MANAGING FOR RESILIENCE IN AN UNCERTAIN WORLD

The role of human-environment linkages

2011 Great Basin Consortium Conference

Mark Brunson, Utah State University

Resilience & rangeland stewardship
A scientist-eye view

- "Sustainable use and stewardship of natural resources is essential to the long-term persistence of human societies and the natural world.
- "Understanding the interdependent behavior of social and natural systems, and how these systems respond to sudden shocks or ongoing stresses, is a major challenge for science.
- "Resilience is the ability of a system to absorb or adapt to change without altering its basic parts and functions.
- "An important line of research therefore is to investigate the resilience of coupled human-natural systems in the face of major stresses …."

- Maria Fernandez-Gimenez, Colorado State University

Resilience & rangeland stewardship: Beyond borders, beyond academia

- "Rangelands Resilience: To assess the sustainability of land-use management practices in the rangelands, a knowledge of the range of social, economic and environmental issues [is] required."

  - Australia Dept. of Agriculture, Fisheries and Forestry

- "The best stewards recognize that they are part of a greater whole, and they manage for its resilience: the capacity of the system to withstand disturbance and retain or resume its essential structure and function."

  - Matt Barnes, Shining Horizons Land Management

Sounds reasonable, but *how*???

- My ambitious plan for the next 20 minutes or so:
  - Share insights from Great Basin research …
  - Share insights from Great Basin outreach …

  … about how socio-ecological systems are linked and how those linkages affect management for resilience

A “bifocal” perspective?

“Earth stewardship involves shaping trajectories of social-ecological change at local-to-global scales to enhance ecosystem resilience and human well-being.”

