Boundary Work

+

Boundary Organizations

Tucson, AZ

April 4, 2018

Southwest Climate Science Center

U.S. Department of the Interior, March 3, 1849

USGS science for a changing world

The University of Arizona

UC Davis University of California

Scripps Institution of Oceanography, UC San Diego

UCLA

DRI

University of Colorado Boulder


MIND THE GAP

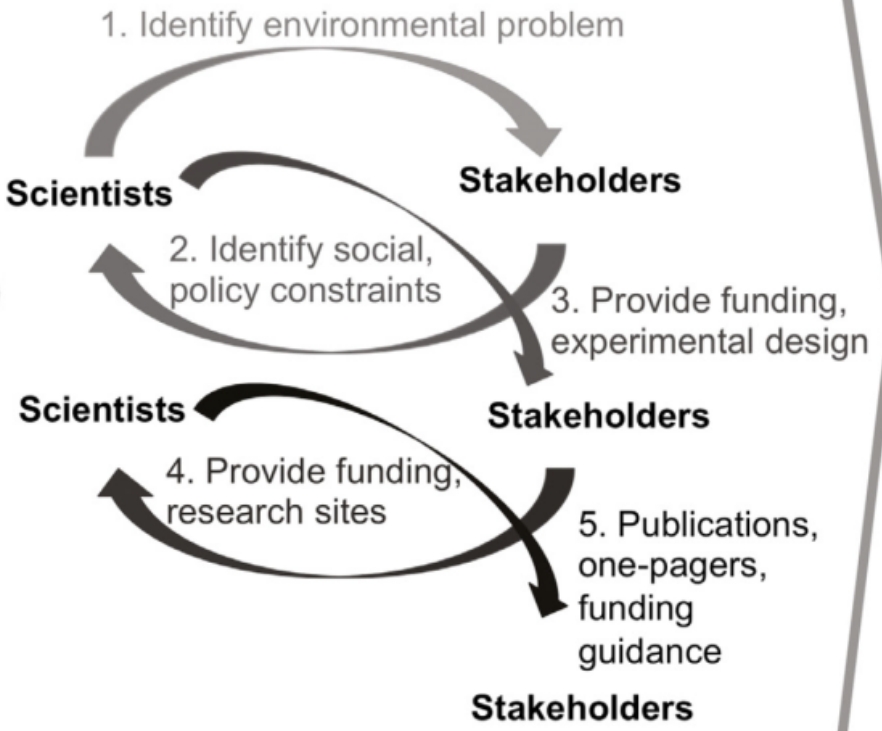
Linear

- Problem
  - Research
    - Knowledge
      - Transfer
        - Adoption
          - Diffusion

(a) Environmental Problem

Agricultural runoff creates algal blooms, compromising water quality and endangered species habitats

