Place-based climate change planning: Overcoming the paralysis of uncertainty

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Wildlife Conservation Society

Flagstaff, AZ Climate Change Workshop
Southwest Climate Change Initiative
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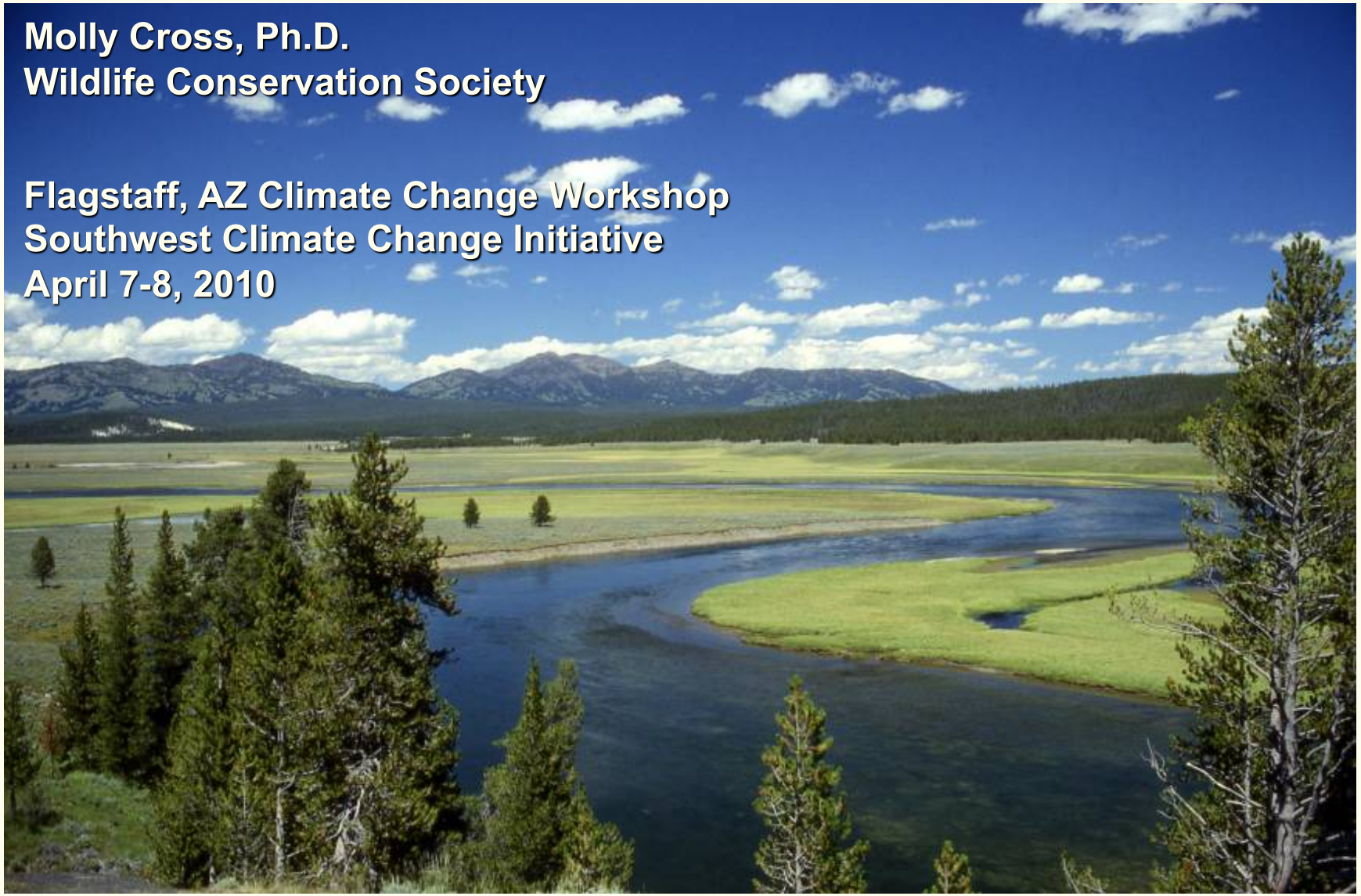
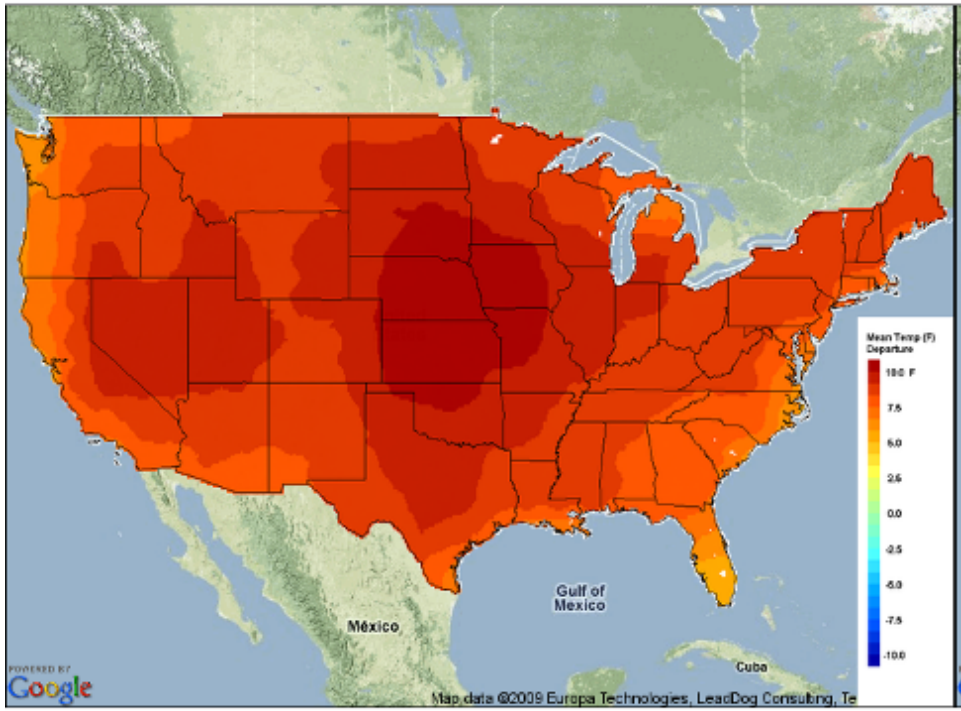


Consequences of climate change

Change in Average Annual Temperature by 2100

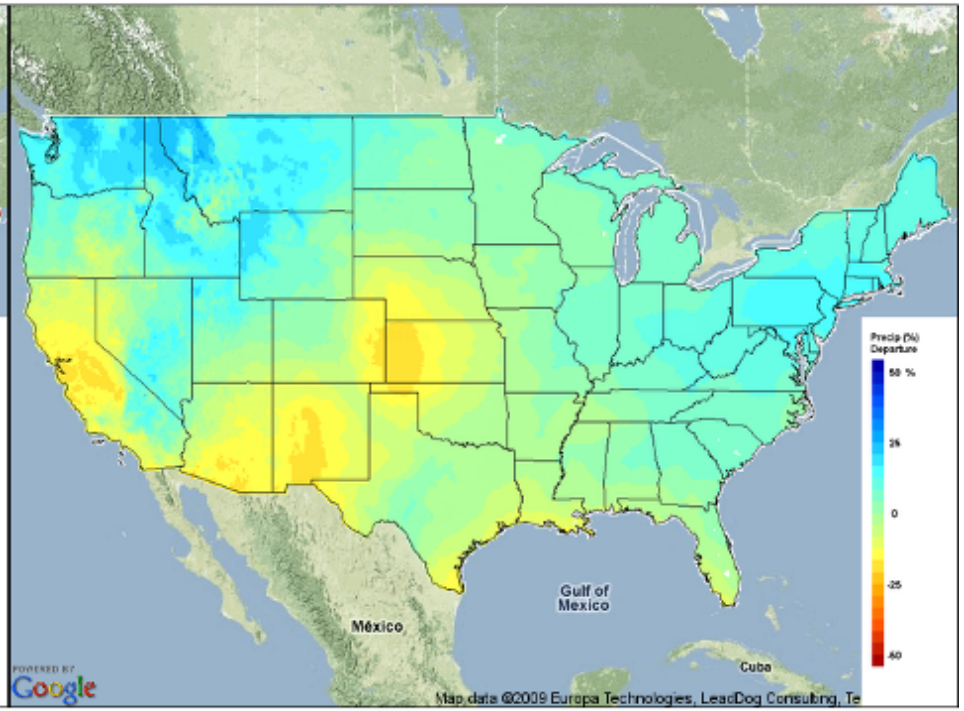
Model: Ensemble Average, SRES emission scenario A2



Data Source: Base climate projections downscaled by Maurer, et al. (2007). We also acknowledge the following groups for providing the WCRP CMIP3 multi-model dataset available: Program for Climate Model Diagnosis and Intercomparison, The WCRP's Working Group on Coupled Modeling,and the Office of Science, US Department of Energy

Change in Average Annual Precipitation by 2100

Model: Ensemble Average, SRES emission scenario A2



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Climate change adaptation

Adaptation = actions that enable species or systems to better cope with or adjust to changing climate conditions.

Challenges facing natural resource management

How to make applicable to my system?

Where to begin?

Uncertainty? Complexity?

What to manage FOR?

Reframing management goals

Increase **RESISTANCE** to change

Promote **RESILIENCE** to change

Enable ecosystems to **RESPOND** to change

Determine when to consider **TRIAGE**
(setting and adjusting priorities)

Adapted from Millar et al. 2007, Ecological Applications and USFS Climate Change Resource Center

Challenges facing natural resource management

How to make applicable to my system?

Where to begin?

Uncertainty? Complexity?

What to manage FOR?