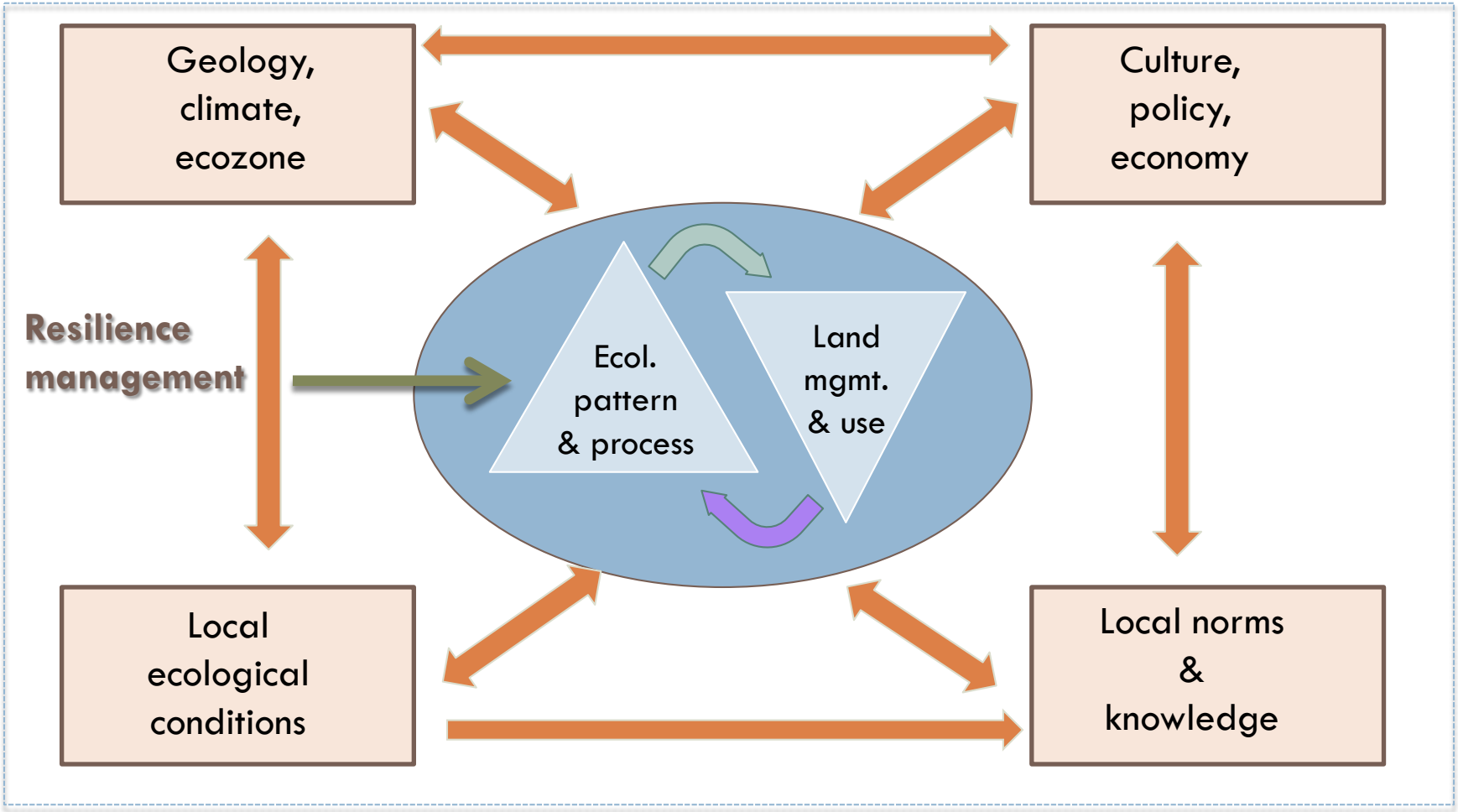
- Ecological Society of America

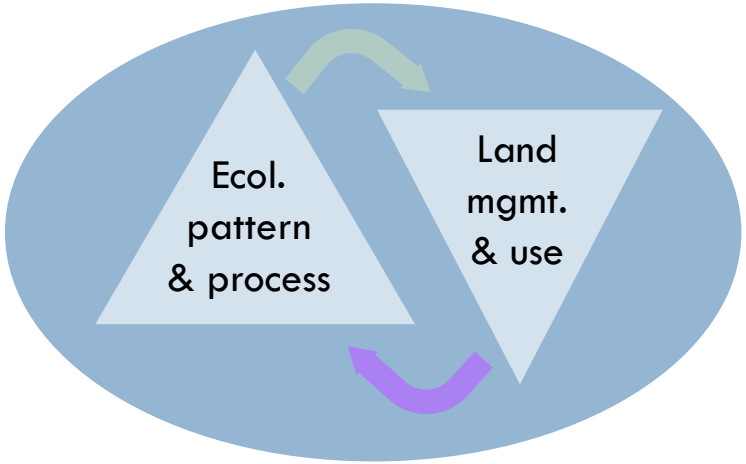
Beyond the bifocal

- We can't just view systems independently, then hope insight arises from speaking at same meetings
- The difficulty is in the intermediate (transition) zone

A model emerging from research in the Intermountain West (e.g., SageSTEP)

Resilience thinking (and communicating)

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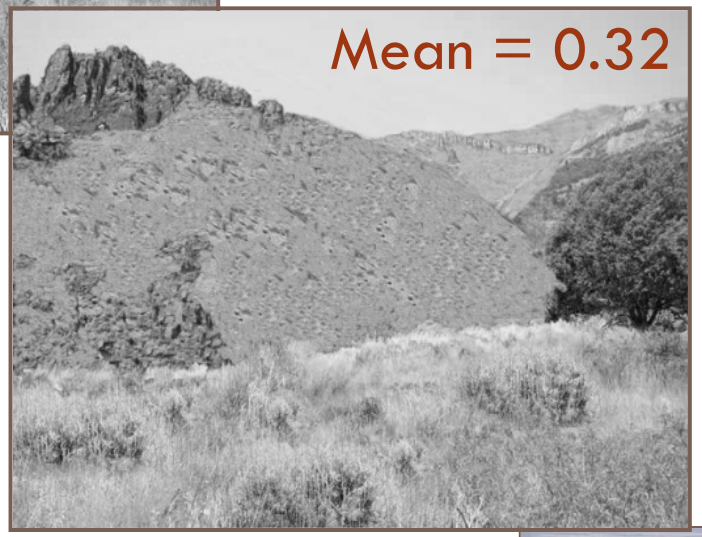
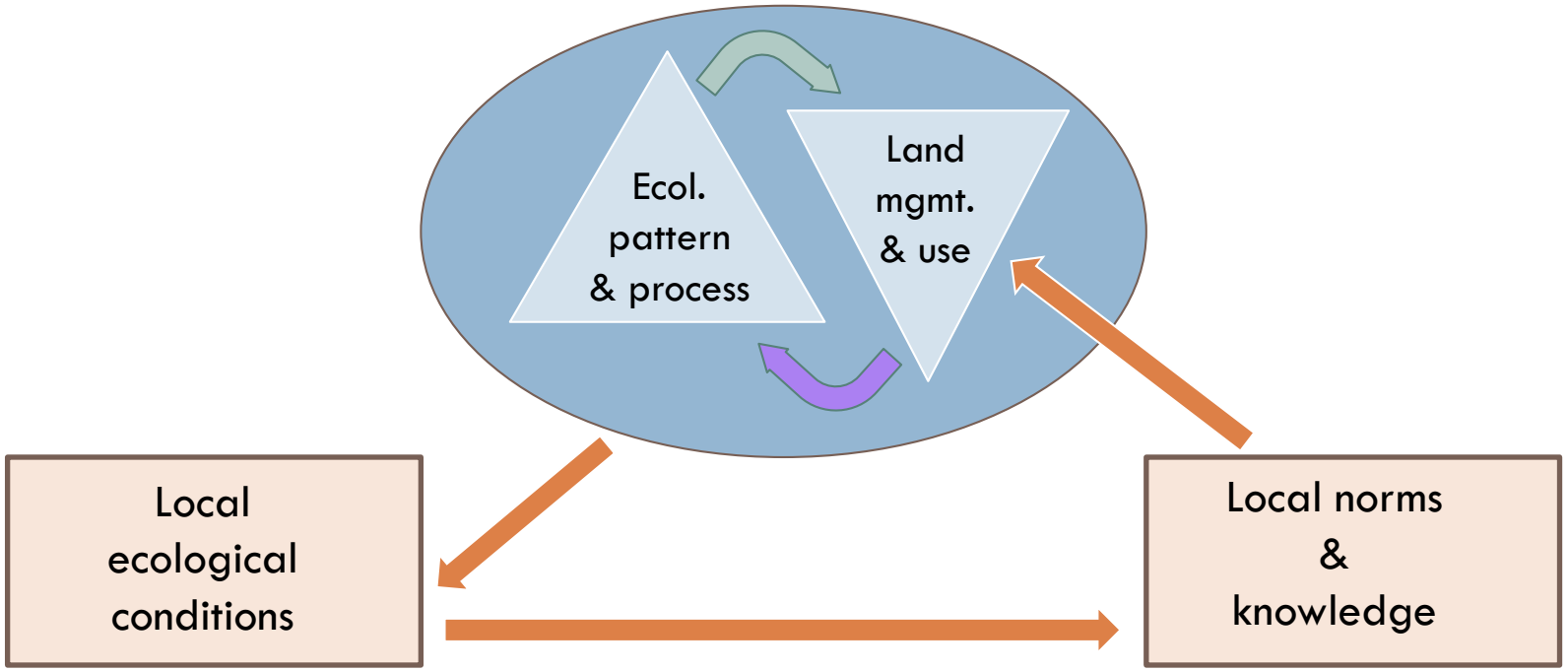