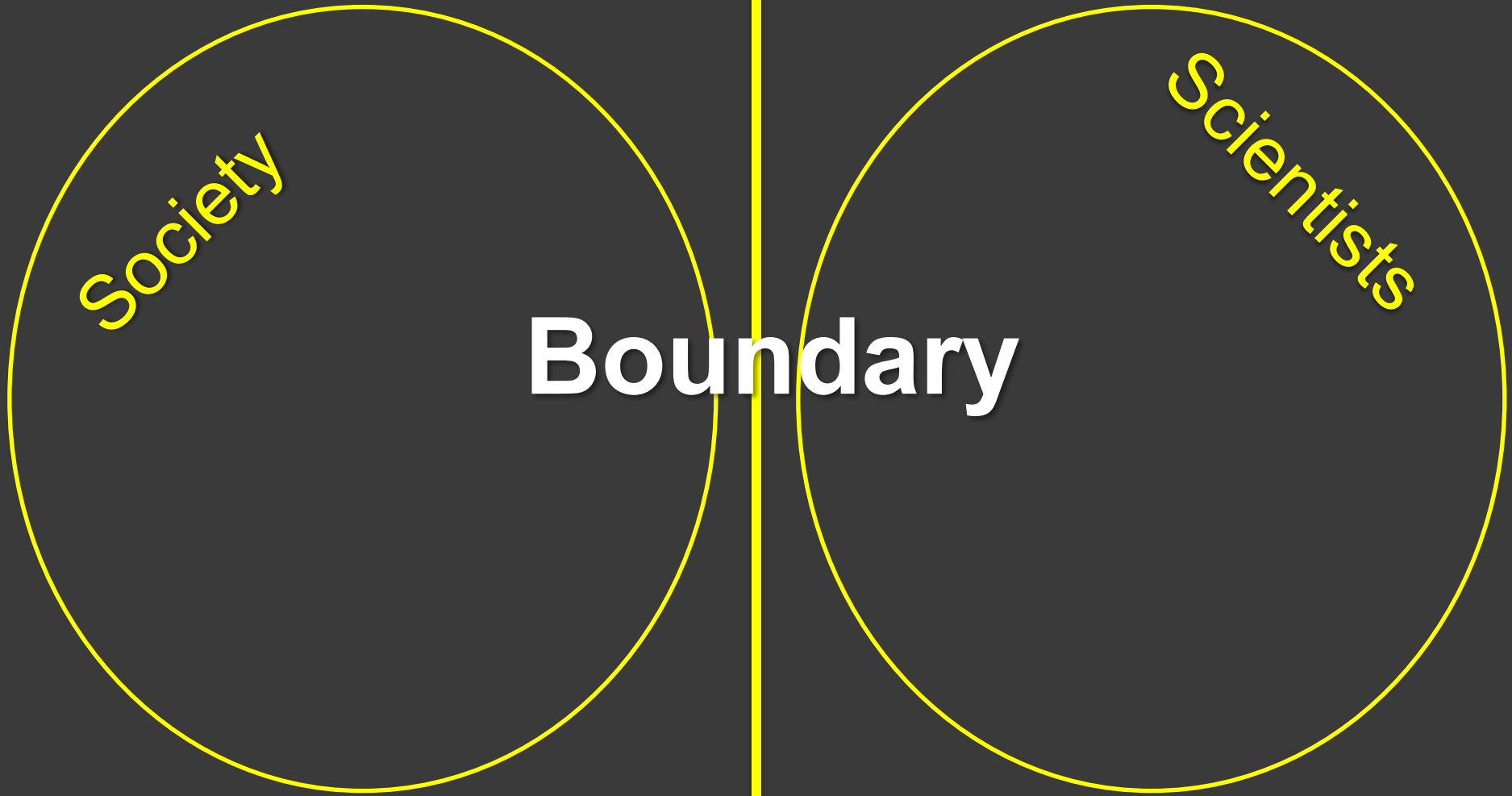
(b) Translational ecology

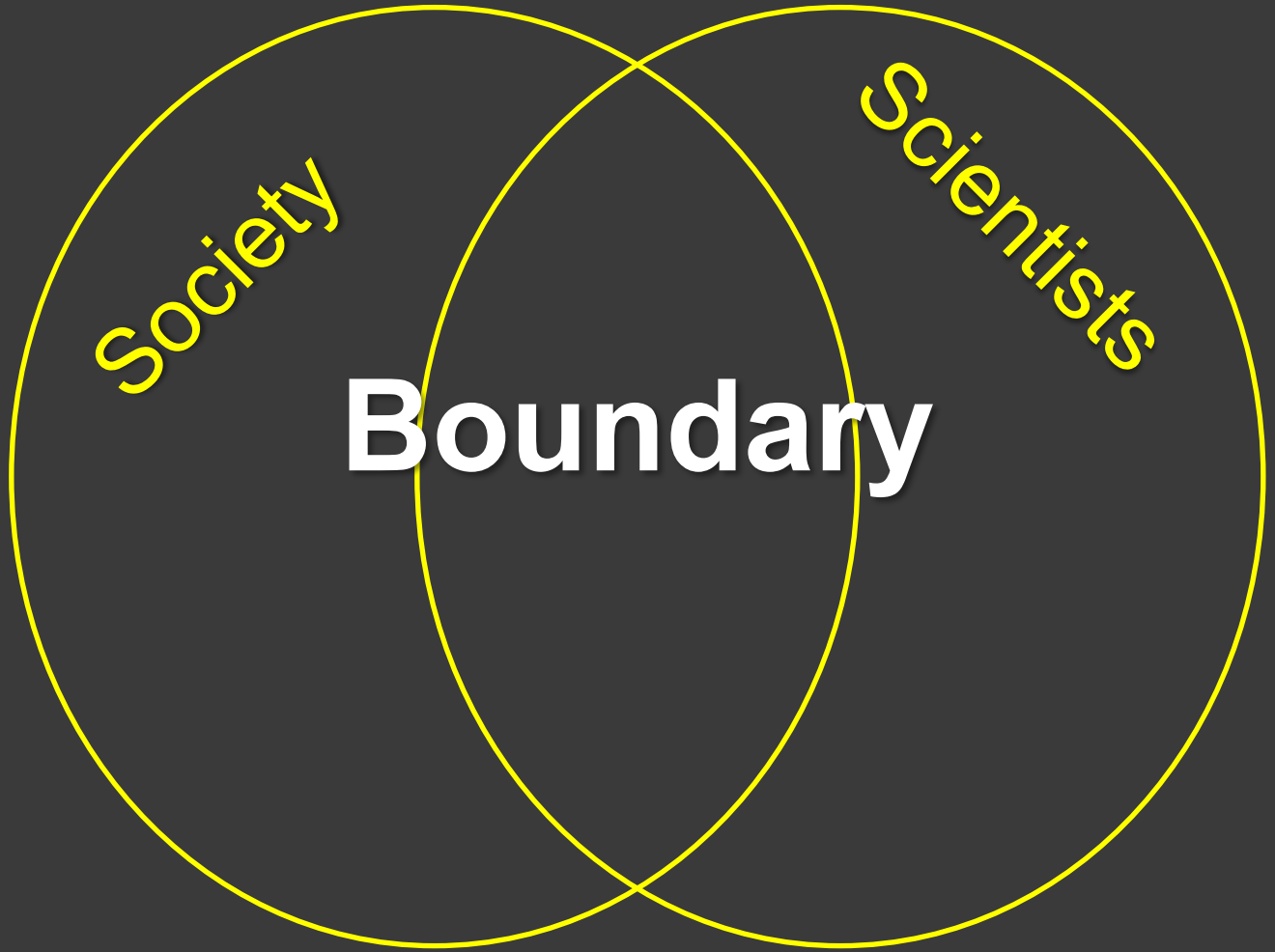


(c) Improved decision making

The use of two-staged ditches and cover crops reduces nitrogen runoff and sustains crop production

Hallett et al. 2017. *Frontiers in Ecology and the Environment*


Society
Boundary
Scientists


Society
Scientists
Boundary

Definitions

Boundary Work

What demarcates science from nonscience is not some set of essential characteristics or methods but rather an array of circumstances and strategic behavior known as “boundary work”.

Guston. 2001. *Science, Technology, & Human Values*, 26(4): 399-408

Definitions

Boundary Work

Initially formulated to explain how scientists maintain the boundaries of their community against threats to its cognitive authority from within (e.g., fraud and pseudo-science).

Guston. 2001. *Science, Technology, & Human Values*, 26(4): 399-408

Definitions

Boundary Work

Blurring of boundaries between science and politics, rather than the intentional separation often advocated and practiced, can lead to more productive policy making.

Guston. 2001. *Science, Technology, & Human Values*, 26(4): 399-408

Definitions

Boundary Organizations

- Negotiate boundary between science and decision making
- Exist between two distinct social worlds, with responsibility and accountability to each
- Provide space to legitimize the use of boundary objects that meet needs and constraints of parties, but maintain common identity

Guston. 1999. *Social Studies of Science, 29*(1): 87-111

Definitions

A boundary organization is an entity that serves as a convener of science producers, science users, and other affected parties, and as a translator and a facilitator of productive tension among these groups.

Beier et al. 2017. *Conservation Letters* 10(3): 288-296

Lemos et al. 2014. *Weather, Climate & Society*, 6: 273-285

Definitions

A boundary organization is an entity that serves as a **convener** of science producers, science users, and other affected parties, and as a **translator** and a **facilitator** of productive tension among these groups.

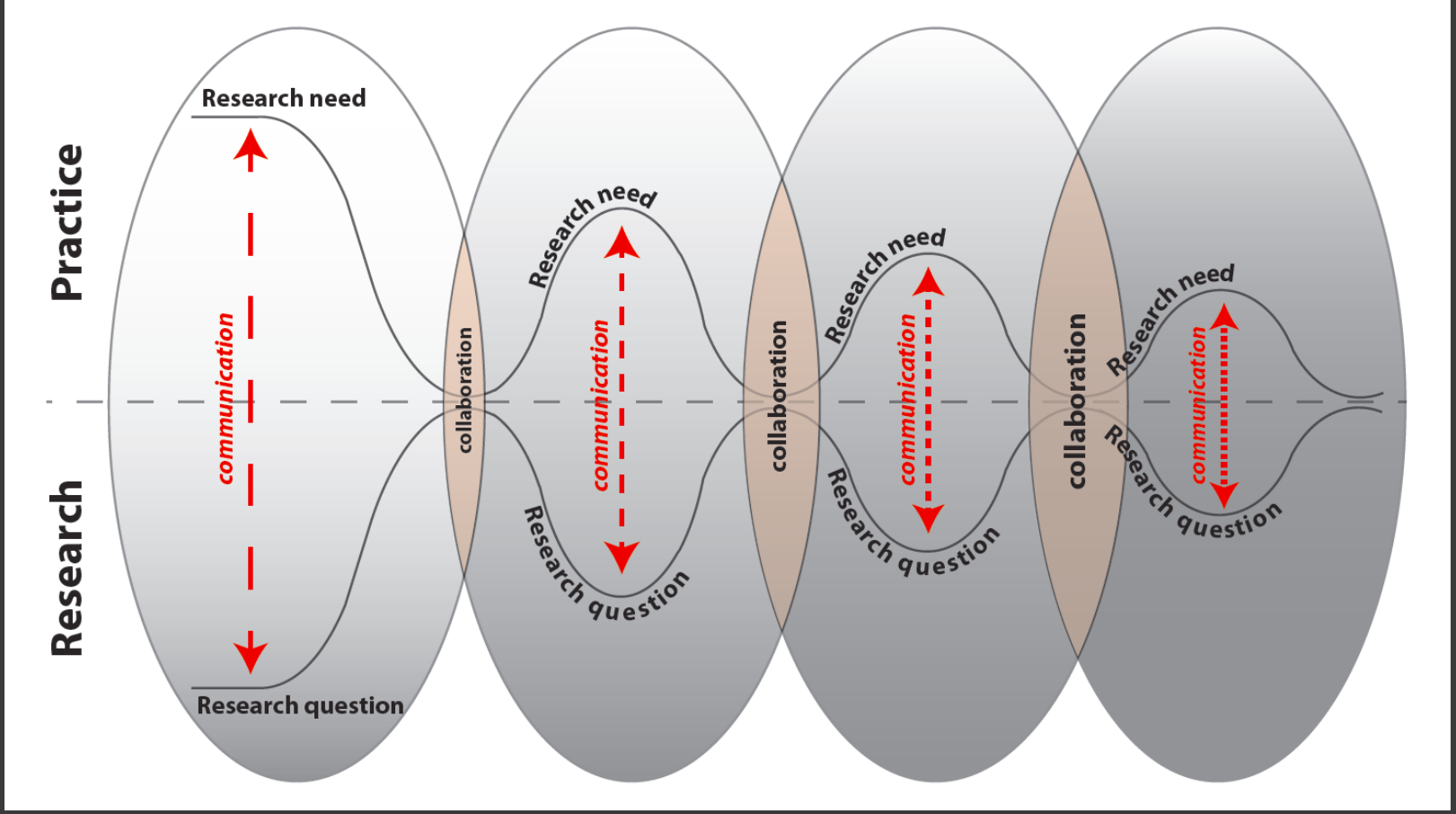
Beier et al. 2017. *Conservation Letters* 10(3): 288-296