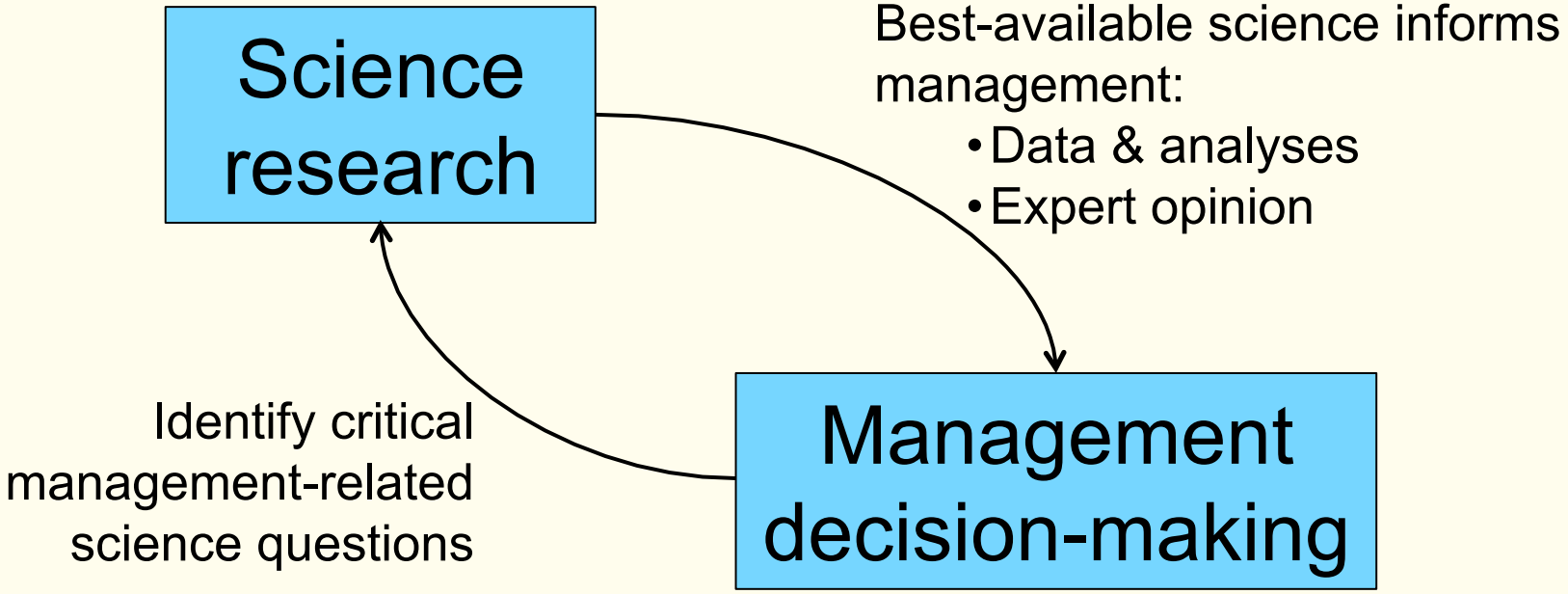
Climate Change Adaptation Framework

Combines concepts from:

1. **ADAPTATION FOR CONSERVATION TARGETS (ACT) FRAMEWORK developed by the Climate Change and Wildlife Conservation working group**

2. **CONSERVATION ACTION PLANNING GUIDELINES FOR DEVELOPING STRATEGIES IN THE FACE OF CLIMATE CHANGE**

Participatory: Integrating science & management



Iterative: Incorporate new information and adjust

Adapted from www.cmar.csiro.au/research/mse/

Climate Change Adaptation Framework

Select conservation feature
&
Define management objectives

FEATURE:

Species
Ecological process
Ecosystem

OBJECTIVES:

Current Objectives

or

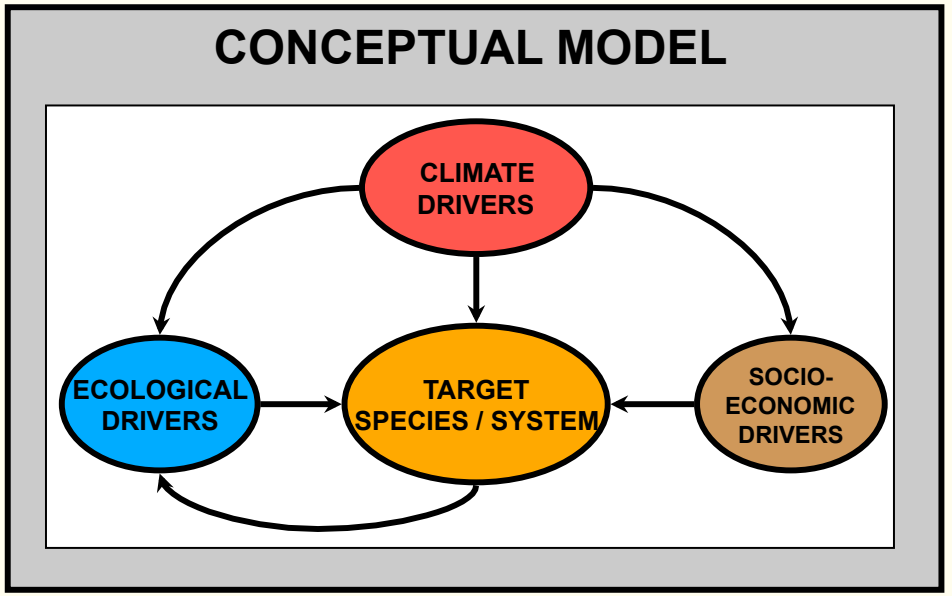
Resistance
Resilience
Response

Climate Change Adaptation Framework

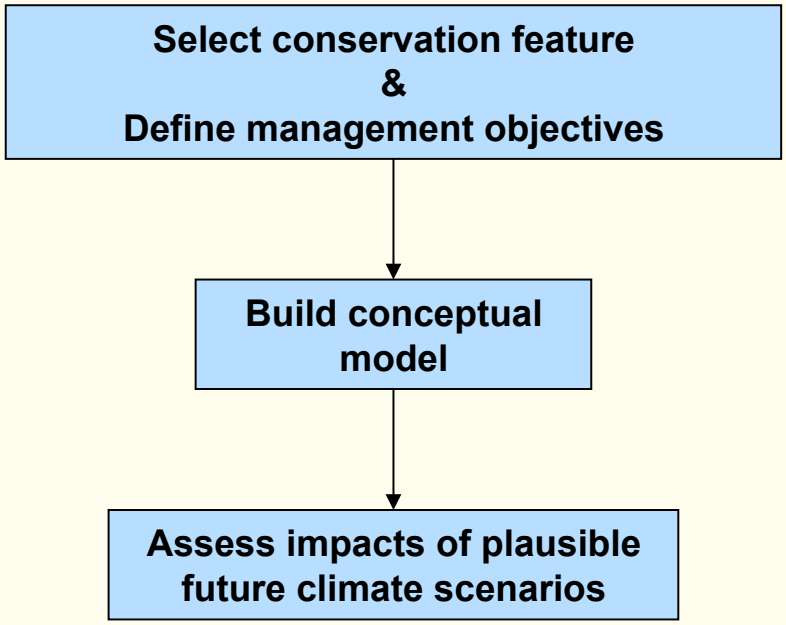
Select conservation feature
&
Define management objectives