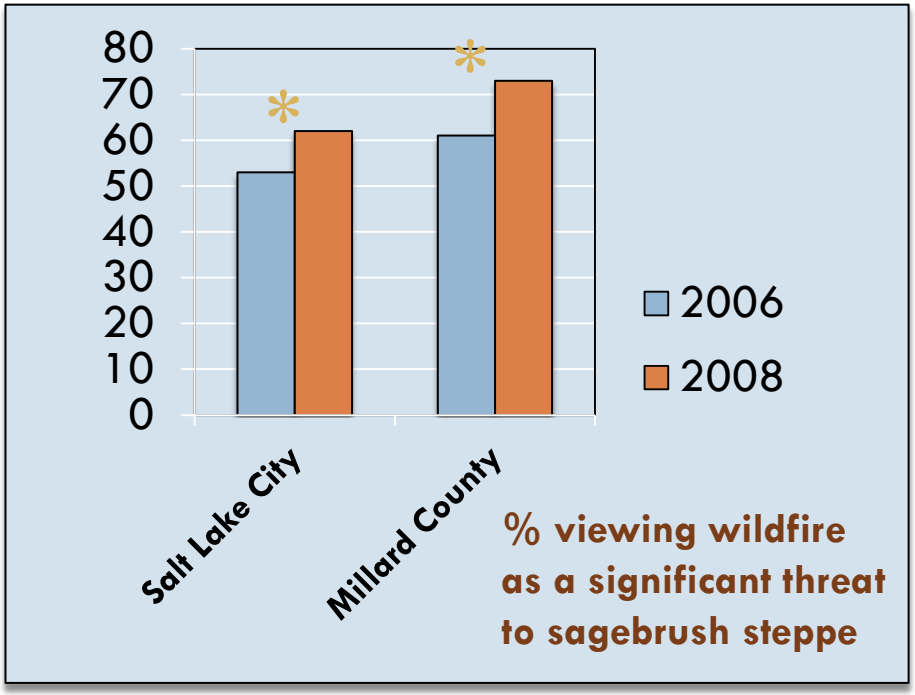
Why?

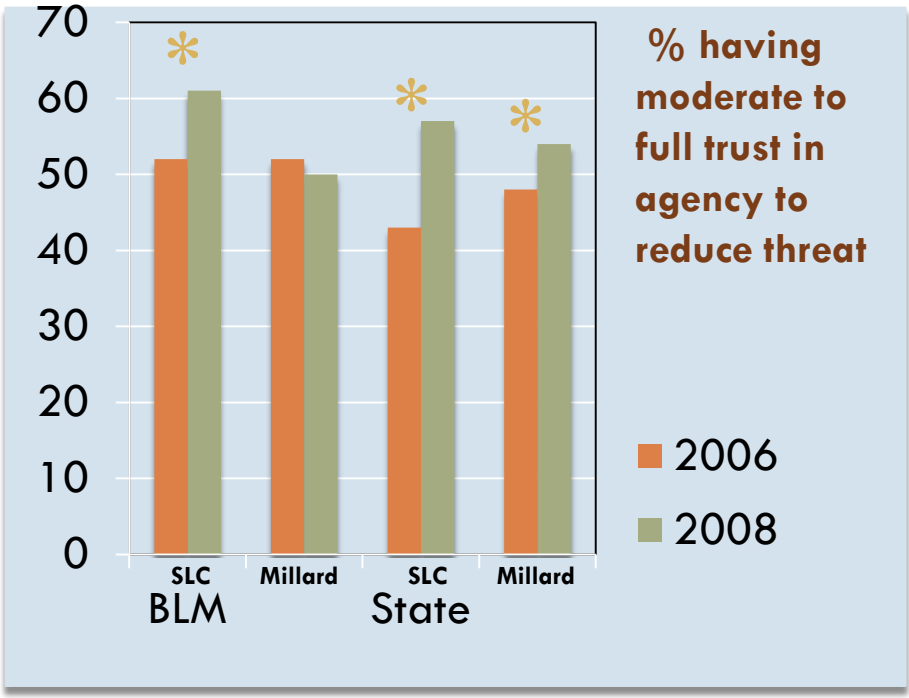
Often a function of citizen norms and knowledge