Definitions

Boundary Organizations

- Create safe spaces for contentious situations to be negotiated through well-established relationships and processes
- Allows for reframing of problems
- Social learning

Leith et al. 2016. *Science, Technology, & Human Values*, 41(3): 375-401



Ferguson et al. 2014. Linking environmental research and practice: lessons from the integration of climate science and water management in the Western United States. Climate Assessment for the Southwest (CLIMAS), 23 p.

Definitions

Boundary organizations related to conservation and climate adaptation include:

- International Platform on Biodiversity and Ecosystem Services
- NOAA Regional Integrated Sciences and Assessments
- DOI Climate Science Centers
- Cooperative Extension Programs
- NGOs — EcoAdapt, Conservation Biology Institute

Beier et al. 2017. *Conservation Letters* 10(3): 288-296

Definitions

Boundary Objects

Boundary objects sit between two different social worlds, such as science and nonscience, and they can be used by individuals within each for specific purposes without losing their own identity.

Guston. 2001. *Science, Technology, & Human Values*, 26(4): 399-408

Definitions

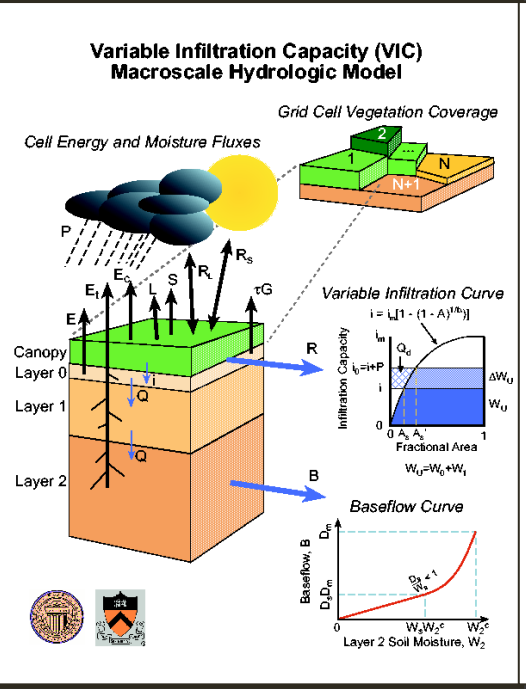
Boundary Objects

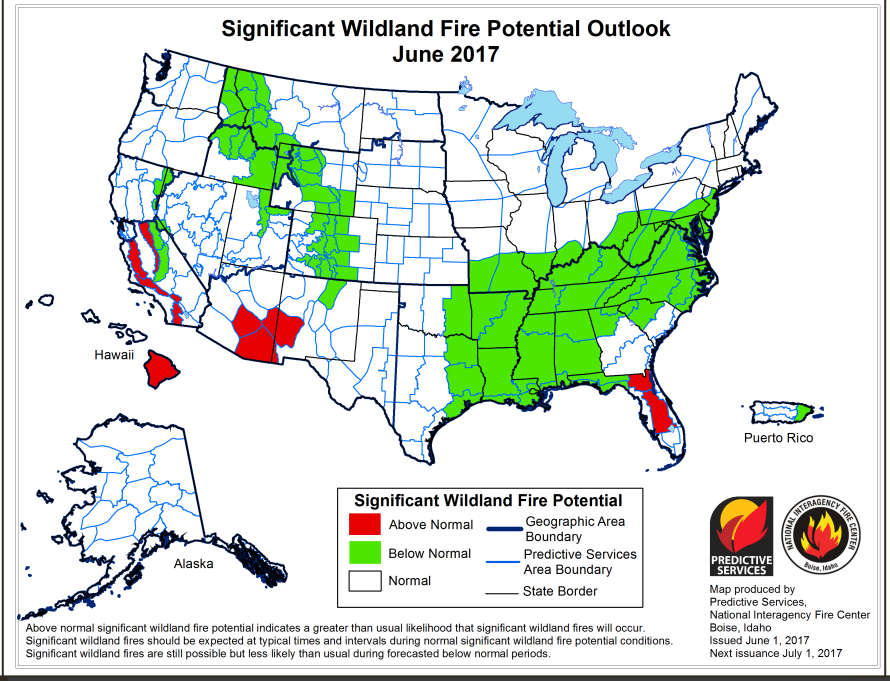
Example:

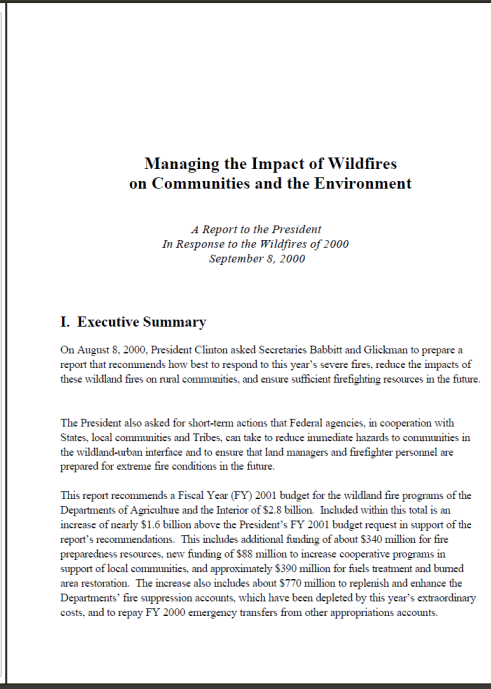
A patent on research results can be used by a scientist to establish priority or for commercial gain. It can simultaneously be used by a politician to measure the productivity of research.

Guston. 2001. *Science, Technology, & Human Values*, 26(4): 399-408

Boundary Objects







Managing the Impact of Wildfires on Communities and the Environment

A Report to the President
In Response to the Wildfires of 2000
September 8, 2000

I. Executive Summary

On August 8, 2000, President Clinton asked Secretaries Babbitt and Glickman to prepare a report that recommends how best to respond to this year's severe fires, reduce the impacts of these wildland fires on rural communities, and ensure sufficient firefighting resources in the future.

The President also asked for short-term actions that Federal agencies, in cooperation with States, local communities and Tribes, can take to reduce immediate hazards to communities in the wildland-urban interface and to ensure that land managers and firefighter personnel are prepared for extreme fire conditions in the future.

This report recommends a Fiscal Year (FY) 2001 budget for the wildland fire programs of the Departments of Agriculture and the Interior of $2.8 billion. Included within this total is an increase of nearly $1.6 billion above the President's FY 2001 budget request in support of the report's recommendations. This includes additional funding of about $340 million for fire preparedness resources, new funding of $88 million to increase cooperative programs in support of local communities, and approximately $390 million for fuels treatment and burned area restoration. The increase also includes about $770 million to replenish and enhance the Departments' fire suppression accounts, which have been depleted by this year's extraordinary costs, and to repay FY 2000 emergency transfers from other appropriations accounts.