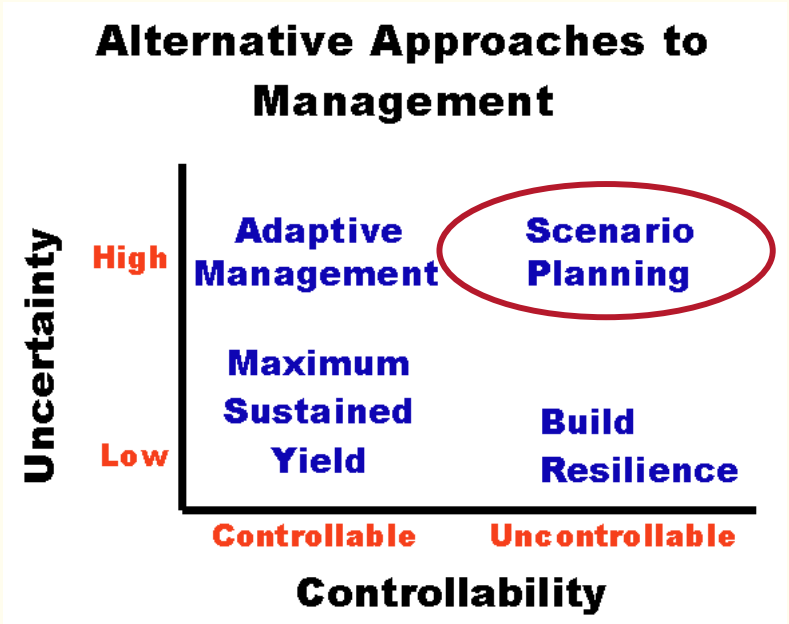
↓

Build conceptual model



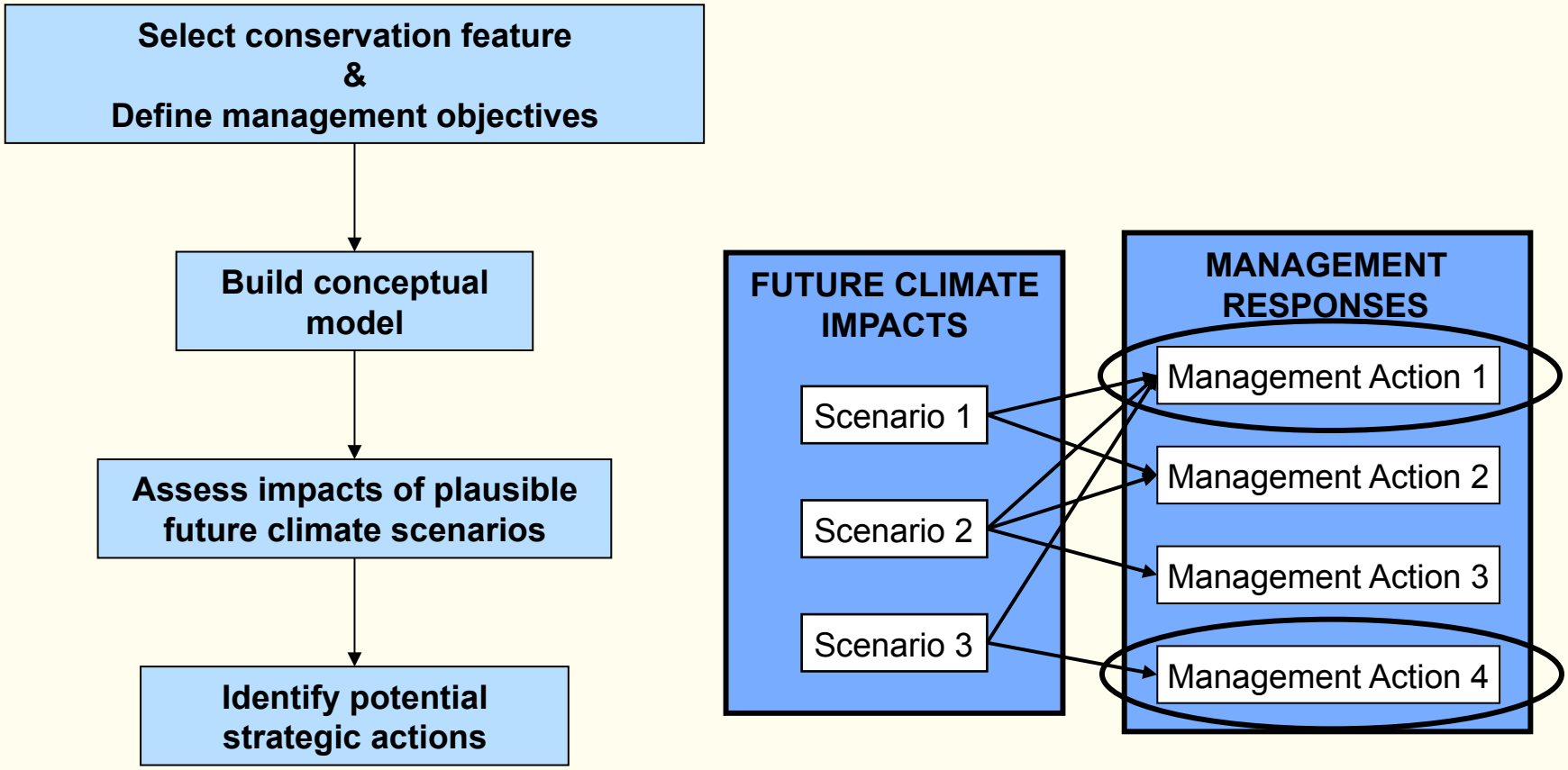
Climate Change Adaptation Framework





Peterson et al. 2004

Climate Change Adaptation Framework



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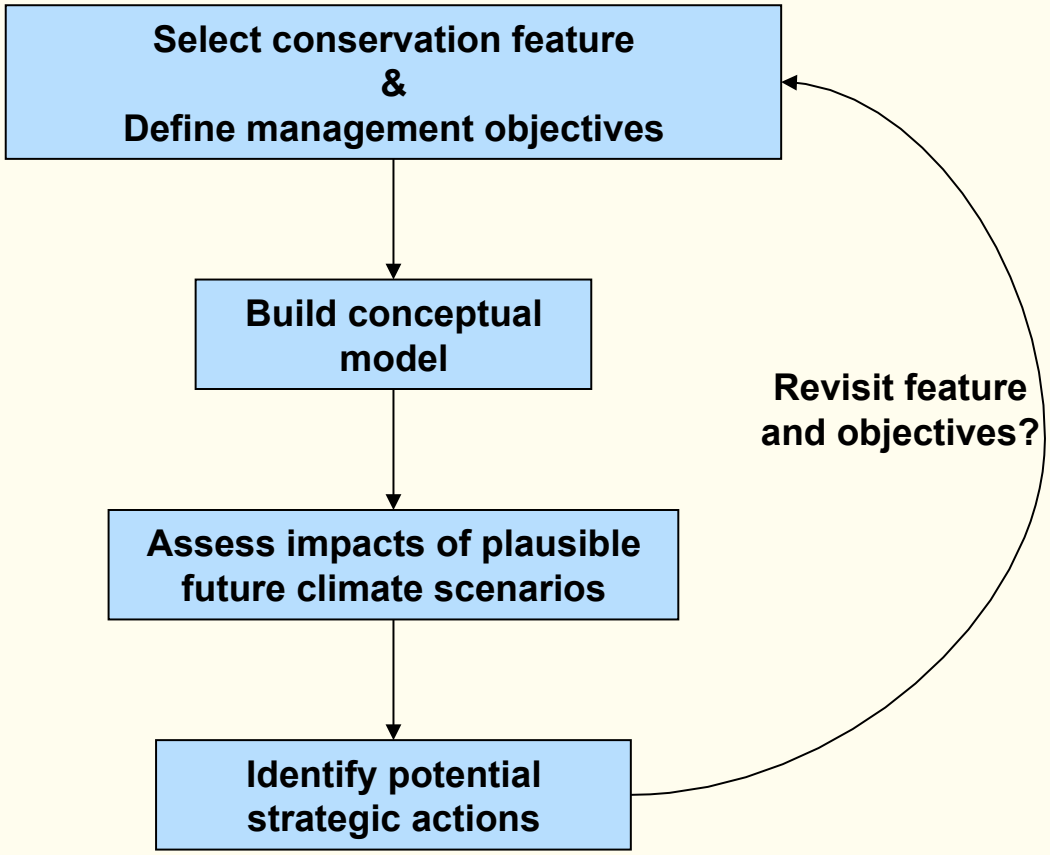

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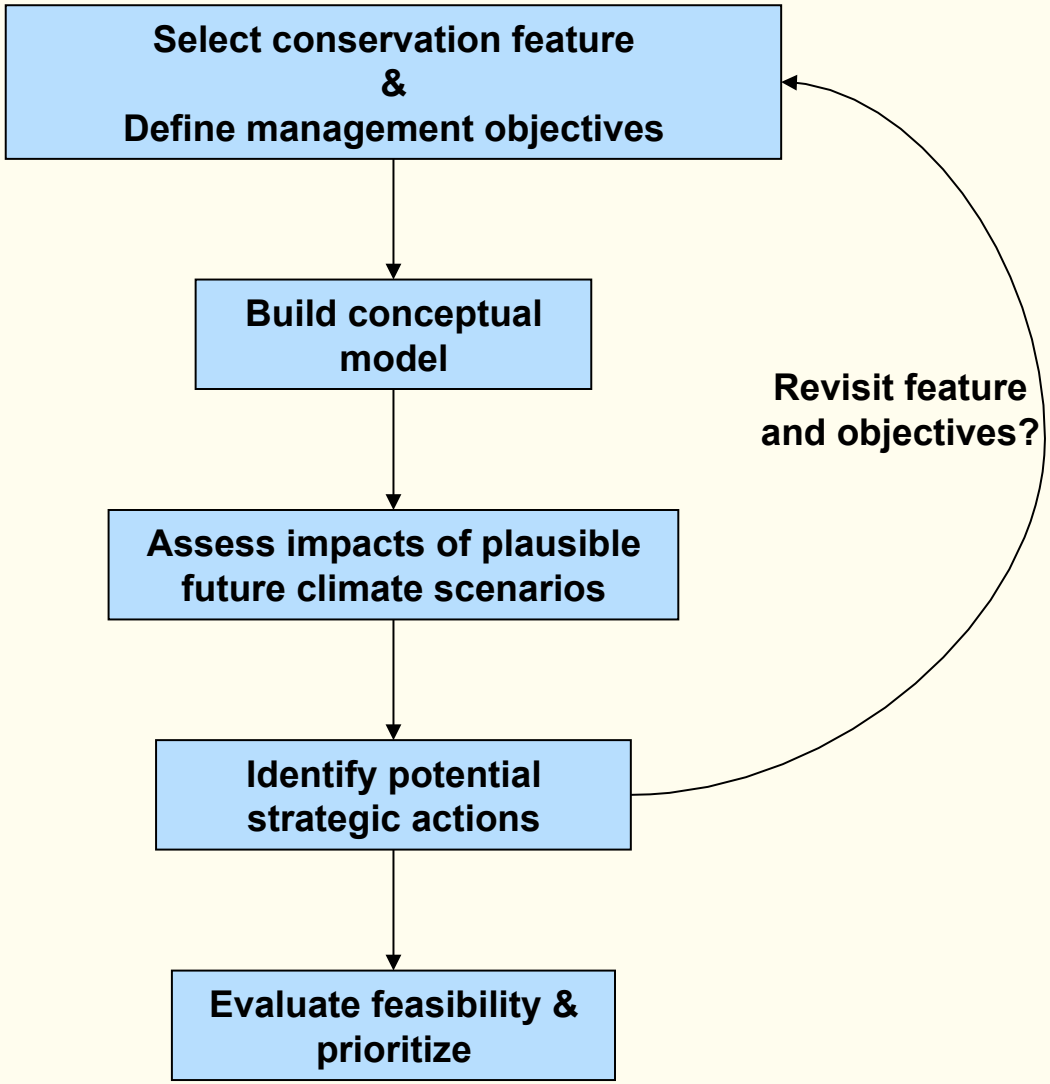
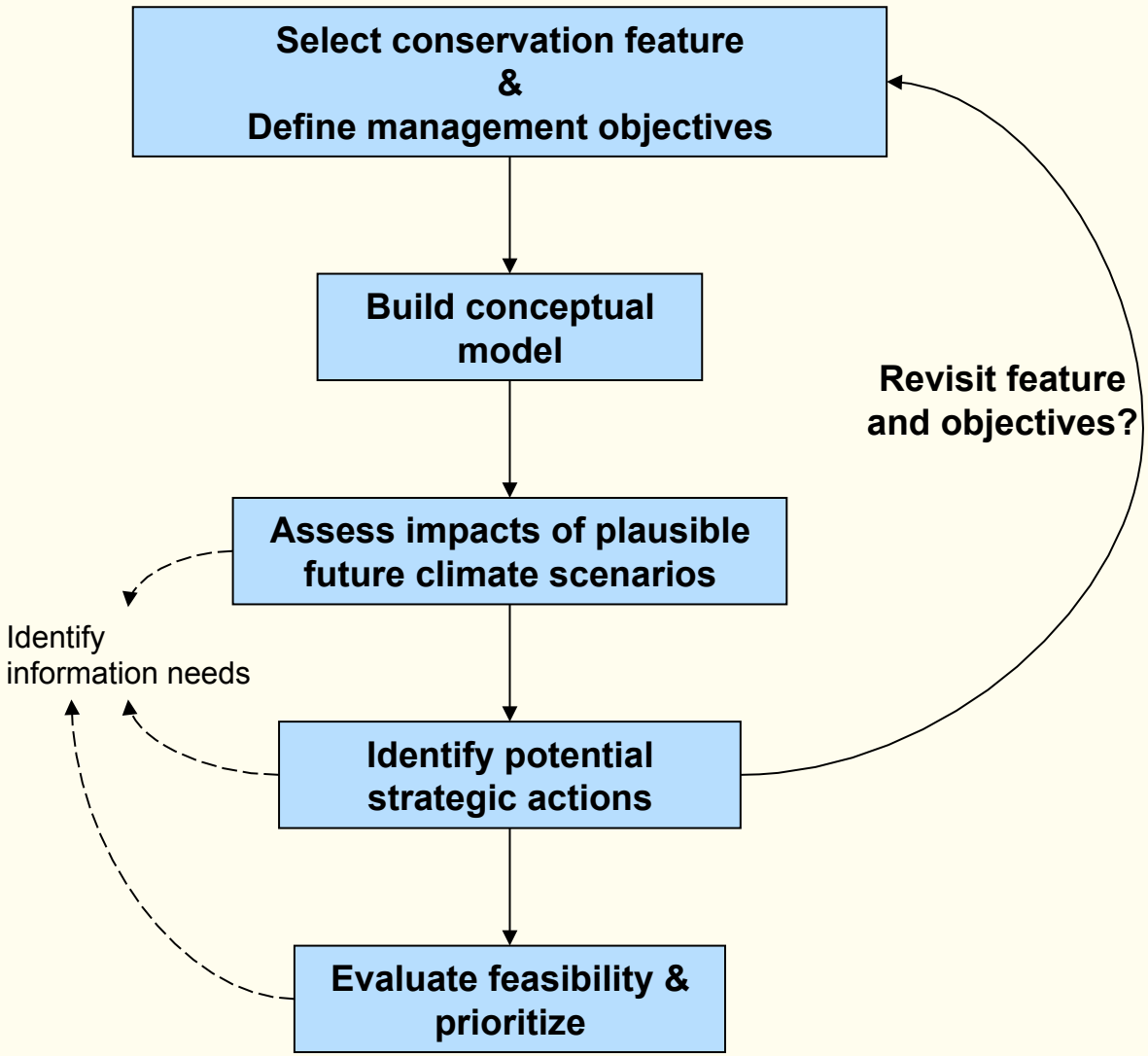