Recognizing linkages and predicting feedbacks



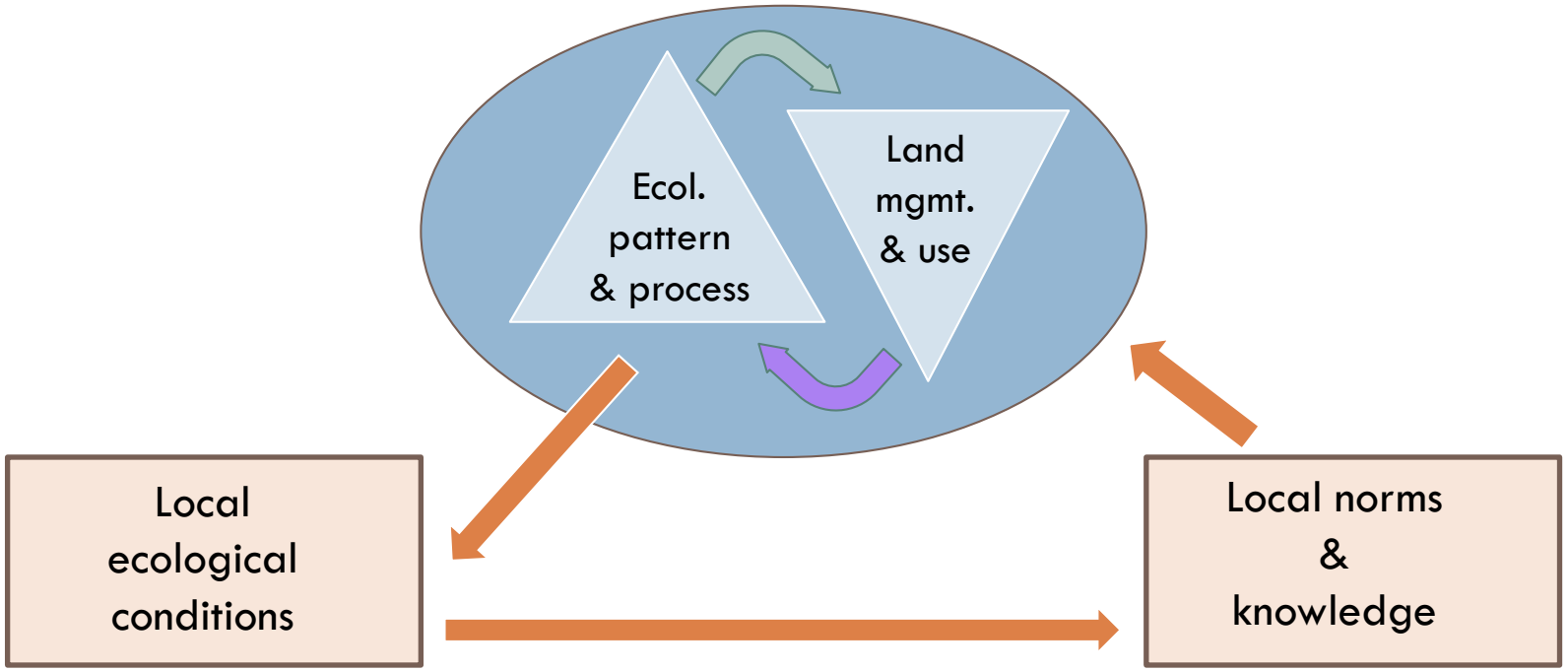
Milford Flat wildfire (2007) largest in Utah history



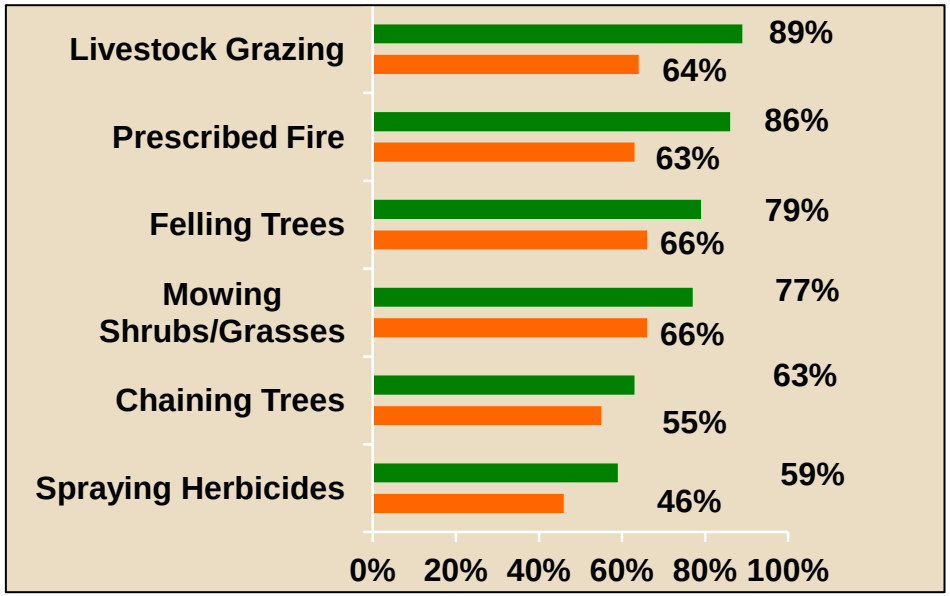


Recognizing linkages and predicting feedbacks

NOTE: The reverse can also occur – unanticipated outcomes can lead to a loss of confidence in agencies (Brunson & Evans 2005)