Model | Forecast | Assessment

Typical Boundary Organization Functions

- Translate information
- Facilitate and manage information flows
  - Across levels
- Convene dialogue
- Incorporate local participants into researchers' experiments
- Foster collaboration

Typical Boundary Spanner Roles

- Information broker
- Science interpreter, communicator
- Meeting facilitator
- Science or interaction process coordinator
- Matchmaker

A Nuanced View

Well-structured problem

- Strong agreement + convergence of values
  - Direct application of scientific information

Leith et al. 2016. *Science, Technology, & Human Values*, 41(3): 375-401

A Nuanced View

Unstructured problem

- Values are divergent + stakes are high
  - Problem definition
  - Develop and evaluate policy options

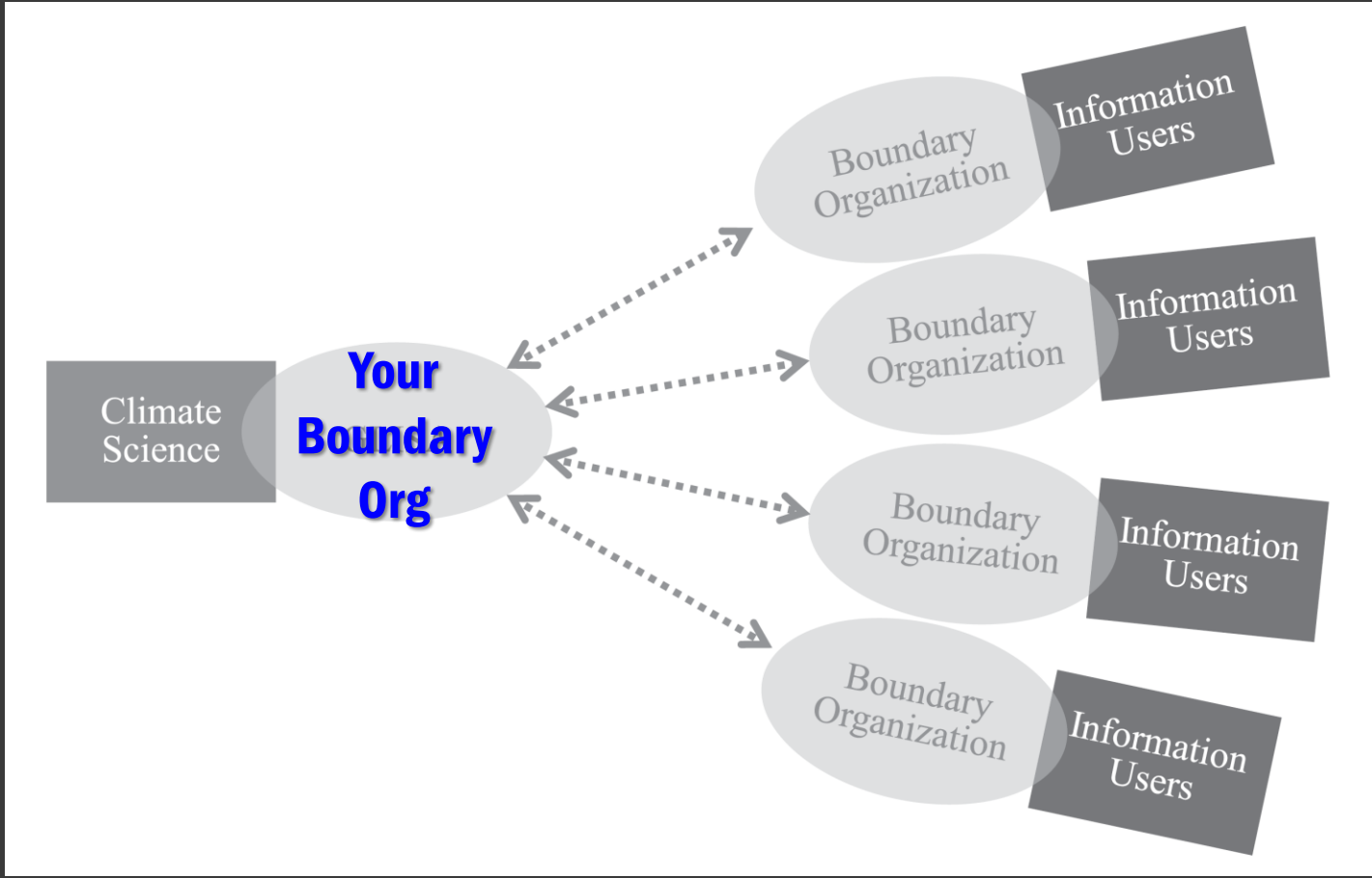
Leith et al. 2016. *Science, Technology, & Human Values*, 41(3): 375-401

A Nuanced View

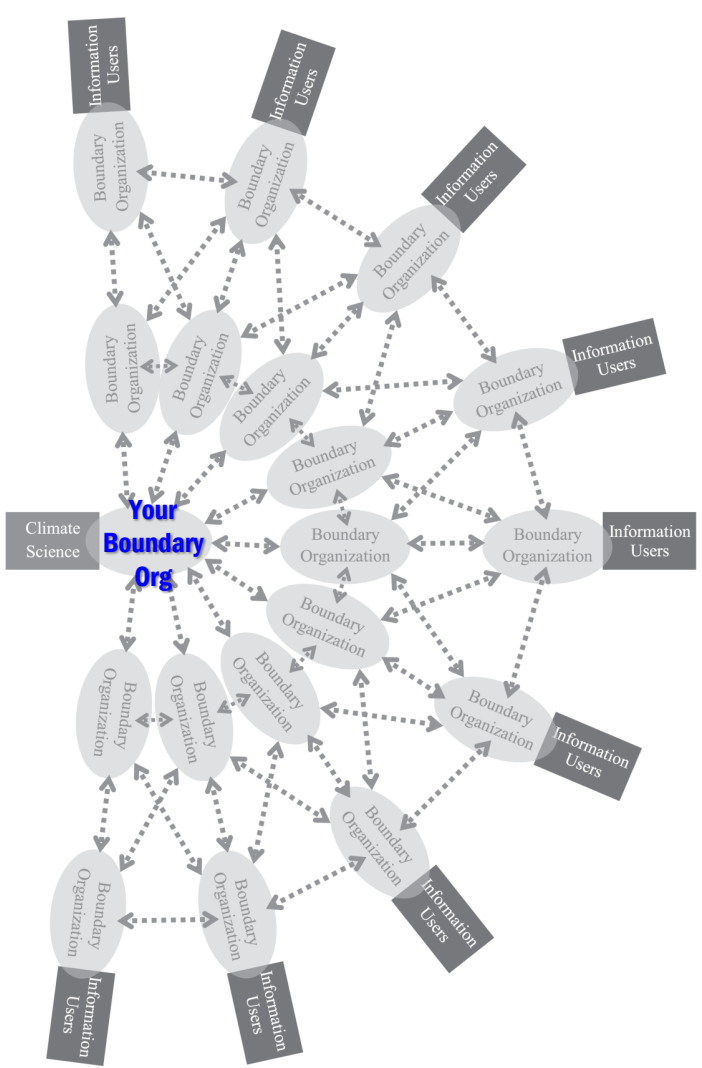
Multi-faceted, cross-scale, multi-jurisdiction

- Multiple boundary organizations
  - Boundary chains
  - Specific roles
  - Cannot be all things to all people

Leith et al. 2016. *Science, Technology, & Human Values*, 41(3): 375-401



Lemos et al. 2014. *Weather, Climate & Society*, 6: 273-285



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Heuristics

- Shared problems + goals
- Mutual respect and trust
- Knowledge exchange, brokering
- Individual and institutional flexibility
- Organizational cultures, norms, governance
- Decision context and calendars
- Mutually agreed upon ground rules
- Reconciling perspectives, clarifying language
- Nurturing collaboration

Ferguson et al. 2014. Linking environmental research and practice: lessons from the integration of climate science and water management in the Western United States. Climate Assessment for the Southwest (CLIMAS), 23 p.


