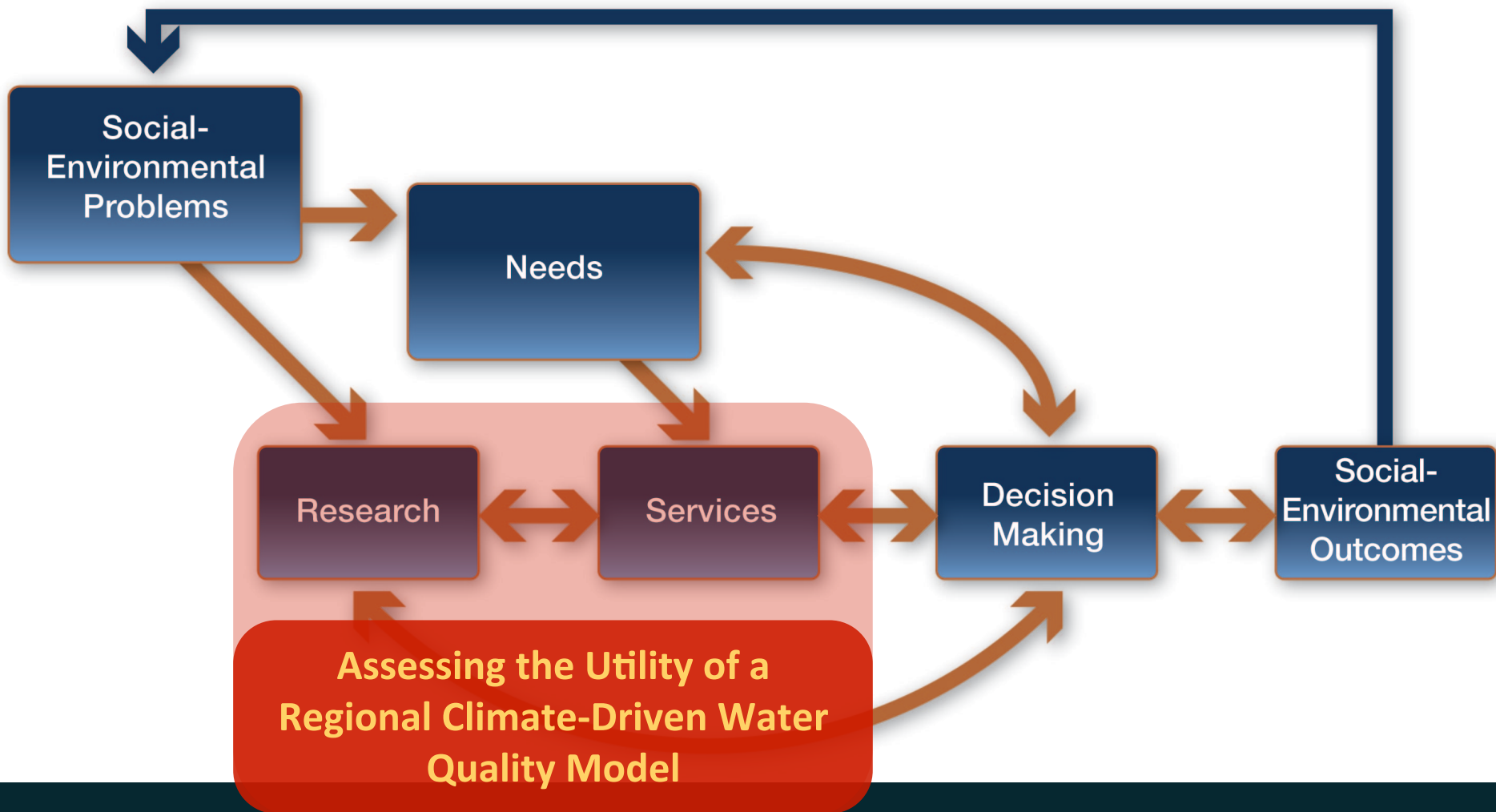


# Recently Completed Projects

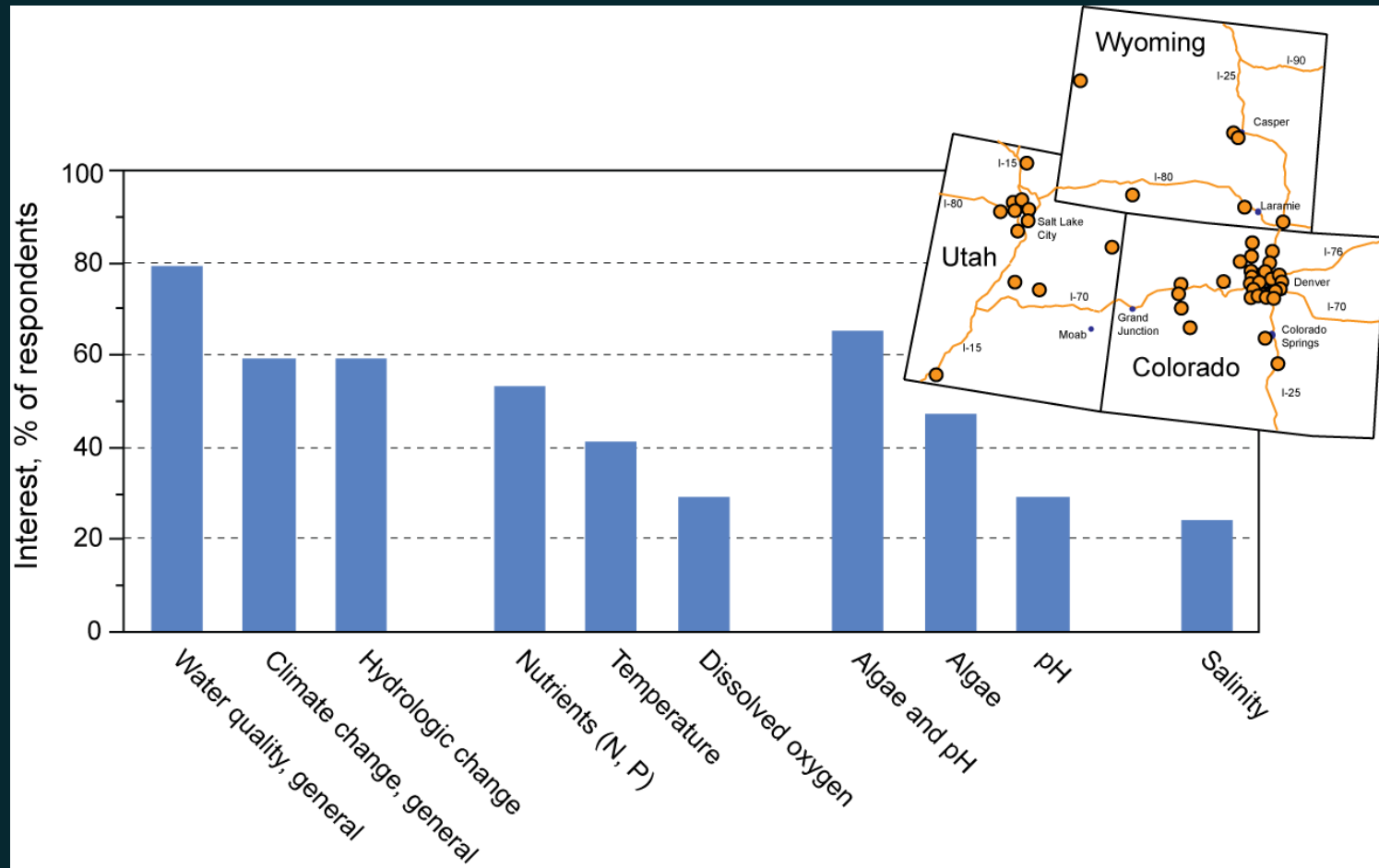