EVALUATION FACTORS:

- How “robust” to climate change uncertainty
- Feasibility (economic, regulatory, social)
- Unintended consequences

Climate Change Adaptation Framework



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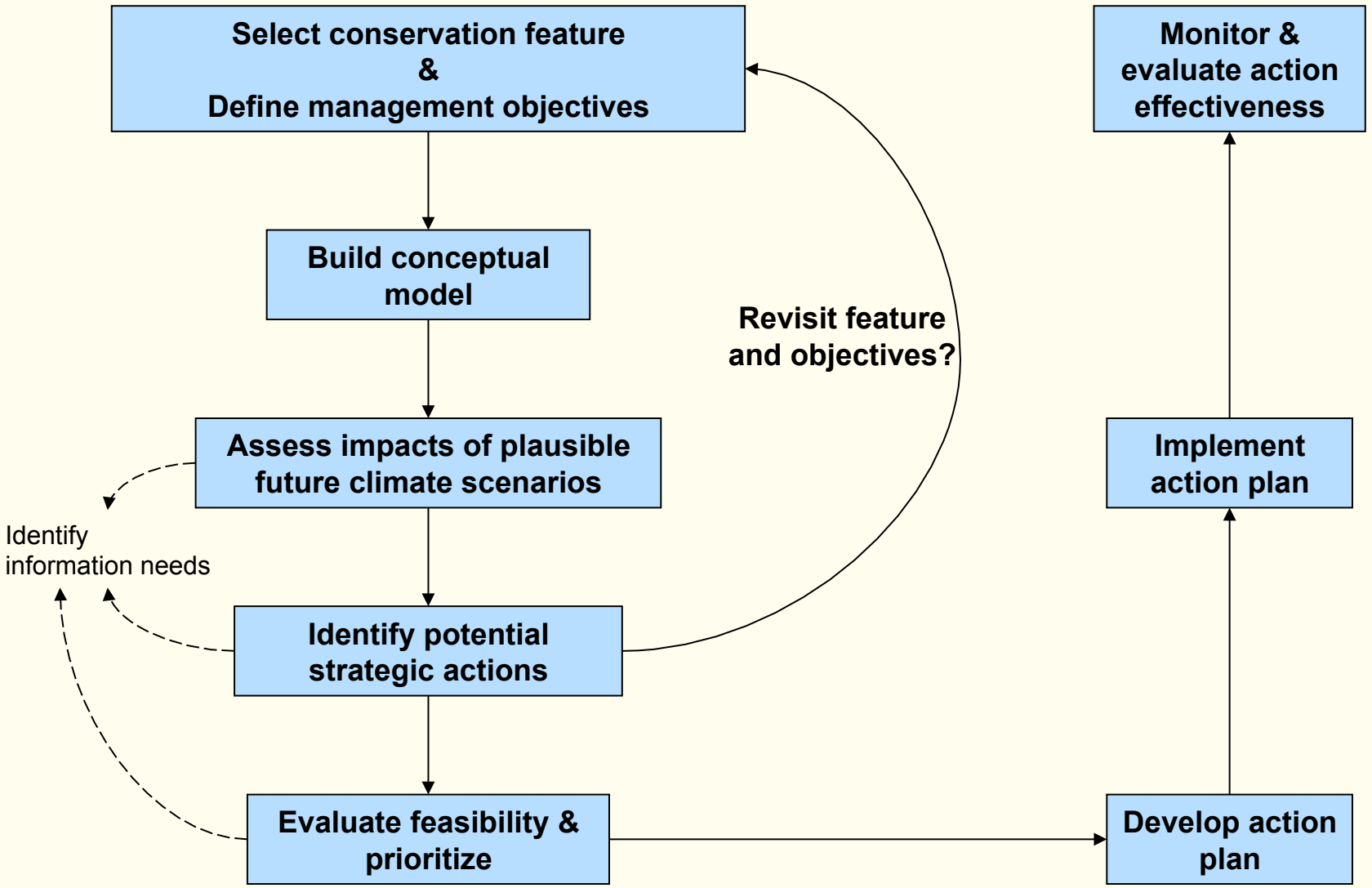

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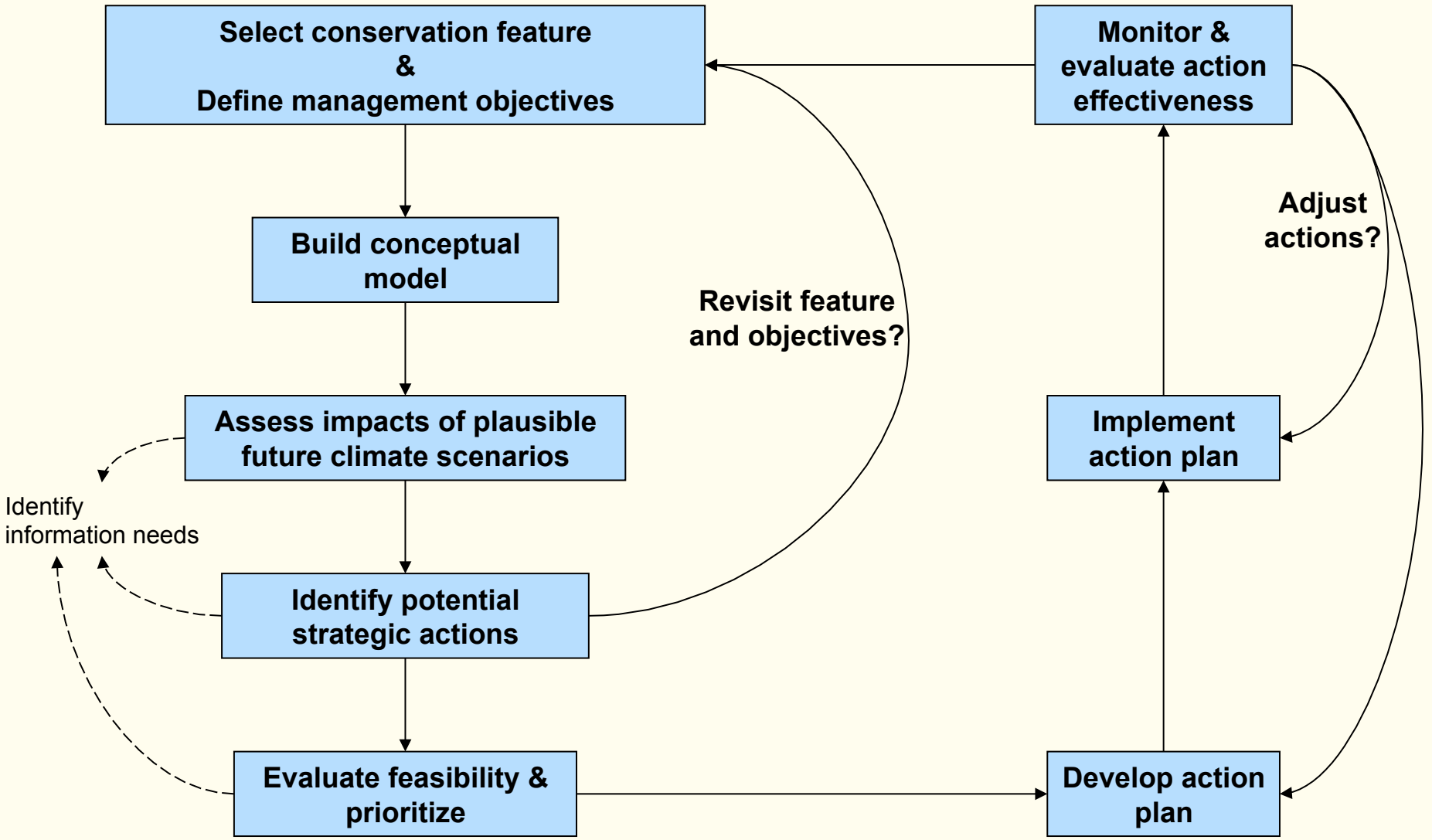