MIND THE GAP

Scenario: Invited Talk

Scenario: Invited Talk

- UNIRUS – Unicorn Ranchers of the U.S.
  - Introduction of GMO species
- Stakeholders
  - Concerned about GMOs
- You
  - Expert on rangeland ecosystems
  - Invasive species, erosion
  - Director of University Consortium of Rangeland Research Science (UCRRS)

Scenario: Invited Talk

- **Think:**
  - 1 minute to think about the situation and your response
- **Pair:**
  - Pair up with another participant
  - 2 minutes to share your ideas
  - 2 minutes for your partner to share ideas
- **Share:**
  - Volunteers share with the entire group

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Steve Jackson
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Definitions

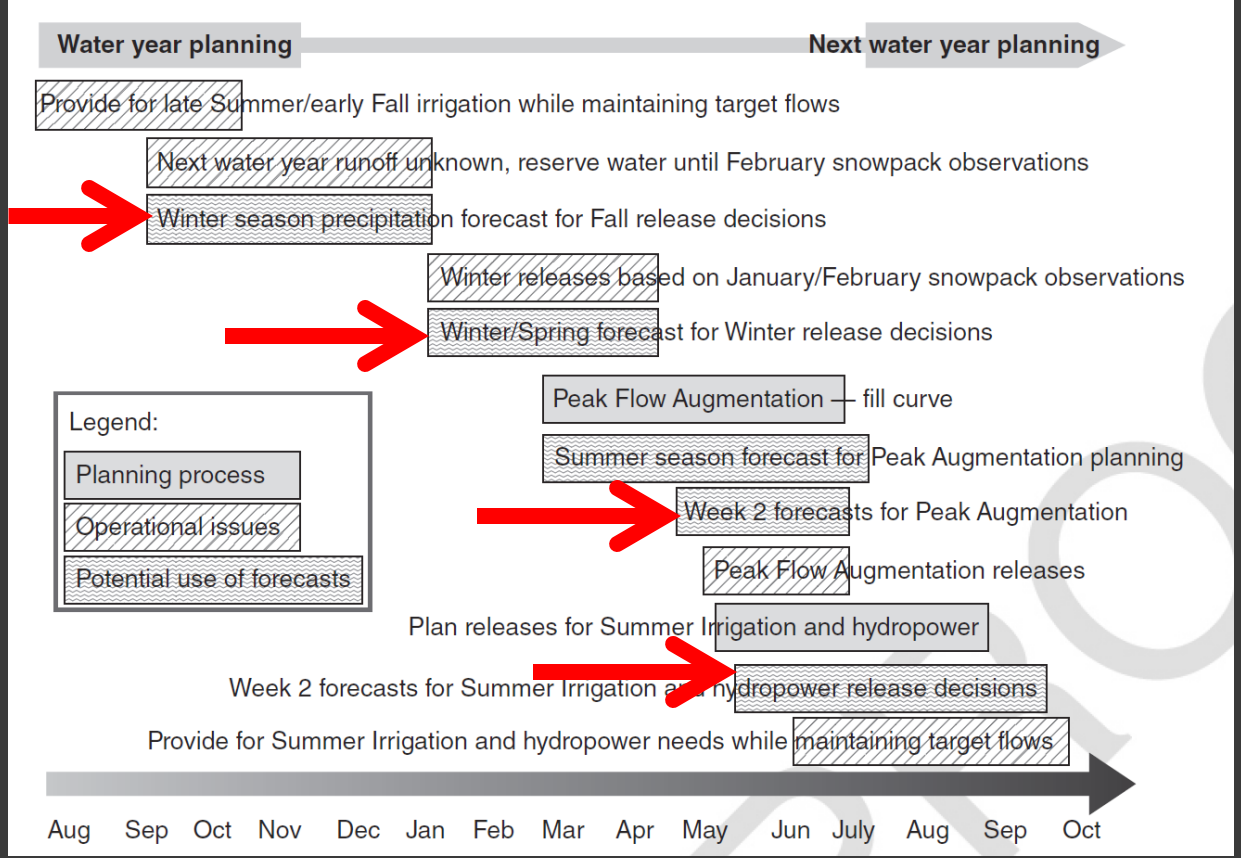
Boundary Organizations

- A means of stabilizing the boundary between scientists and decision makers, through distinct organizations that lie between these groups, are accountable to both, and that serve distinct and potentially conflicting sets of goals of each.

Leith et al. 2016. *Science, Technology, & Human Values*, 41(3): 375-401

Typical Scientist Roles

- Honest broker of policy alternatives
- Pure scientist
- Science arbiter
- Issue advocate



Ray and Webb 2016. Understanding the user contexts: decision calendars as frameworks for linking climate to policy, planning, and decision making. In A. Parris et al. (eds.), Climate in Context: Science and Society Partnering for Adaptation. Wiley/AGU, p. 27-50.

RISA Regional Integrated Sciences and Assessments

Southwest Climate Science Center

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FIG. 3. Linked chain arrangement.

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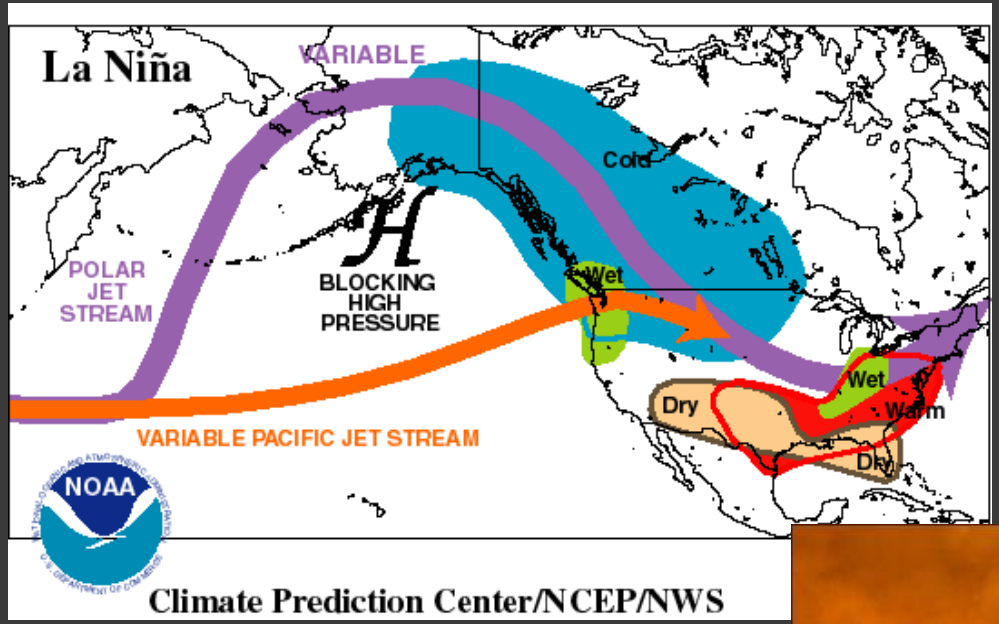
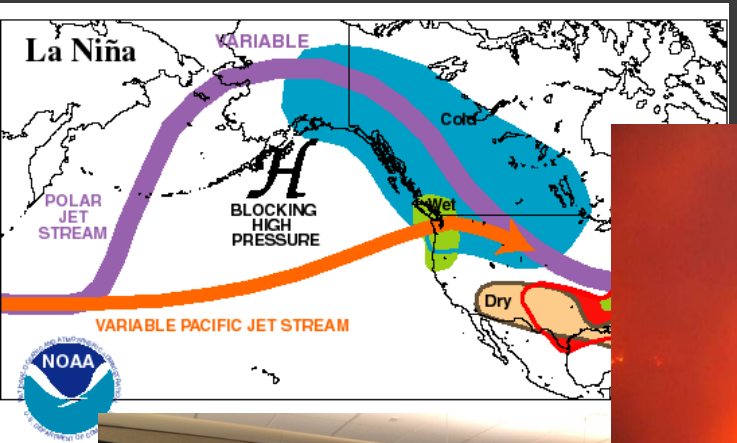
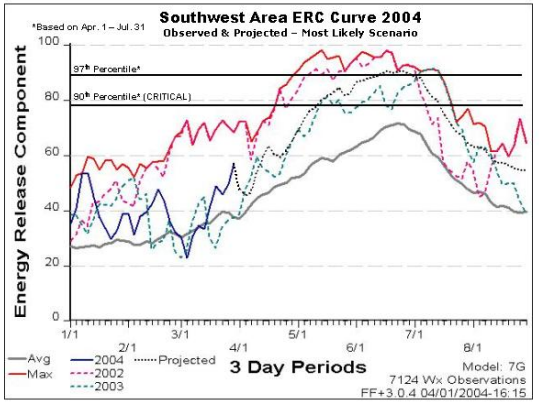
Fire-Climate Forecasts