## Part 2

# Feedback



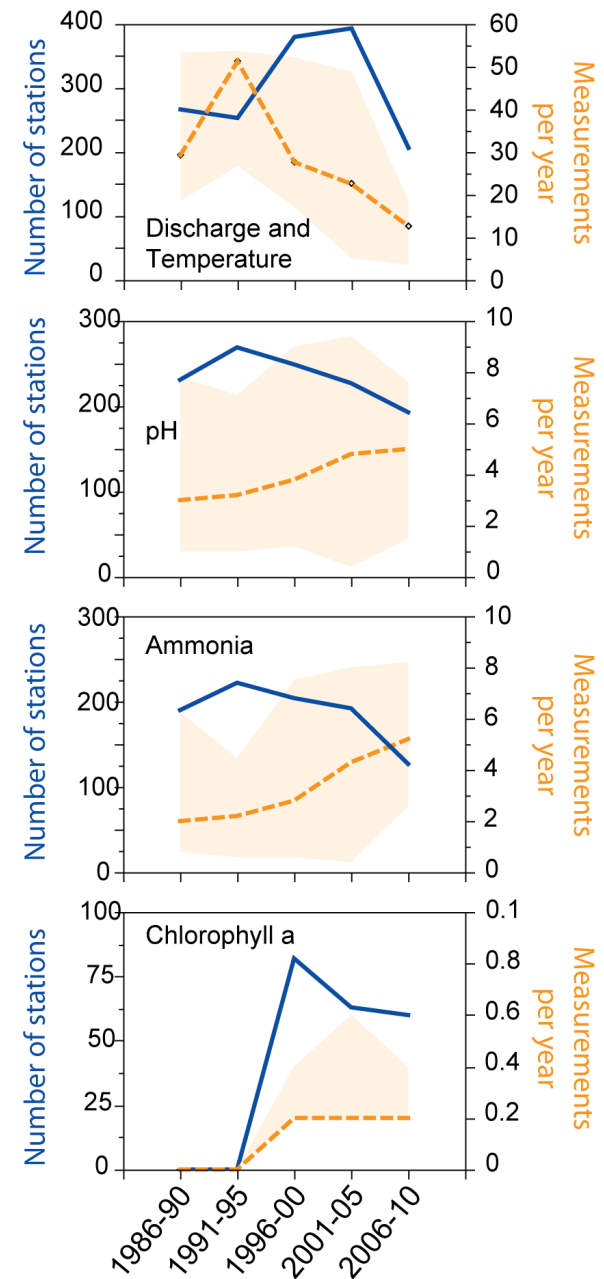
# Assessing the Utility of a Regional Climate-Driven Water Quality Model