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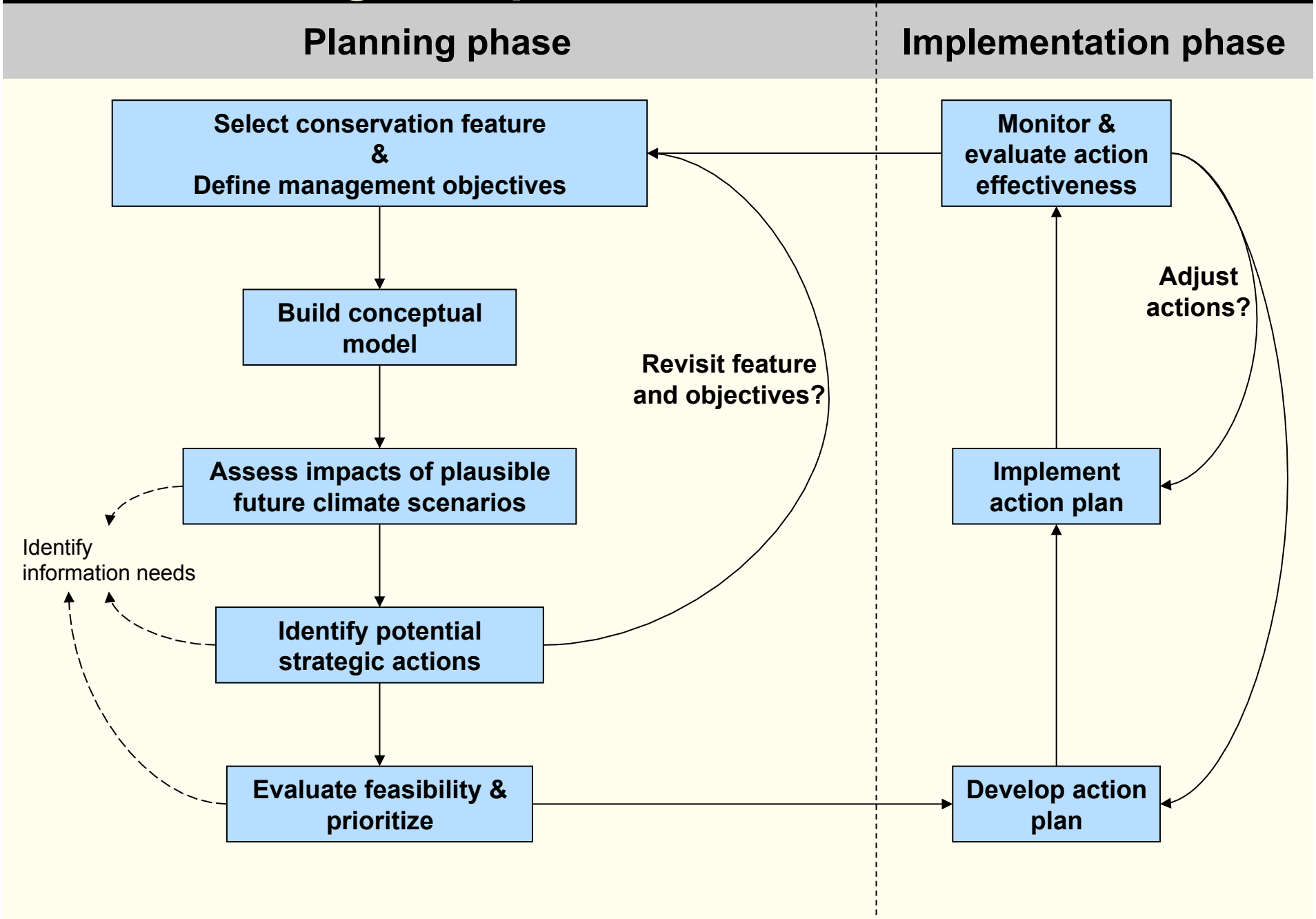

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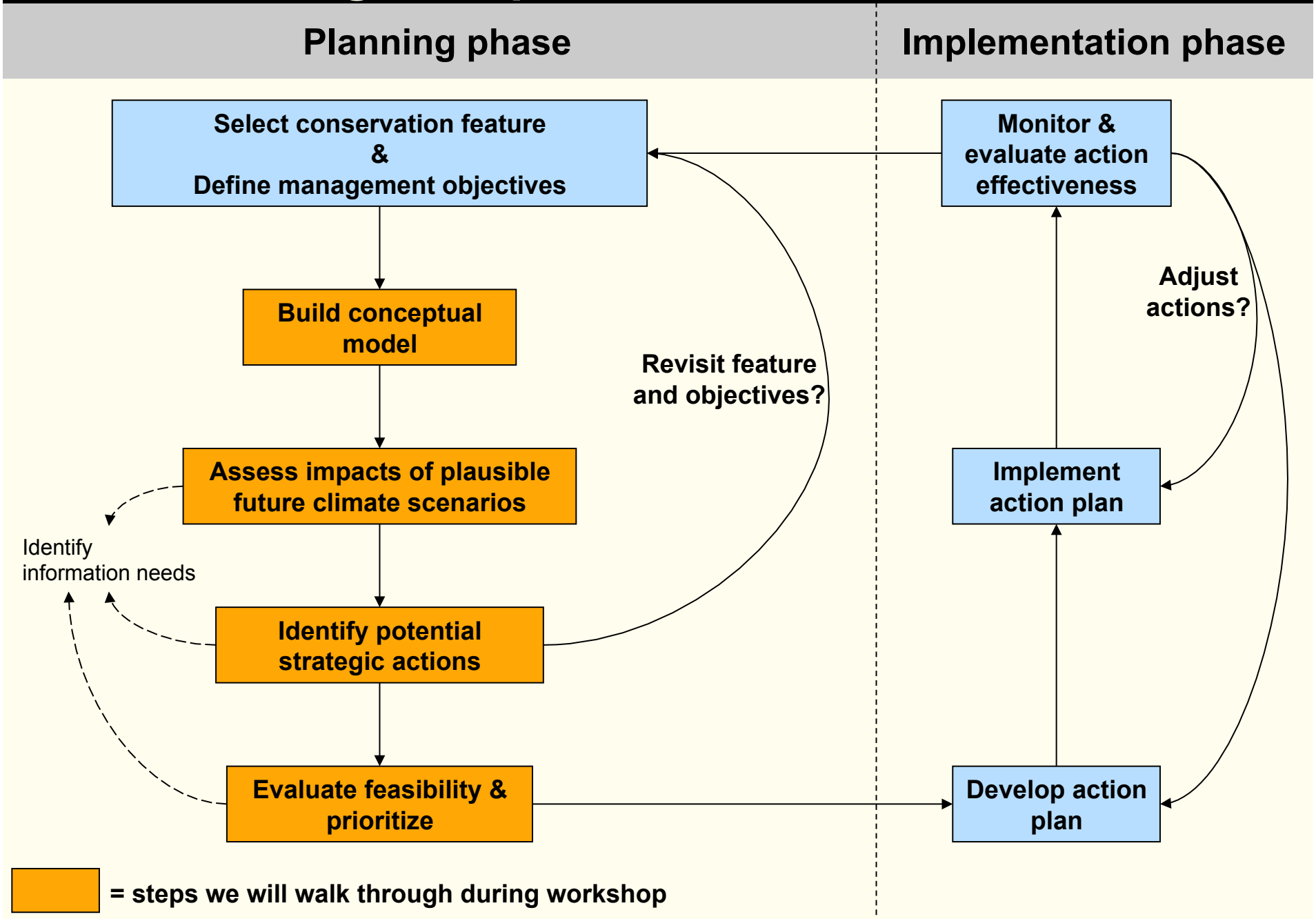