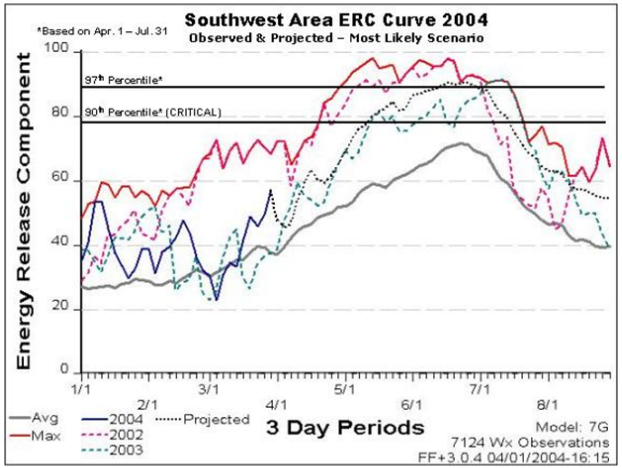
Fire-Climate Workshops





Process: Fire-Climate Workshops

- Resource allocation
- Prescribed fire
- Public education



National Fire Plan

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National Seasonal Assessment Workshop

2003-2011

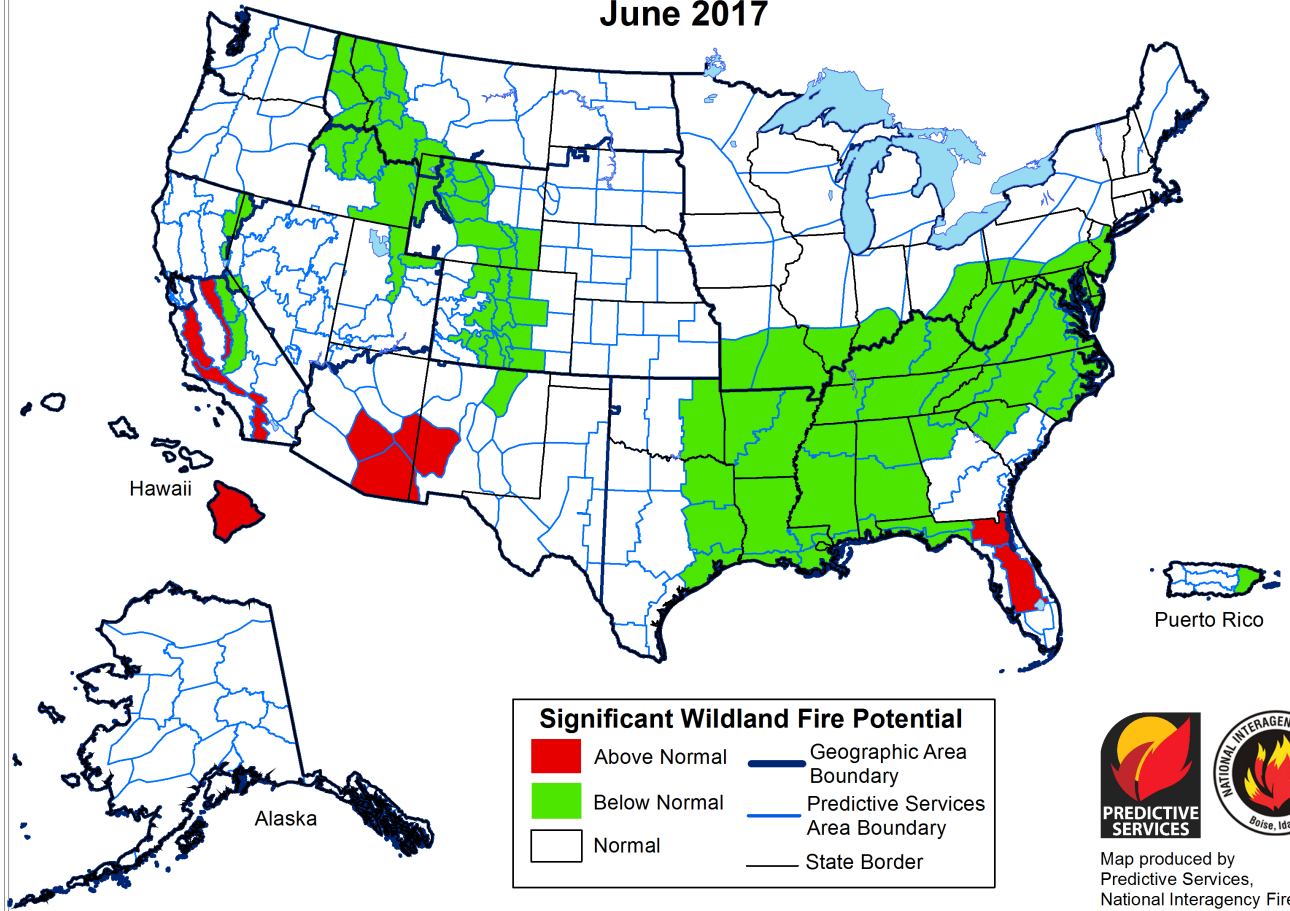
National Interagency Coordination Center

ECOSYSTEM CLIMATE FIRE APPLICATIONS

DRI Desert Research Institute

CLIMAS Climate Assessment Project for the Southwest

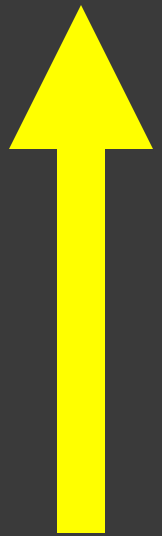
Significant Wildland Fire Potential Outlook
June 2017



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
Issued June 1, 2017
Next issuance July 1, 2017

Northern California												
Decisions	J	F	M	A	M	J	J	A	S	O	N	D
Suppression												
Rx and Fire Use												
Seasonal Staffing												
Budgeting												
Special: Pile Burning												



Corringham et al. 2008 – Journal of Forestry

Northern California												
Decisions	J	F	M	A	M	J	J	A	S	O	N	D
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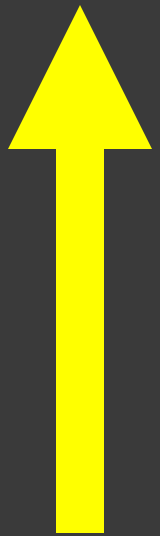