J. McCutchan, M. Huisenga, W. Travis

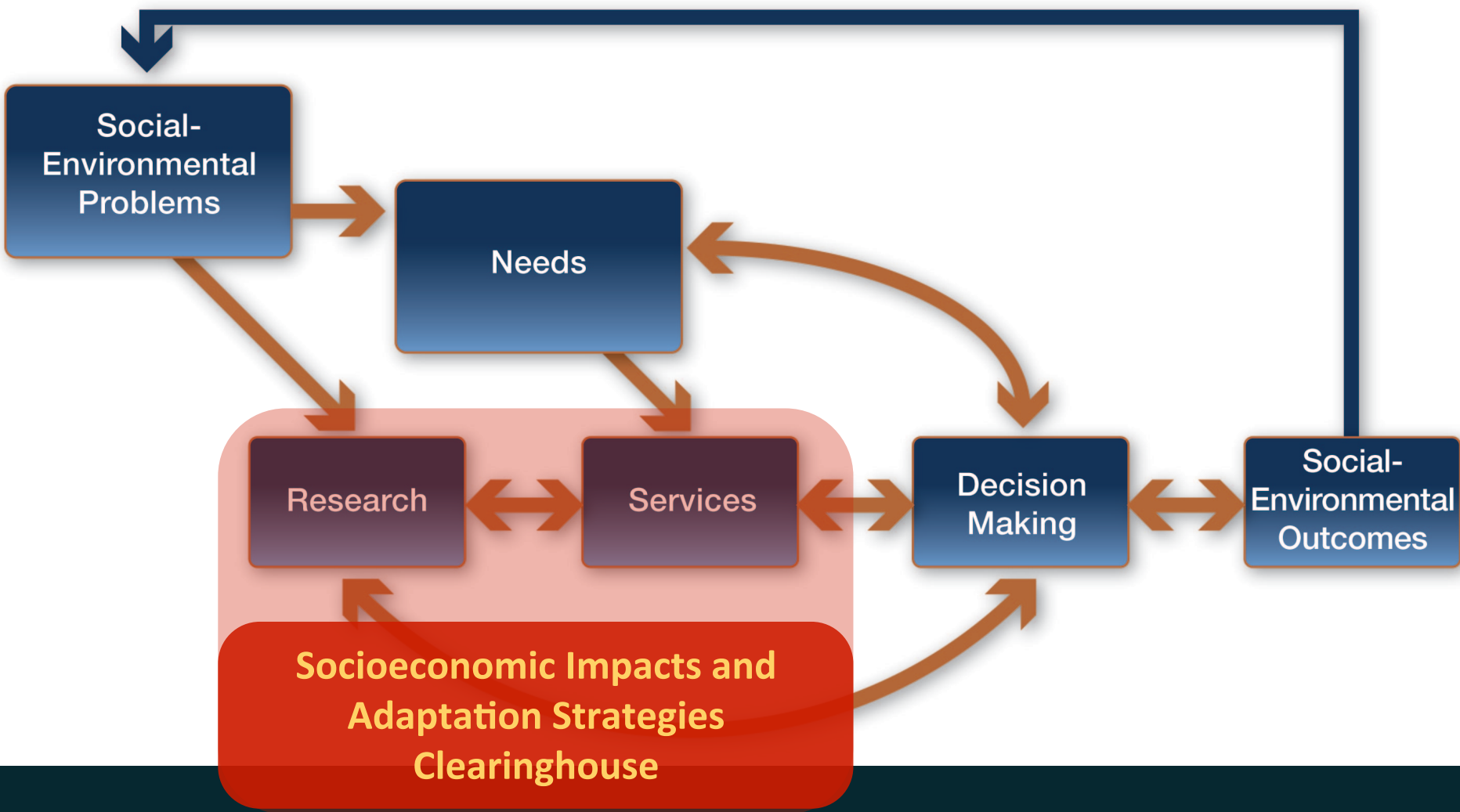


# Ongoing Work

- Database integration (USGS, EPA STORET, CO DWR, etc.)
- Assessment of data availability, gaps
- Identify framework(s) for modeling
  - Site-specific models
  - Regional models
- Model development
  - Beetle kill and water quality (regional)
  - Controls on pH, ammonia toxicity in Plains rivers (site specific, regional)
  - Stream temperature model for Colorado (regional)



# Feedback



# A Socioeconomic Impacts and Adaptation Strategies Clearinghouse

B. Klein, W. Travis

## Objective

Produce publicly accessible and searchable database addressing socioeconomic impacts from climate variation with a focus on outdoor recreation in the WWA region. Synthesize and summarize findings for stakeholders.

## White Papers

*Socioeconomic Impacts and Adaptation Strategies: Assessing Research on Quantification of Drought Impacts*

*Socioeconomic Impacts and Adaptation Strategies: Assessing Research on Drought, Climate Change and Recreation*

# Socioeconomic Climate Impacts



## Document List

1 **Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation. A Report by the Western Water Assessment for the Colorado Water Conservation Board**

Year: 2008

Author: Ray, A.R., J.J.Barsugli, K.B. Averyt, lead authors

Synthesizes climate change science important for Colorado water resources, including discussion of potential socioeconomic impacts.