A real world example

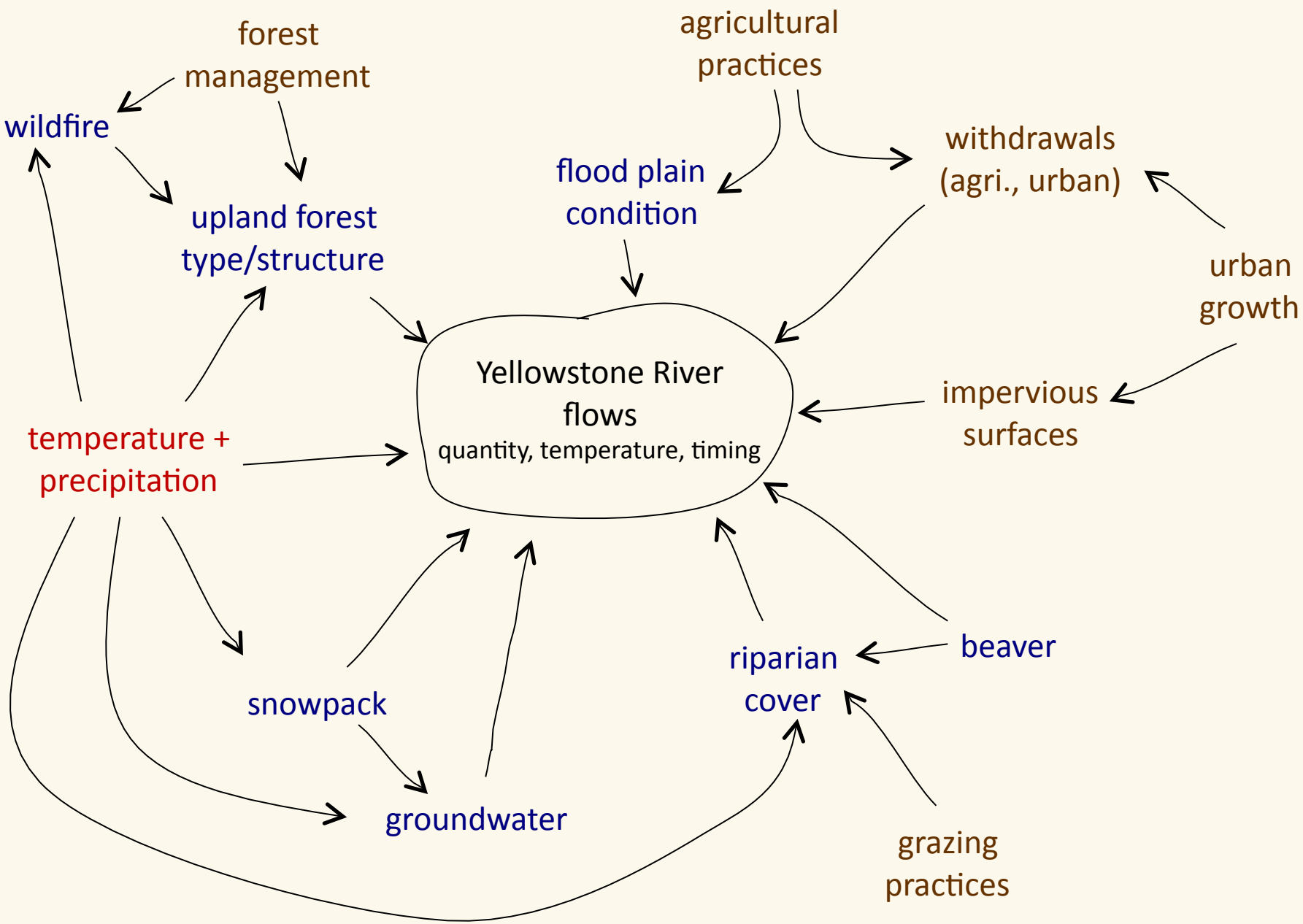
Greater Yellowstone Ecosystem

Select feature and define management objective

Yellowstone River flows (ecological process)

To maintain Yellowstone cutthroat trout

Build conceptual model



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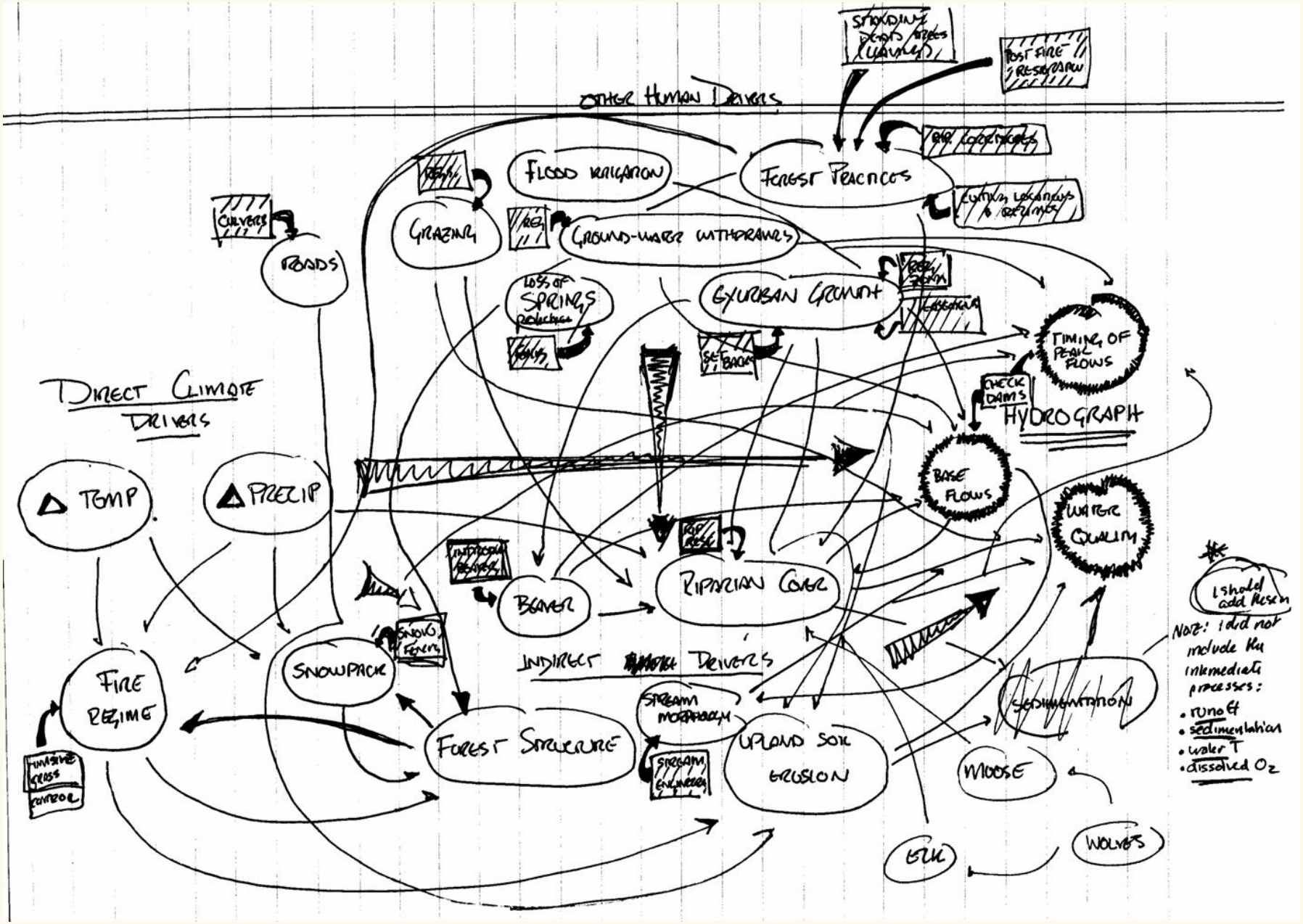