Corringham et al. 2008 – Journal of Forestry

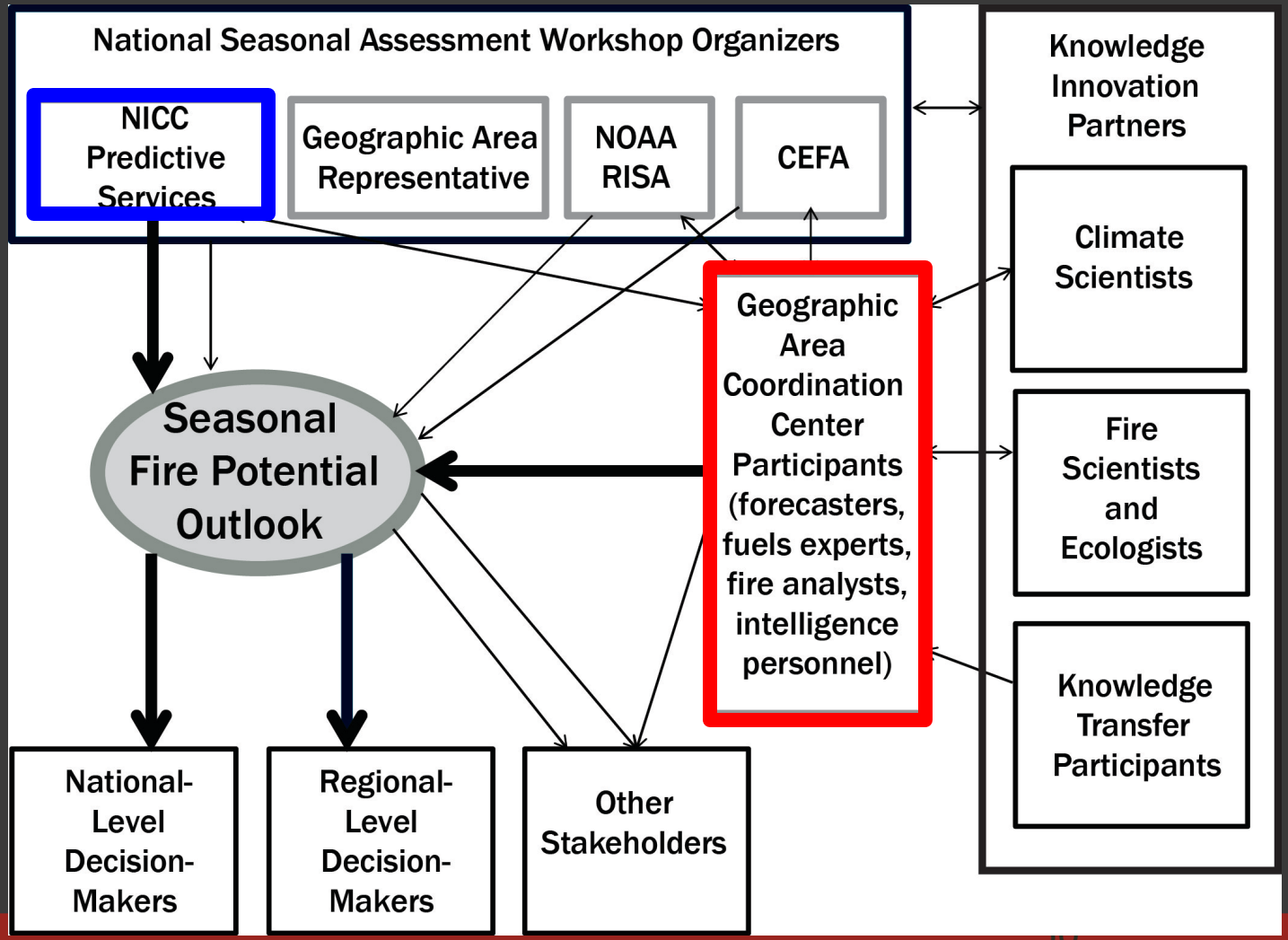
Mental Models + Cultural Norms

Illustration: CRED, 2009 – The Psychology of Climate Change


FIRE
ALARM


FALSE
ALARMS

Owen, G., et al. (2012). "Wildfire Management and Forecasting Fire Potential: The Roles of Climate Information and Social Networks in the Southwest United States." Weather, Climate, and Society **4**(2): 90-102.


National Seasonal Assessment Workshop Organizers
NICC Predictive Services
Geographic Area Representative
NOAA RISA
CEFA
Knowledge Innovation Partners
Climate Scientists
Geographic Area Coordination Center Participants (forecasters, fuels experts, fire analysts, intelligence personnel)
Fire Scientists and Ecologists
Knowledge Transfer Participants
Seasonal Fire Potential Outlook
National-Level Decision-Makers
Regional-Level Decision-Makers
Other Stakeholders