## Find Documents

Phenomenon:

Drought

Sector:

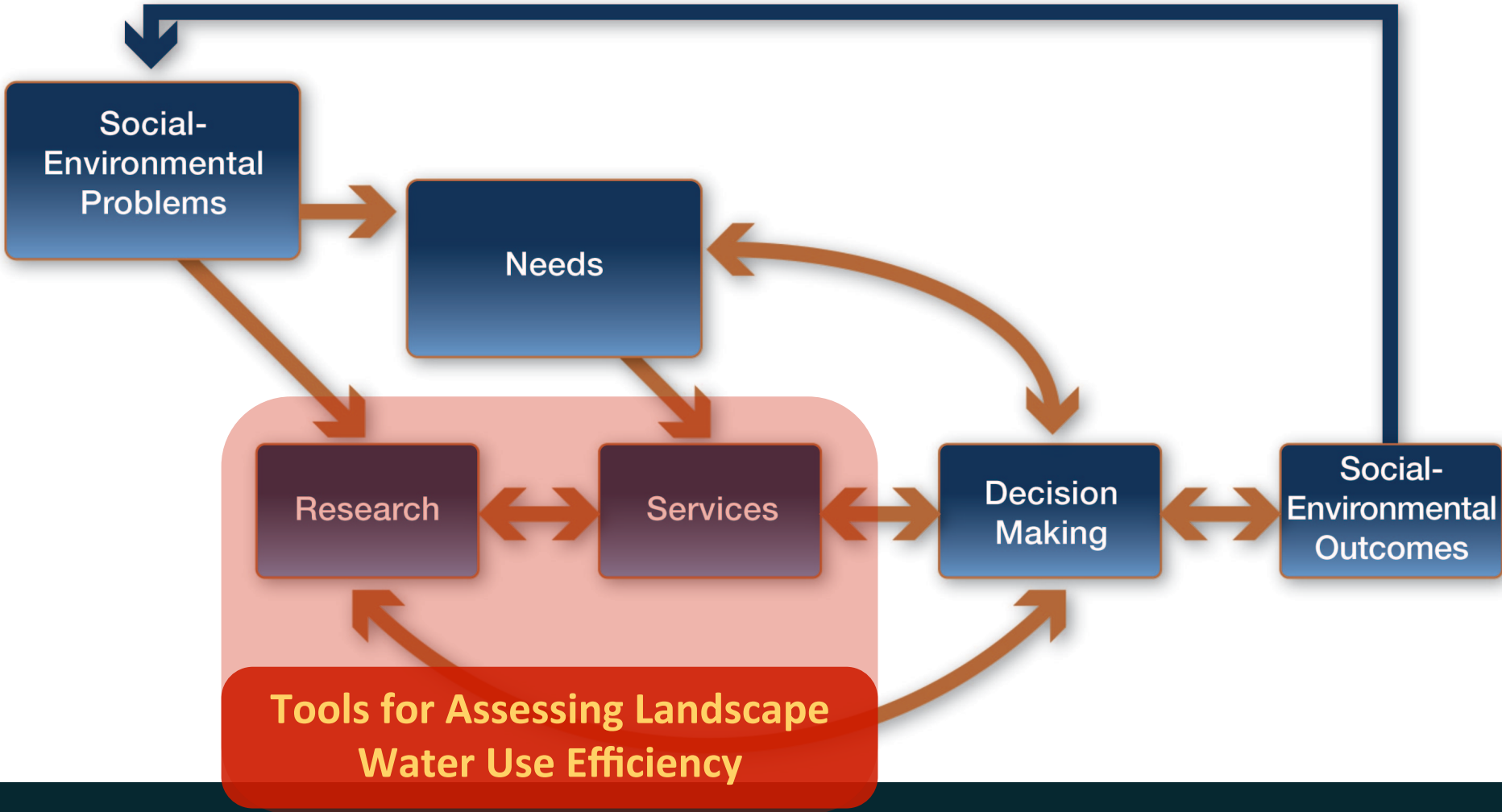
Outdoor Recreation - ALL

Location:

Contains 207 documents

Searchable by  
phenomenon, state, etc.

# Feedback





# Tools for Assessing Landscape Water Use Efficiency

J. Endter-Wada, C. Neale, R. Kjelgren

## Landscape Irrigation Ratio(LIR)

Landscape Water Use *estimated*  
(derived from mining municipal or water provider meter/billing data)

LIR = 

---

Landscape Water Need *estimated*

(derived from the classification of remotely-sensed airborne multispectral imagery and localized reference  $ET_0$  rates modified by relevant landscape correction factors and irrigation system inefficiencies)