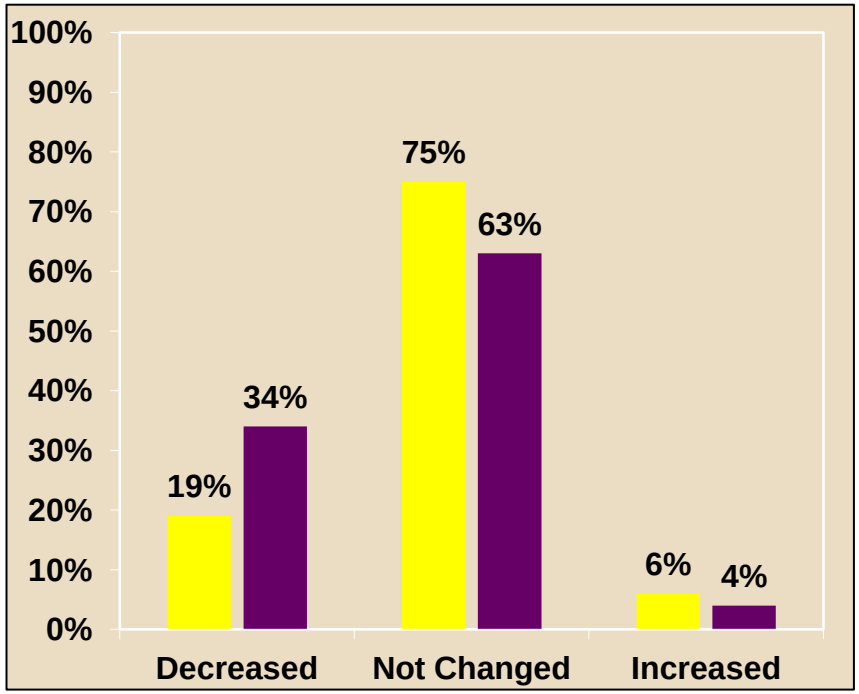


Trust as a key socio-ecological process



Social acceptance level (% believing practice can/should be used, in green) vs. trust level (% with medium/high trust in agencies to use safely, in orange), 2010 Great Basin survey

Change in trust level for BLM mgmt., 2006→2010 among urban (yellow) and rural (purple) respondents