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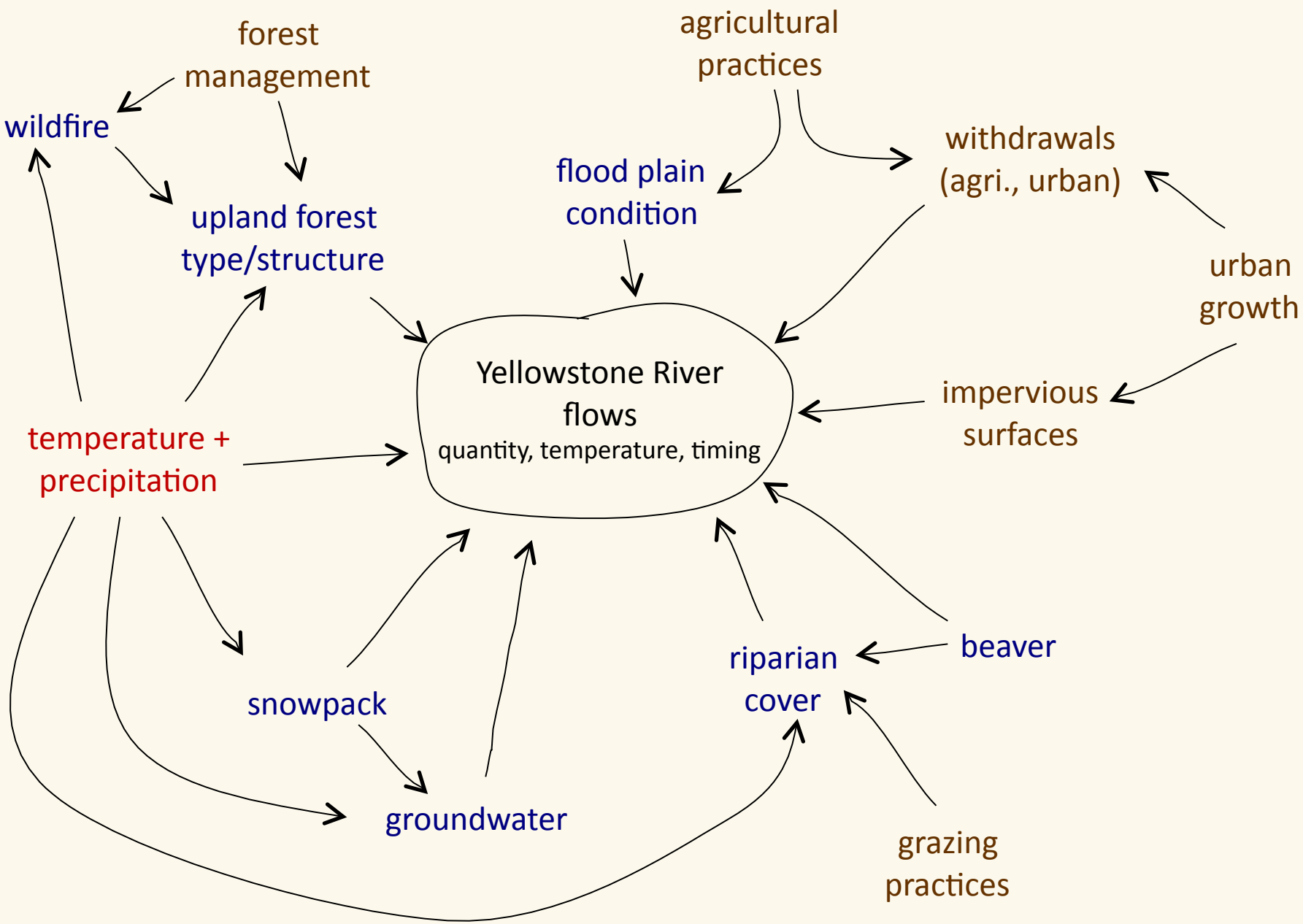
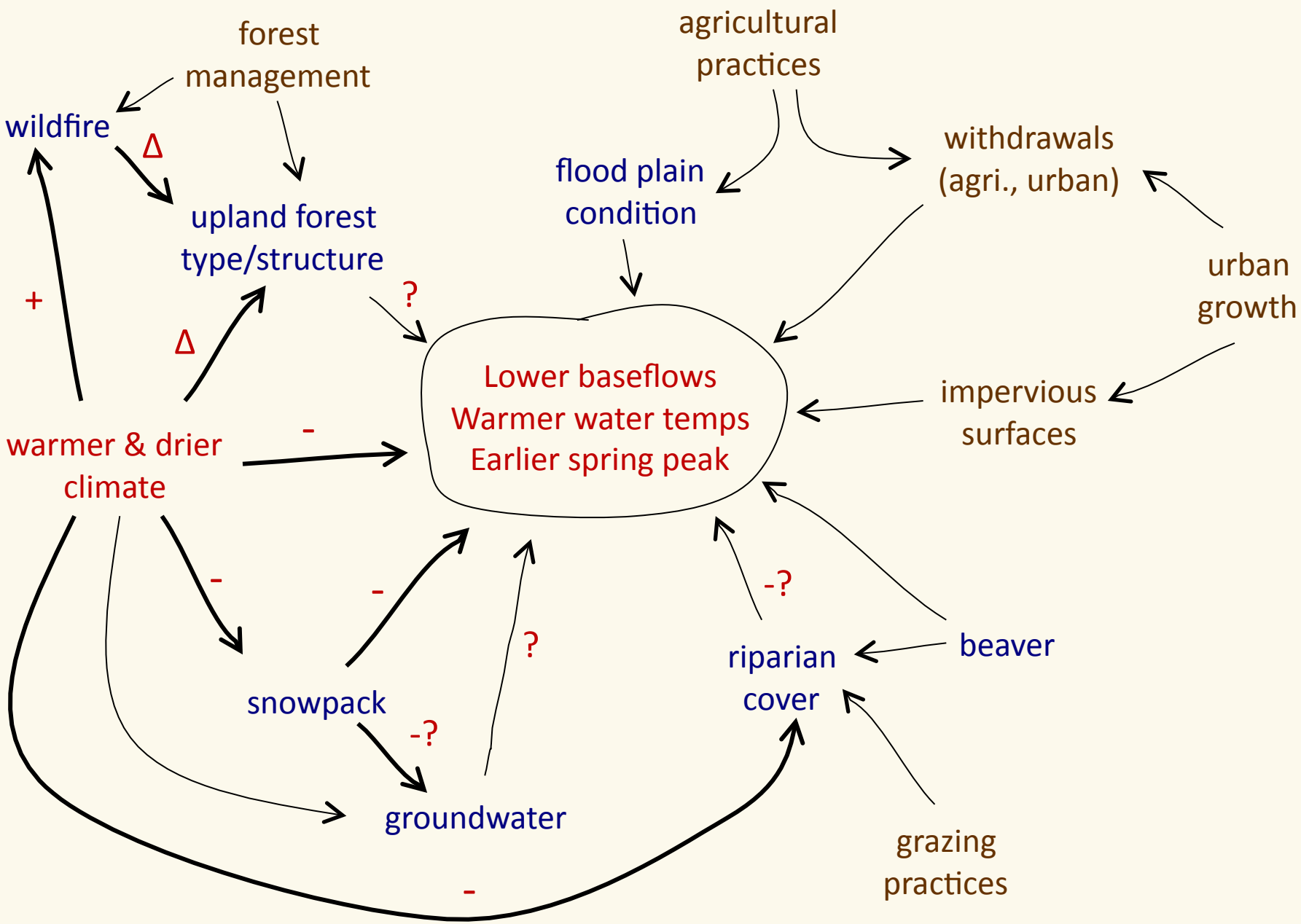
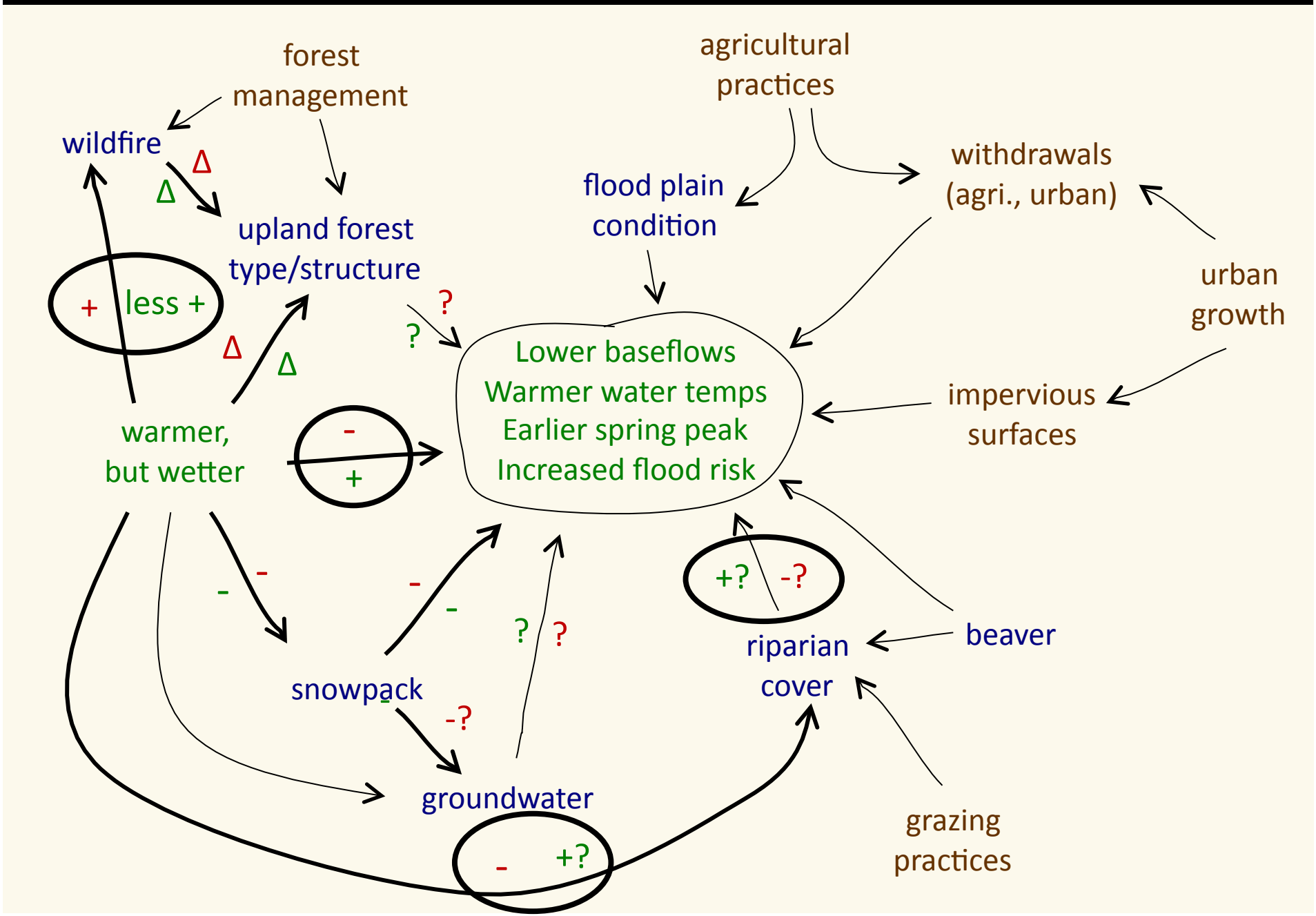