## Establishing Benchmarks

### Cut points

$LIR \leq 1$

$1 < LIR \leq 2$

$2 < LIR \leq 4$

$4 < LIR \leq 8$

$8 < LIR$

### Labels

*efficient*

*acceptable*

*inefficient*

*unnecessary*

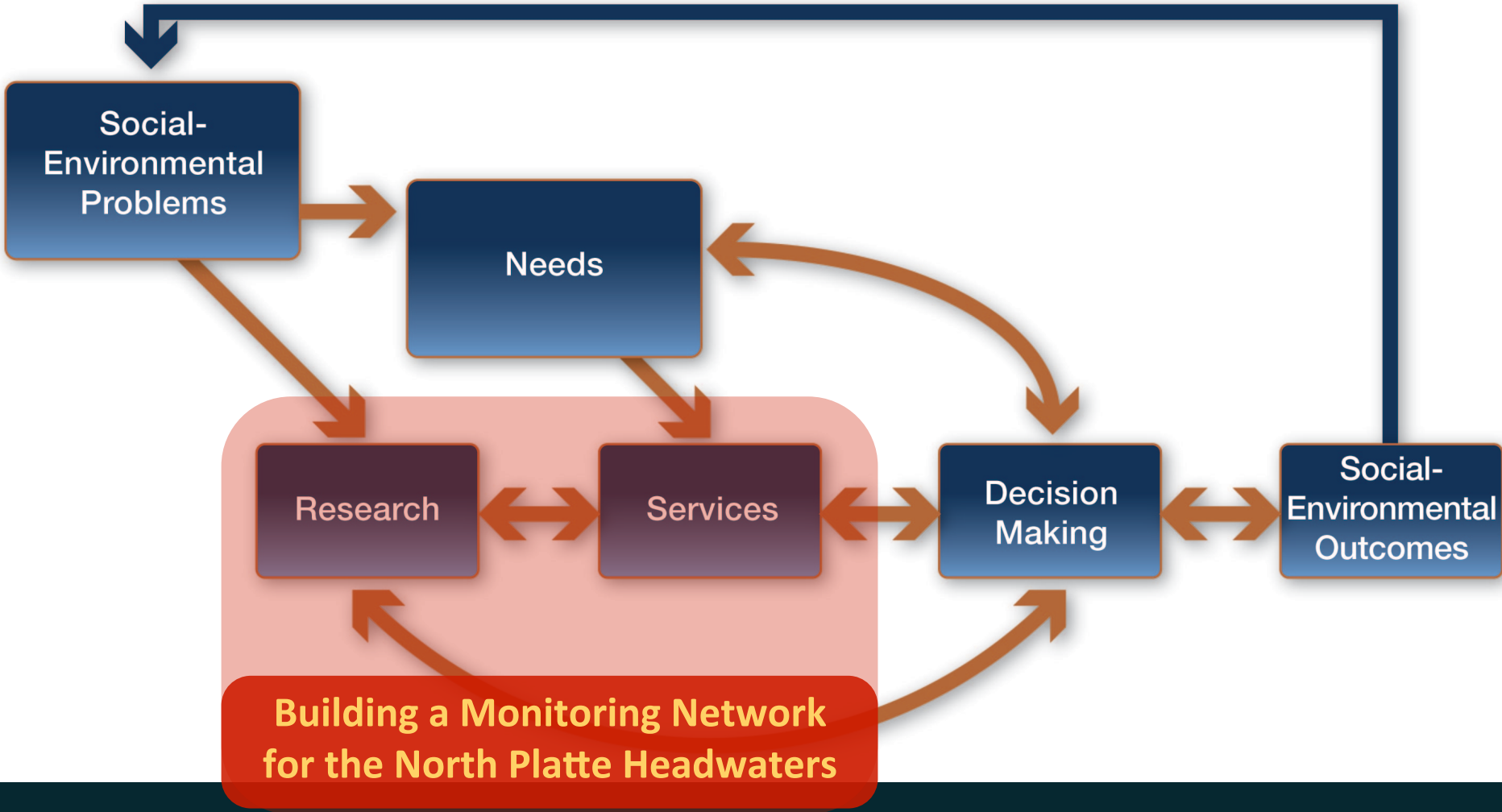
*problem ?*

# Water Management Analysis and Planning Software

- Allows user to make different assumptions or choices for estimating water use and water needs based on policy decisions
- Facilitates the mining of water billing data
- Automates the analytic process
- Provides a software graphical user interface to run within the ArcGIS environment
- Provides a spatial view of results and allows queries



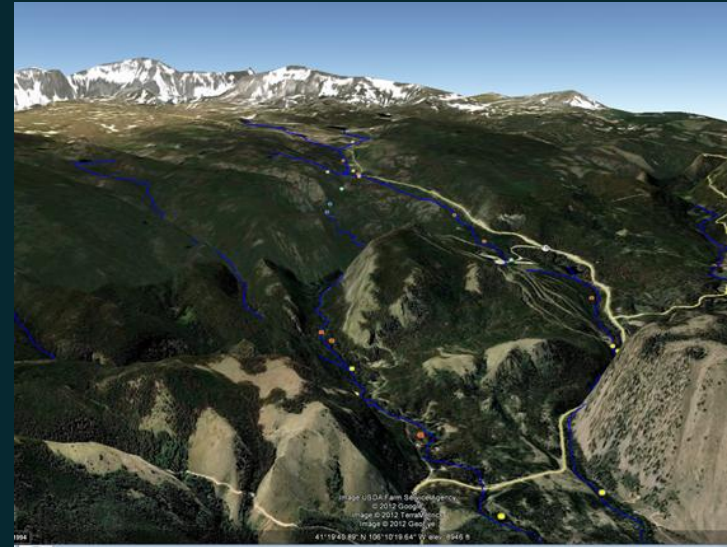
# Feedback



# Building a Monitoring Network for the North Platte Headwaters

S. Miller

- Goal is to monitor and interpret changes in flow and temperature in Wyoming rivers
  - Response to GCC, beetle kill, management
- Look for changes in surface / subsurface flux
  - Stress on hydrology, ecology, fish
- Use runoff gaging, temperature probes, and groundwater samples
- Target critical hydrologic & ecologic locations