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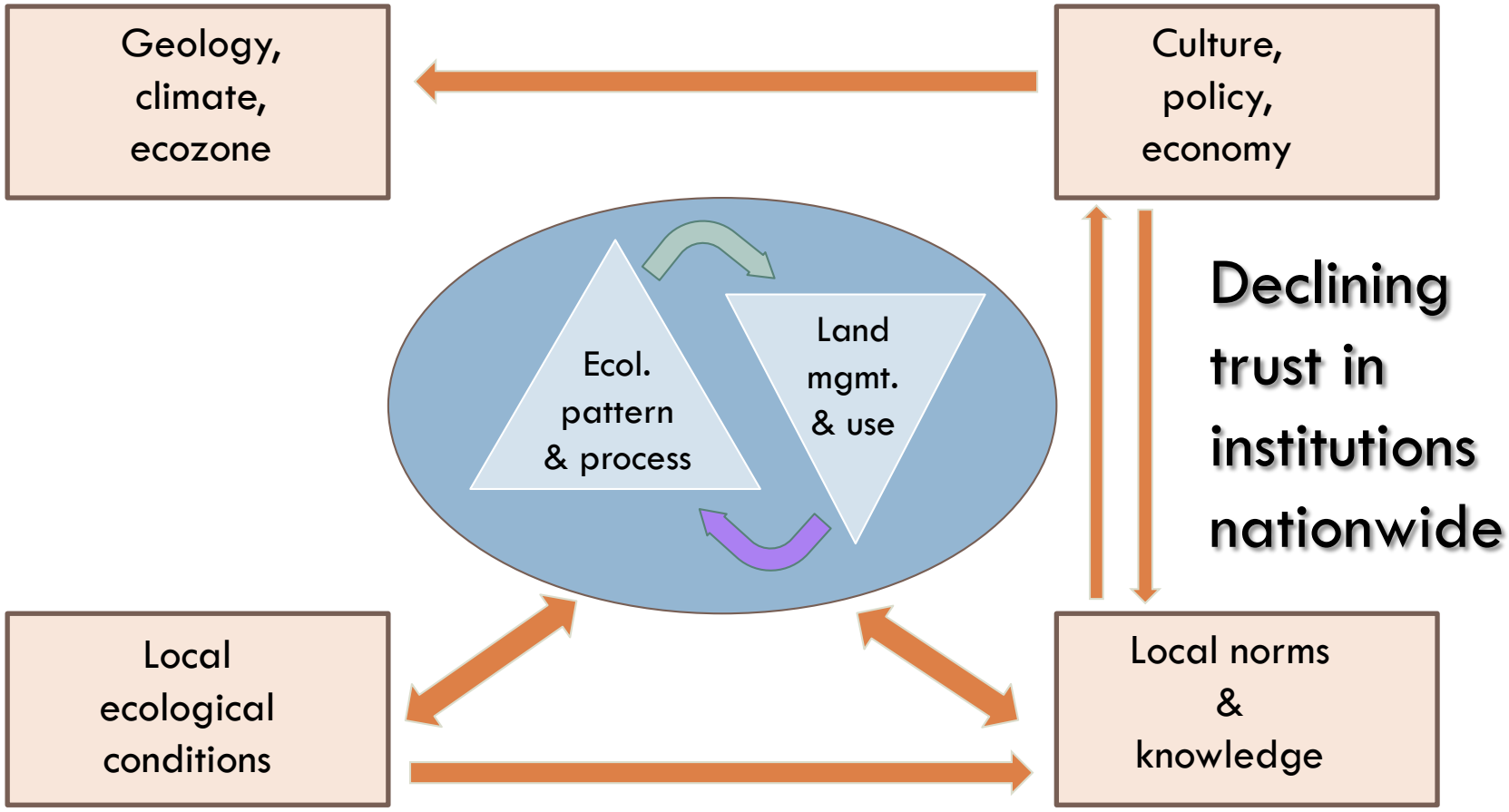
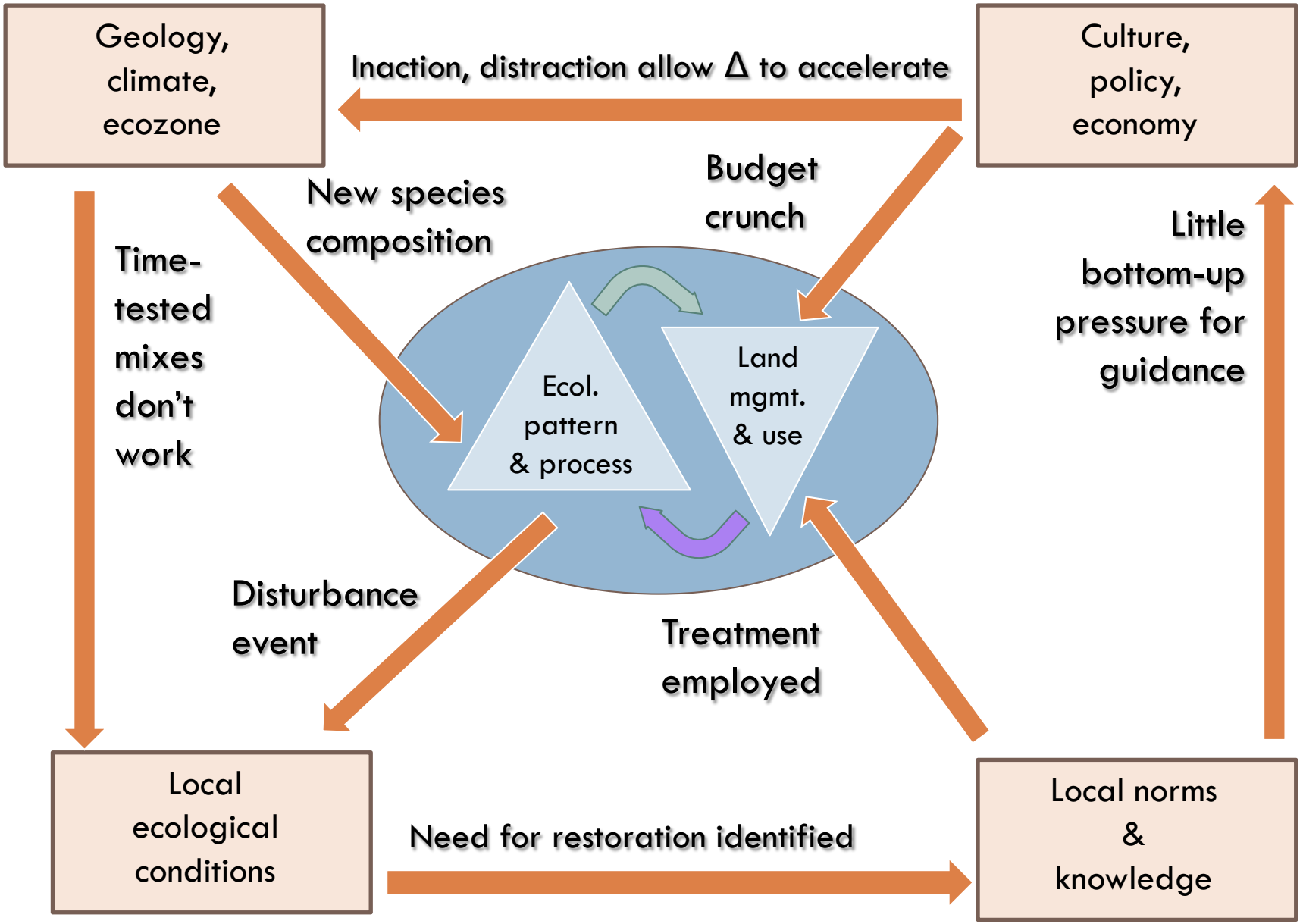


Putting it all together: Rangeland forbs and climate change

Comparing ambient to experimentally warmed summer conditions suggests climate change is likely to affect some native rangeland forbs more negatively than common non-native forbs

