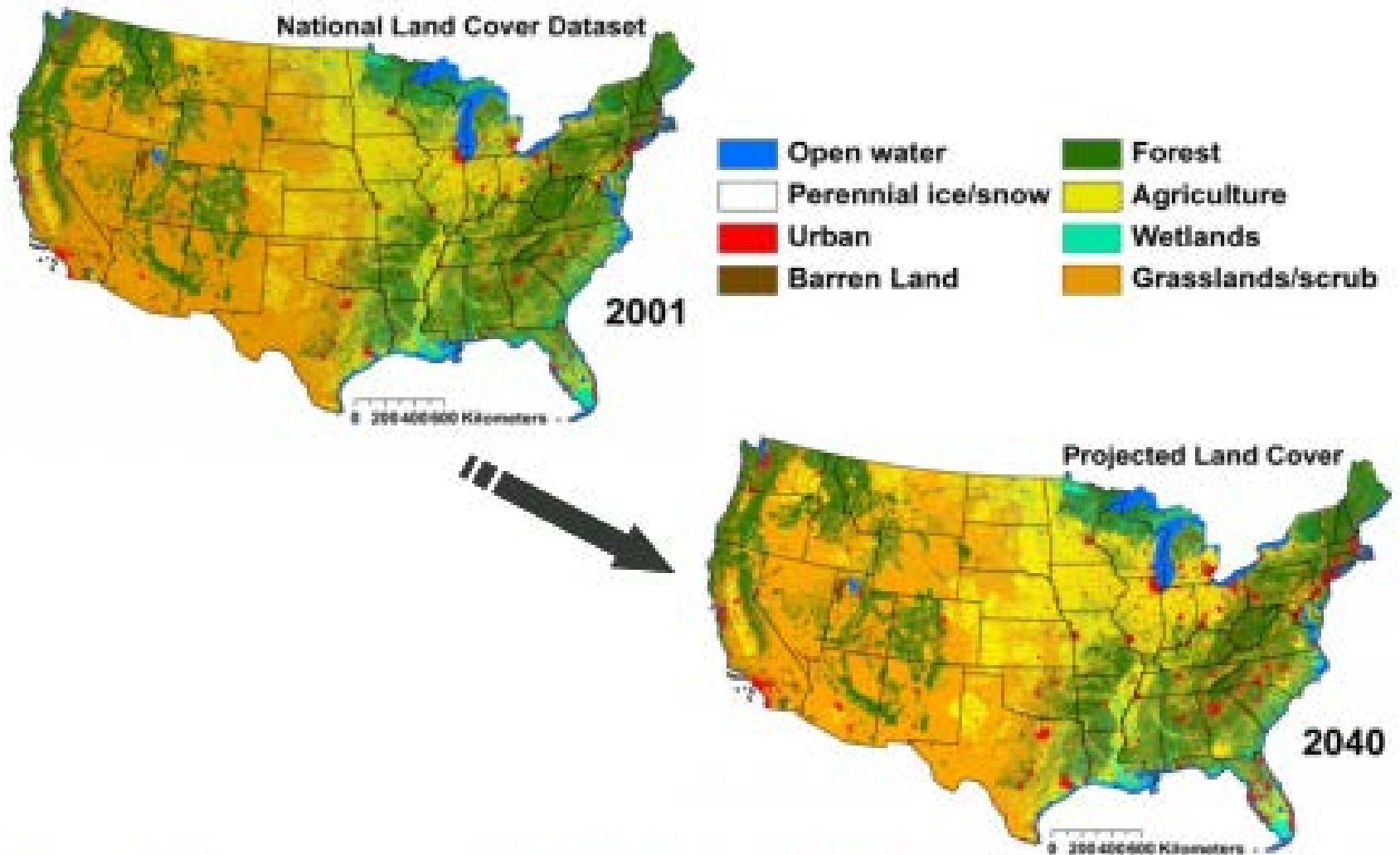
Projected Change based on the ECHAM5 Global Climate Model  
Resolution 50 km



# Key Climate Projections and Assumptions



# Likely Landscape Changes



**Panel 2.** Land use for 2001 and 2040 (Credit: B. Pekin and B. Pijanowski).



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# Workgroup Background

- Our climate is changing, and these changes will impact fisheries.
- Higher temperatures will :
  - reduce winter snowpack
  - cause winter and spring flooding
  - Decrease flows to streams and rivers in the summer and fall.
    - Disrupt migration of fish.
- In the Northeast and Midwest:
  - increasing precipitation and runoff, leading to more flooding, and increases in sediment, nitrogen and pollutants in rivers.
  - Intense rainfall and storm events will increase scouring of river beds, potentially washing away essential spawning habitat.



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# Workgroup Background

- Sea level rise and increase storm surges may reduce coastal freshwater wetlands, which provide important fish spawning grounds.
- In the Southeast, southwest and Hawaii:
  - an increase in summer droughts.
  - Decreases in runoff and droughts will reduce re-charge of surface waters and ground water, especially in the Southeast, Southwest and Great Plains



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# Workgroup Background

- With increases in water temperature and drought:
  - Reduced lake mixing
  - Decreasing oxygen deeper lake waters
  - Increased time required for pollutants to break down.
- On a local scale these changes likely will shift the balance among species
  - Making the habitat more suitable for some
  - less suitable, or entirely unsuitable for others



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# Workgroup Background

Speakers in this session will address tools available for modeling species vulnerability and distributions in a changing climate. They will also discuss the challenges and dilemmas that climate change poses for fishery management agencies.



# Workgroup Speakers

Dana Infante - National assessment of fluvial fish habitat change with climate: Importance of developing data and approaches for management across large regions

Damon Krueger - Assessing Midwest stream fish habitat in the face of a changing climate: An adaptive management approach using the FishVis mapping tool

-----Discussion-----

Kevin Wehrly - Assessing climate change impacts on lakes and developing tools for fisheries management.

Craig Paukert (Gary Whelan) - How are state freshwater fisheries agencies adapting to climate change?

Gary Whelan - The horns of a warming dilemma: The climate change conundrum for fisheries agencies and managers.

-----Discusson-----