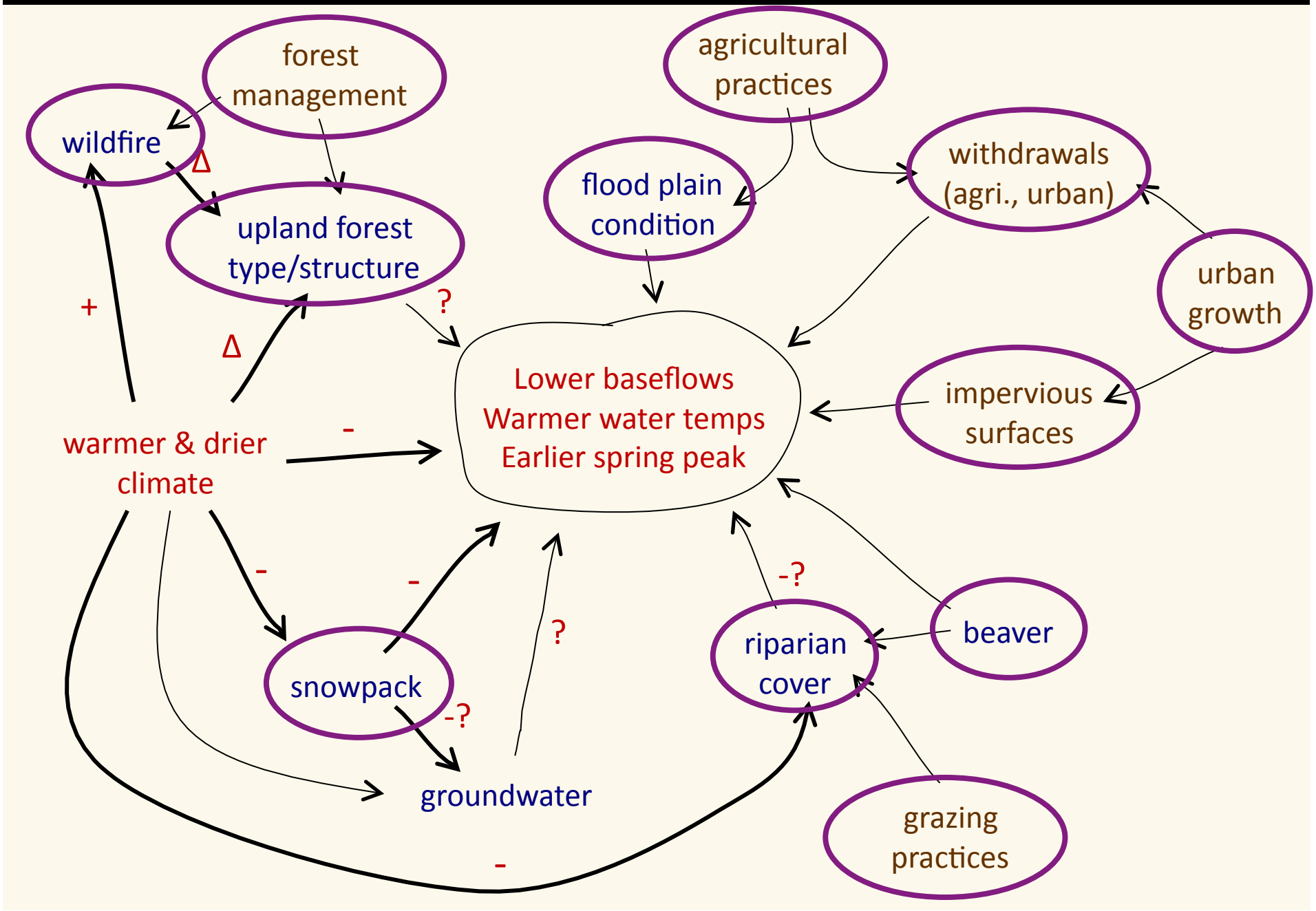
Initial climate scenario: Warmer & drier



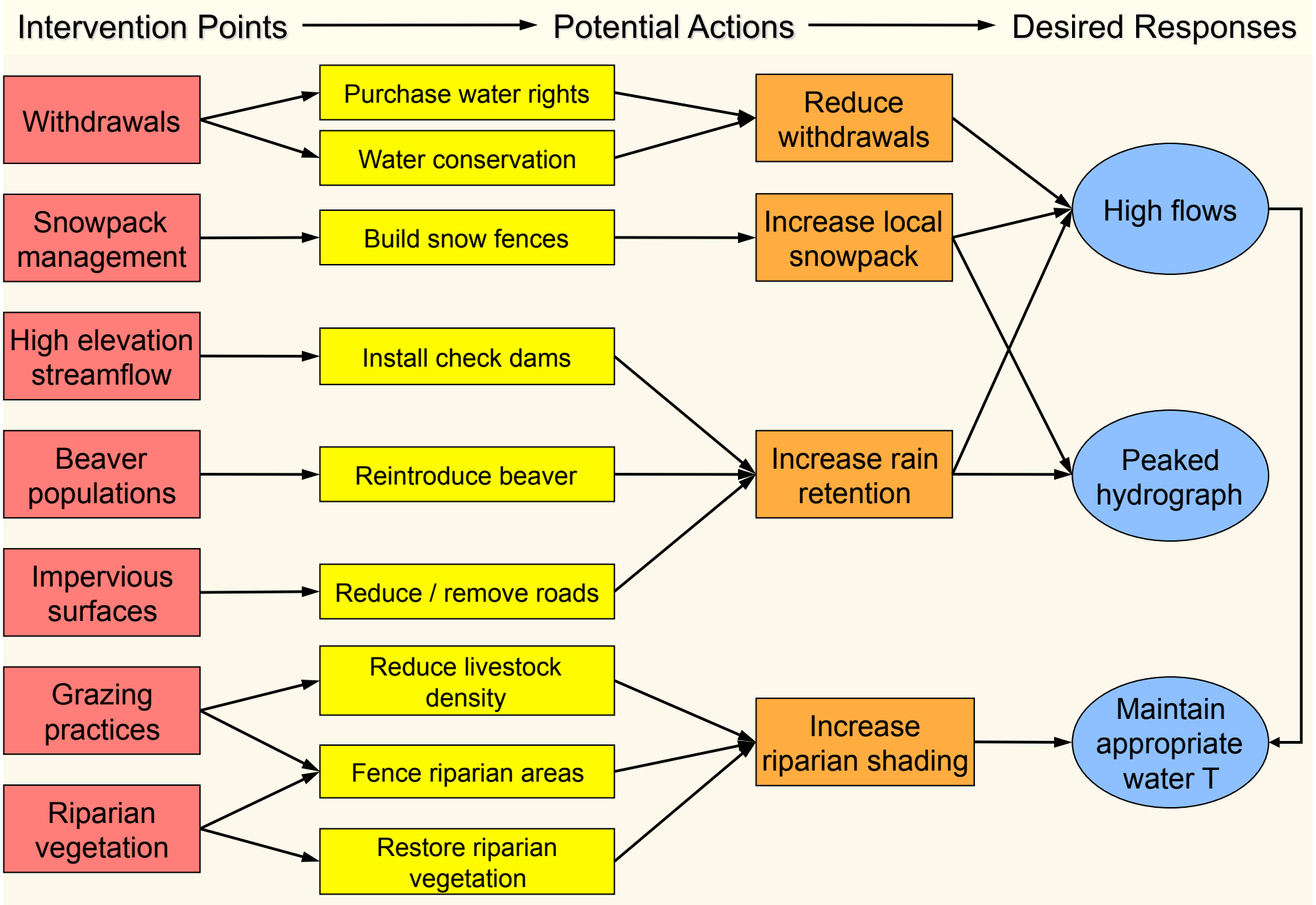
Alternate climate scenario: Warmer & wetter



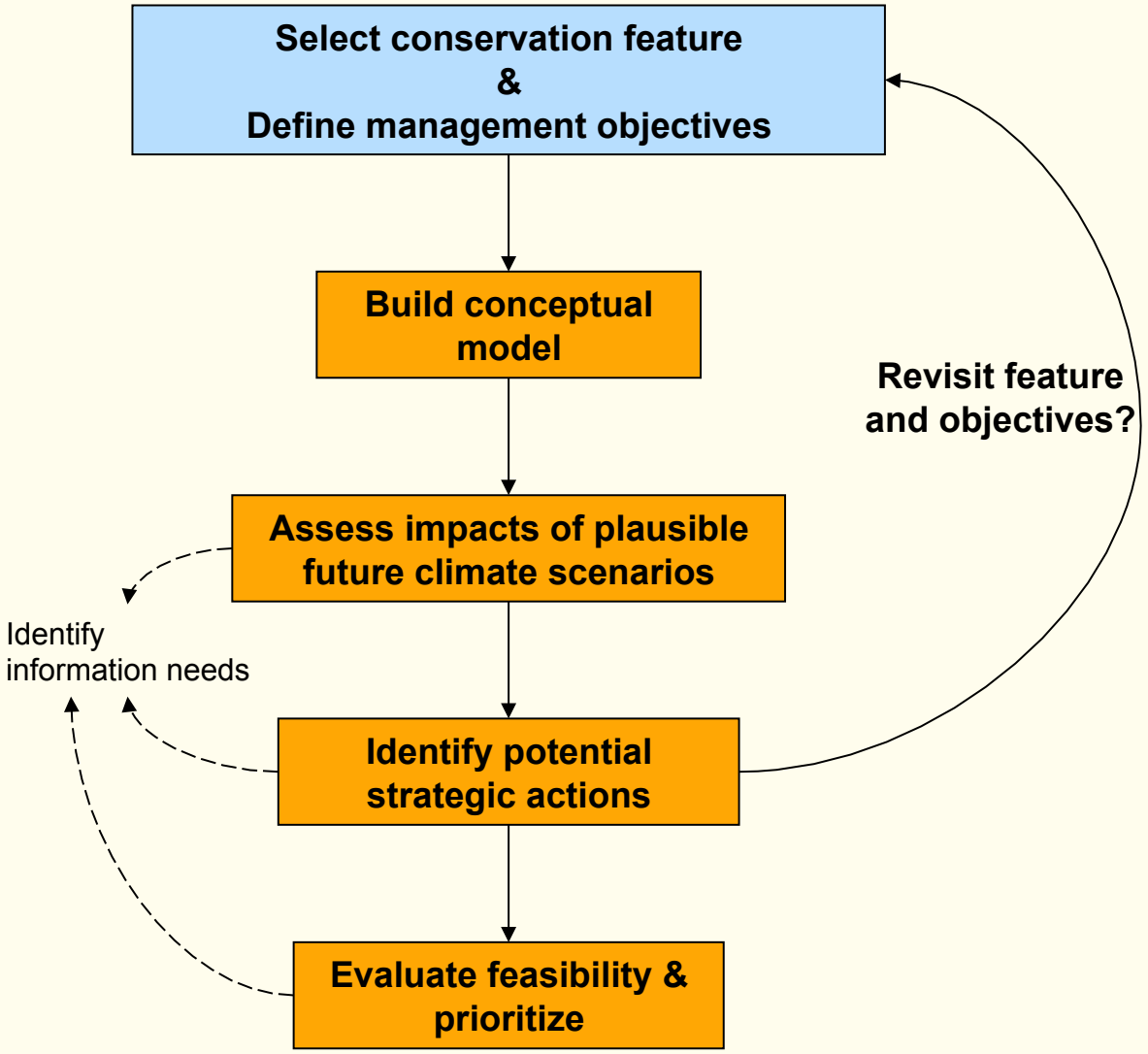
Identify intervention points



Potential actions for initial climate scenario



Goal for breakout sessions



Conservation features for this workshop

1. Ponderosa Pine – Fire

2. Ponderosa Pine - Water

3. Mexican Spotted Owl

WILDLIFE CONSERVATION SOCIETY

Questions?

B. Karesh, WCS