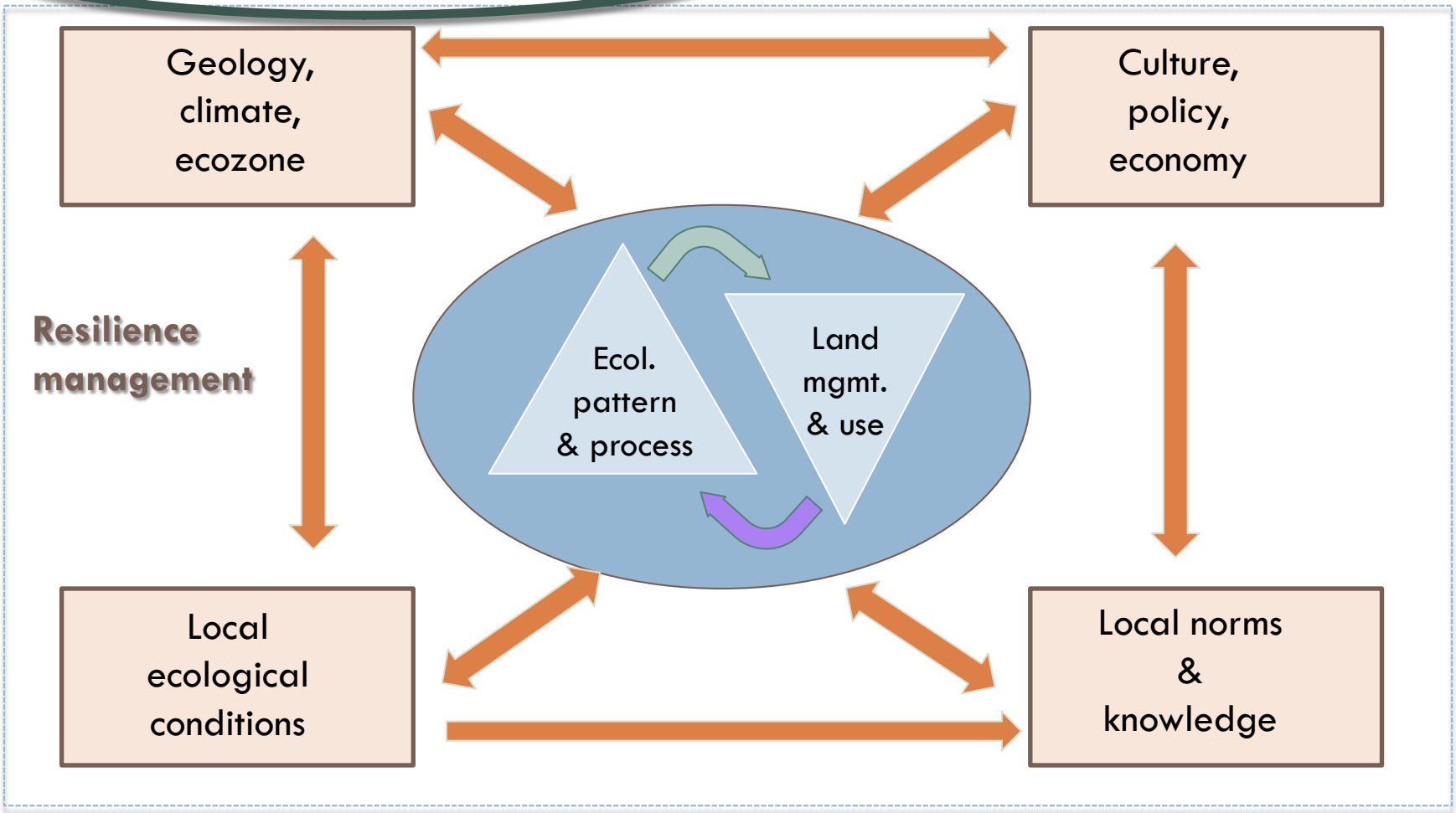
Range manager interviews reveal that many doubt climate is changing, await guidance before considering its effects, and give low priority in seed choice to forbs (due to cost, low value as forage, low value for stabilization)


Geology, climate, ecozone
Inaction, distraction allow Δ to accelerate
Culture, policy, economy
New species composition
Budget crunch
Time-tested mixes don't work
Little bottom-up pressure for guidance
Ecol. pattern & process
Land mgmt. & use
Disturbance event
Treatment employed
Local ecological conditions
Need for restoration identified
Local norms & knowledge

Managing for resilience

- Consider connections between social and ecological systems
  - Do local management norms match latest science?
  - Specific activities to build/maintain public trust
- Consider connections between local and larger spatial scales
  - Do local management norms reflect regional trends?
  - National policies must be practical to implement in varied local conditions

Resilience thinking (and communicating)

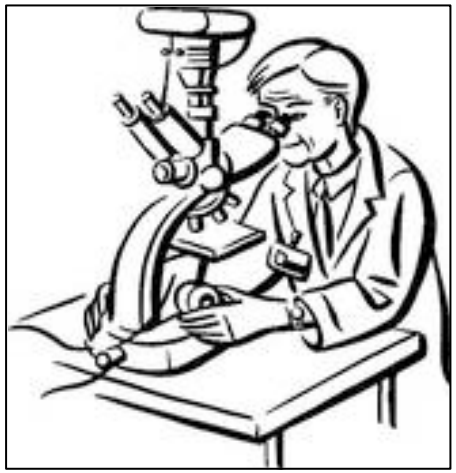


Managing for resilience requires public and policy-maker support

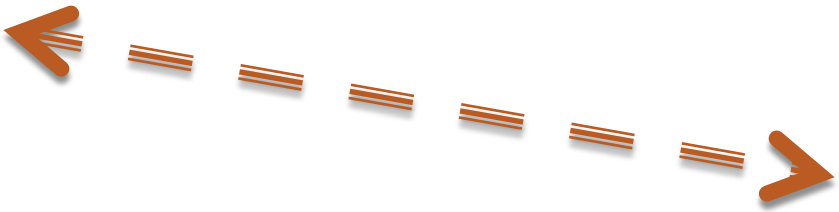
"[D]espite producing an enormous amount of new information, ecologists are often unable to convey knowledge effectively to the public and to policy-makers. Unless the discoveries of ecological science are rapidly translated into meaningful actions, they will remain quietly archived while the biosphere degrades."