# Snowy Range Field Site

Nash Fork = 21 km<sup>2</sup>

12,000 ft

Pine beetle kill

Outwash plain

7,600 ft

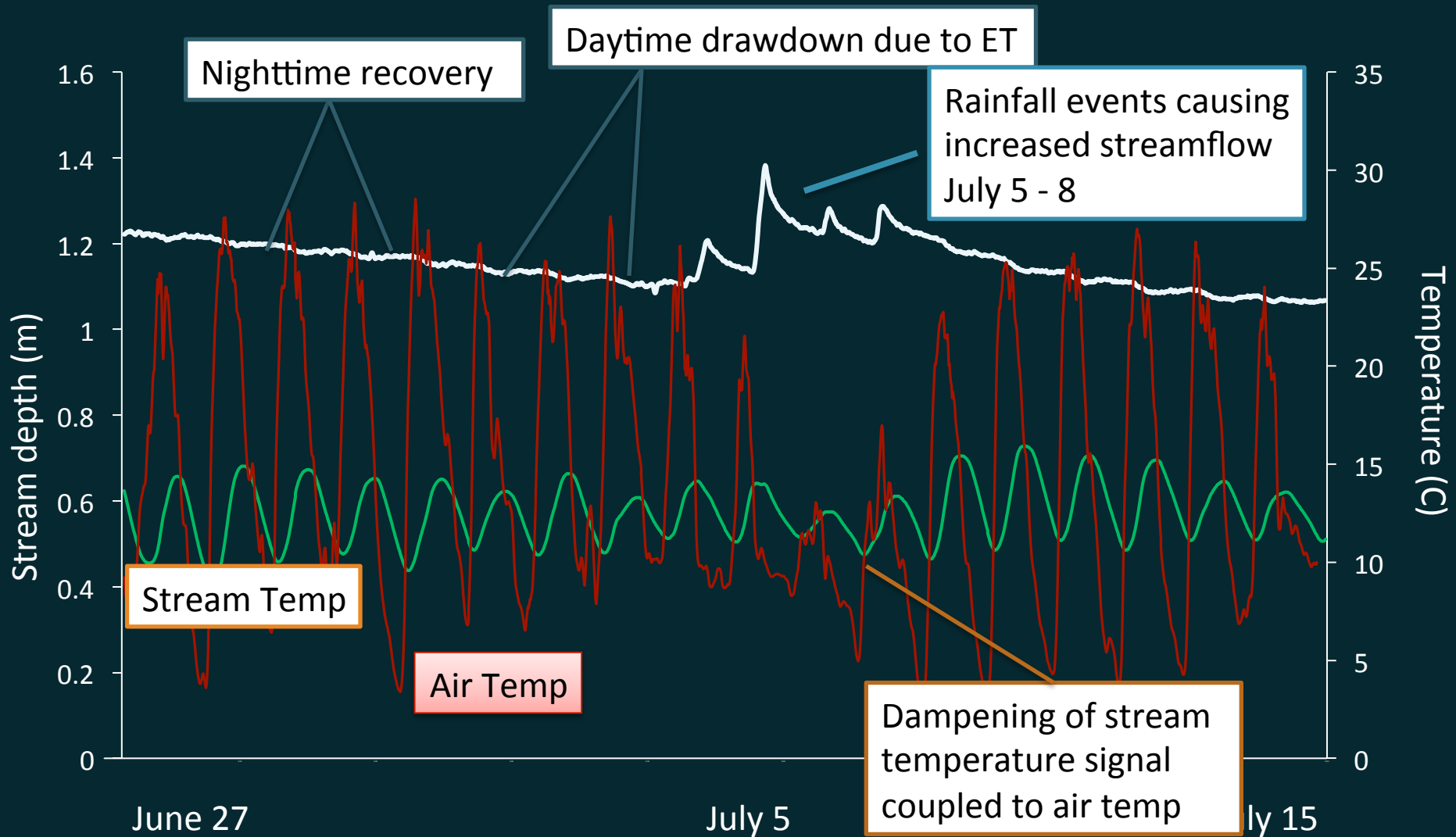
Glacial lakes

Private land

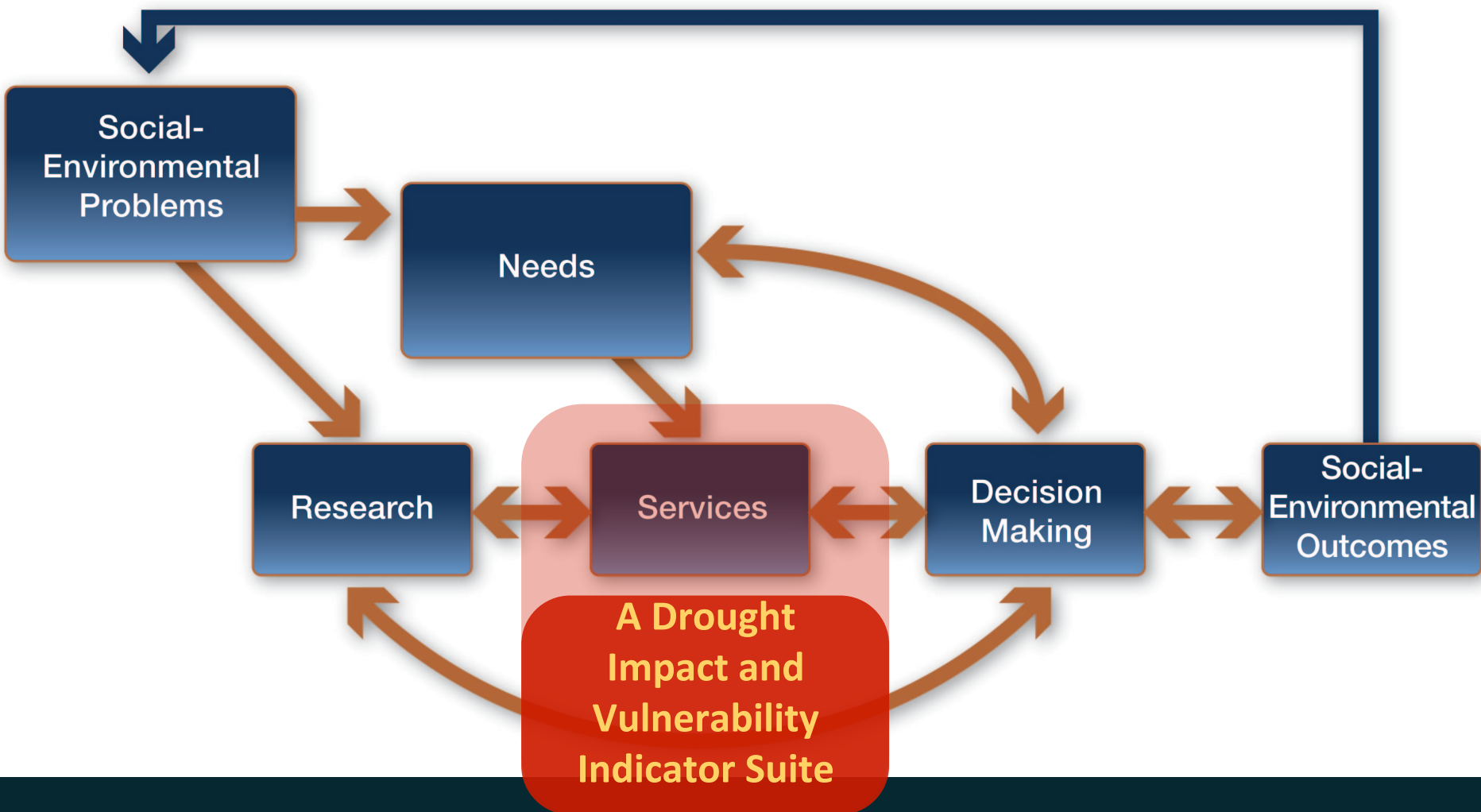
Little Laramie R. = 410 km<sup>2</sup>

- North Platte Drainage
- Nested sample design
- High mountain to valley
- Snow-driven
- Fracture flows
- Managed water
- Beetle-kill pervasive
- Local field site
- Summer field course

# Flow, Temperature and Rainfall



# Feedback



# Drought Socio-Economic Impact Analytics and Dashboards

W. Travis, B. Klein, K. Gangwer

Develop socio-economic impact indicators that:

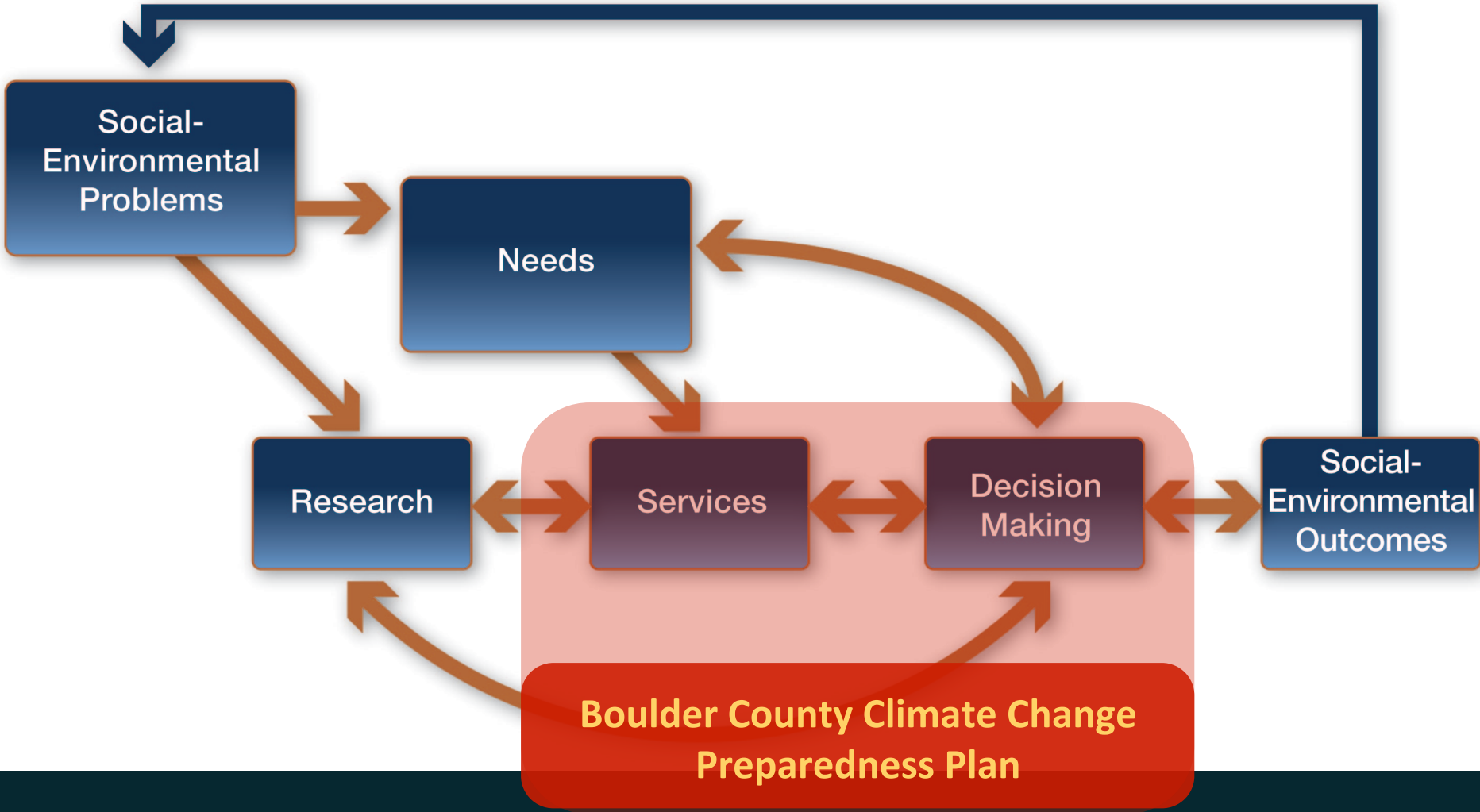
- Place drought impacts in geographical perspective
- Normalize and index to common bench-marks (e.g., 2002 drought)
- Proto-type real-time national impacts
- Reflect region-specific vulnerability and impacts
- Express measures of underlying vulnerability
- Provide early-warning and leading indicators



# Drought Socio-economic Impact Analytics and Dashboards



# Feedback



# Boulder County Climate Change Preparedness Plan

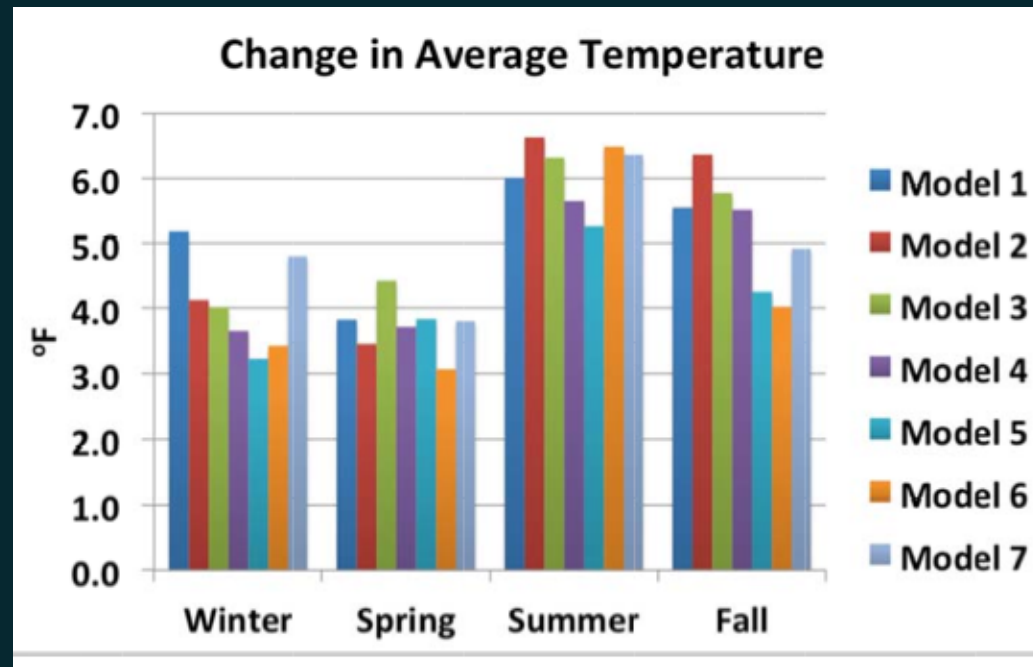
E. Gordon, J. Barsugli

- Policy-oriented analysis of climate adaptation opportunities within Boulder government
- WWA contributions: Science and Water chapters



# Boulder County Climate Change Preparedness Plan

- Temps to increase 2-3F by 2030, 3.5-5F by 2050
- Uncertain changes to precipitation
- Recommendation already acted on: Water Stewardship Initiative



# Intermountain West Climate Summary

Jeff Lukas