- William Schlesinger, *Science* (Aug. 6, 2010)

Schlesinger's answer: Do "translational ecology"



Borrowed from medicine: Concern over a gap between basic research and patient care

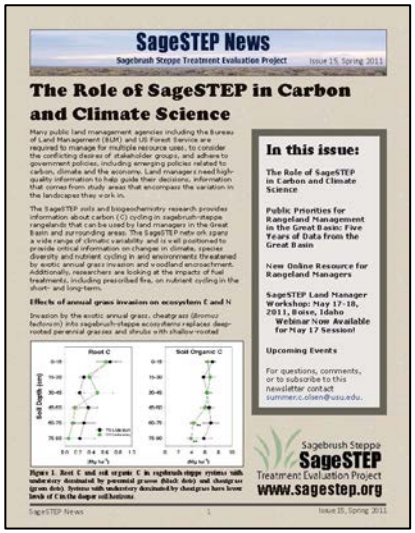


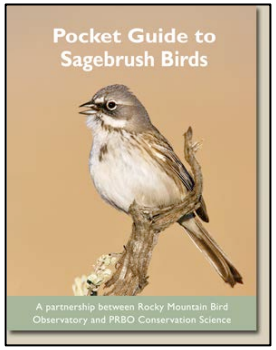
In ecosystems "translation" entails frequent, accurate, accessible two-way communication between scientists and "end-users"

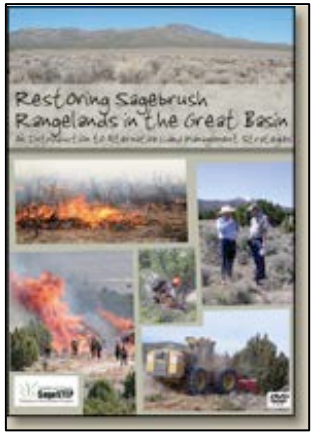
Translation in the Great Basin

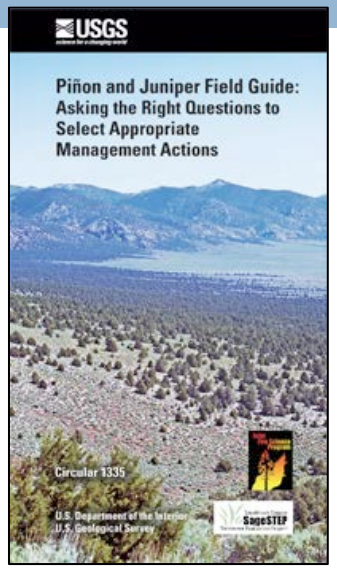
- Organizations/events like this (hope the $$ hold)
- GBRMP's Great Basin Fire Science Delivery project
- SageSTEP's outreach program

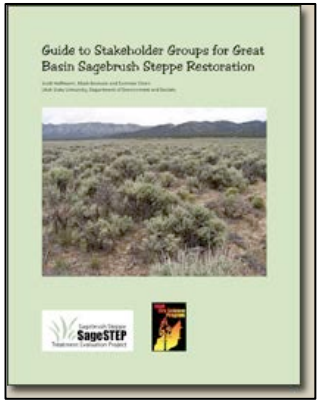
SageSTEP outreach: Maintaining one-way information flows


SageSTEP News
Sagebrush Steppe Treatment Evaluation Project
The Role of SageSTEP in Carbon and Climate Science
In this issue:
www.sagestep.org

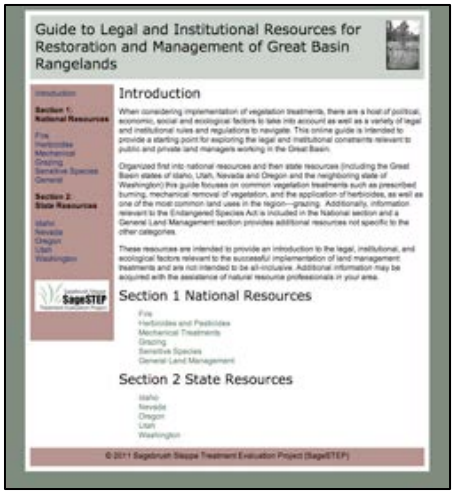

Pocket Guide to Sagebrush Birds
A partnership between Rocky Mountain Bird Observatory and PRBO Conservation Science


Restoring Sagebrush Rangelands in the Great Basin


USGS
Piñon and Juniper Field Guide: Asking the Right Questions to Select Appropriate Management Actions
Circular 1335
U.S. Department of the Interior
U.S. Geological Survey


Guide to Stakeholder Groups for Great Basin Sagebrush Steppe Restoration


Guide for Quantifying Post-treatment Fuels in the Sagebrush Steppe and Juniper Woodlands of the Great Basin
Andrea Bourne and Stephen C. Bunting
Technical Note 437
BLM


Guide to Legal and Institutional Resources for Restoration and Management of Great Basin Rangelands
Introduction
Section 1 National Resources
Section 2 State Resources


SageSTEP
Sagebrush Steppe Treatment Evaluation Project
http://www.sagestep.org

SageSTEP outreach: Promoting two-way information flows

Managers consistently tell us: The most useful mode of technology transfer is real-time conversation with scientists in the field.