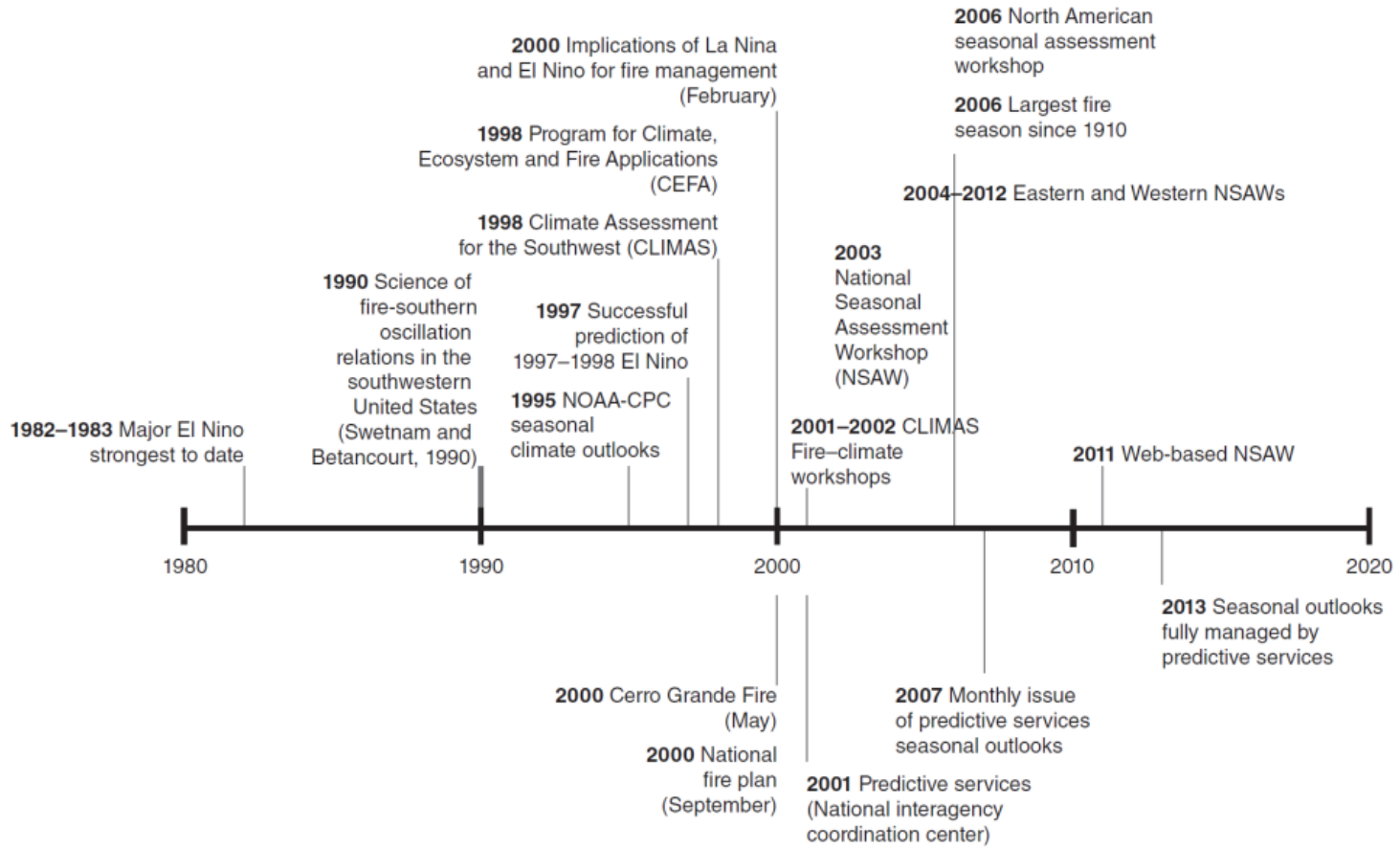
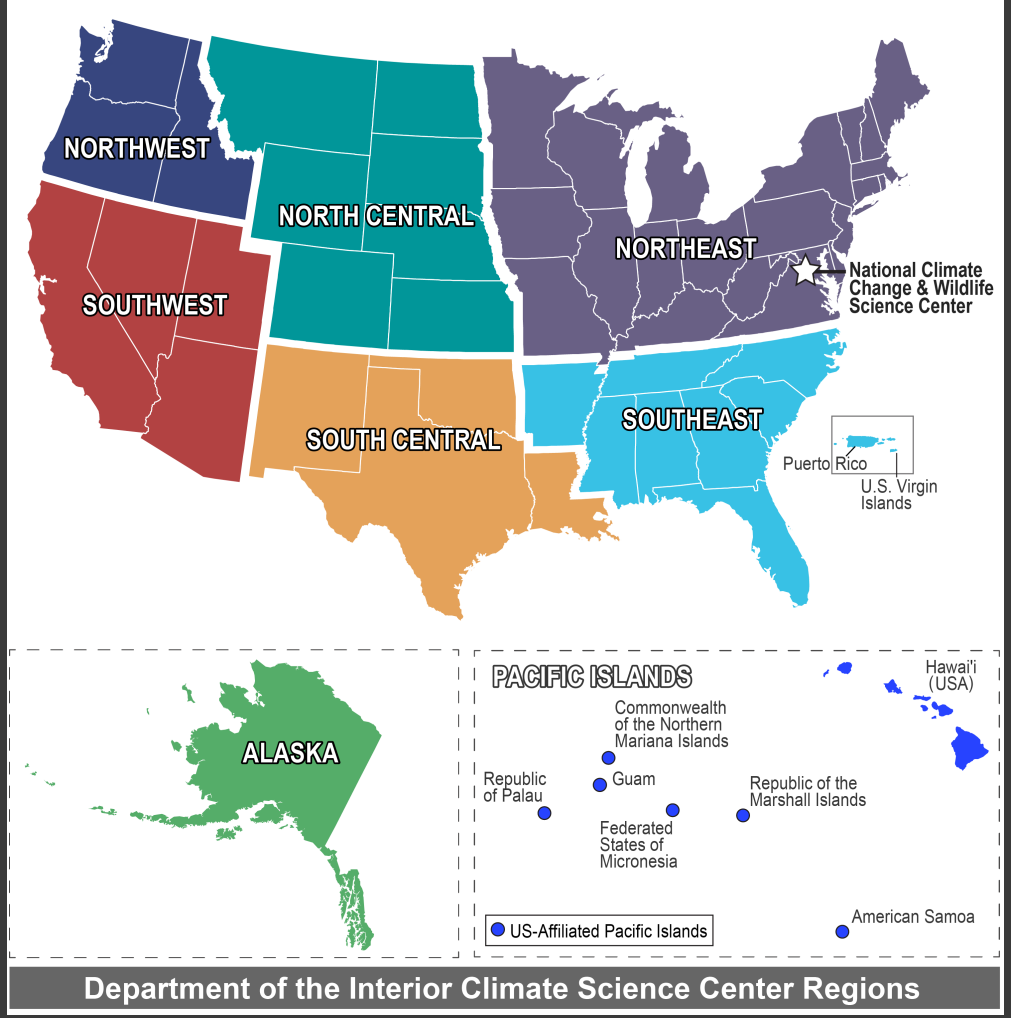


Figure 7.1 Timeline of key events pertaining to the development of seasonal fire potential outlooks.

CSC Origins

- 2007 – USGS National Climate Change and Wildlife Science Center
- 2009 – Secretarial Order 3289 (Salazar)
  - DOI-wide service
  - 8 regional centers
  - Climate adaptation
  - Natural resource managers
  - Federal, state, tribal, regional, local
- 2010 first Climate Science Center competition



Department of the Interior Climate Science Center Regions

The SW CSC Host University Network

Current Organization

University/Partner

- UCLA — Post-doc — 12 mo./yr.
- SOI — Post-doc — 12 mo./yr.
- DRI — Post-doc — 12 mo./yr.
- UCD — No full time
- CSU — No full time

Federal/Partner

"Core Office"

- Univ. Director — G. Garfin — 2 mo./yr.
- USGS Director — S. Jackson — 12 mo./yr.
- BIA Tribal Liaison — TBD — 12 mo./yr.
- Program and Grants Mgr. — A. Govert — 12 mo./yr.
- Deputy Dir. — C. Enquist — 12 mo./yr.
- Research Coordinator — TBD — 12 mo./yr.
- Communications Team
- Admin. Officer — M. Matty — 12 mo./yr.
- Post-doc — T. Krause — 12 mo./yr.

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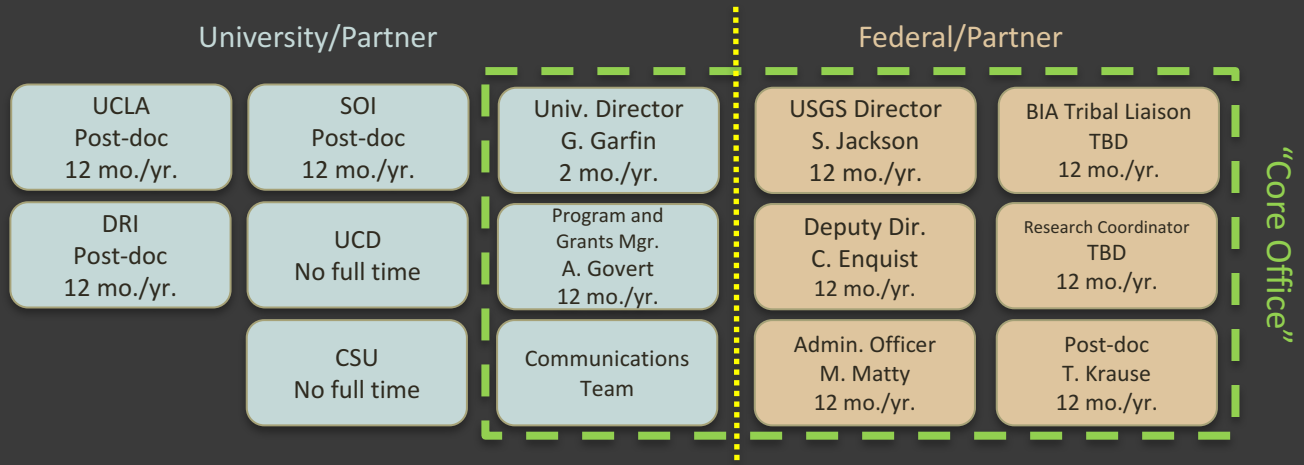
"Core Office"

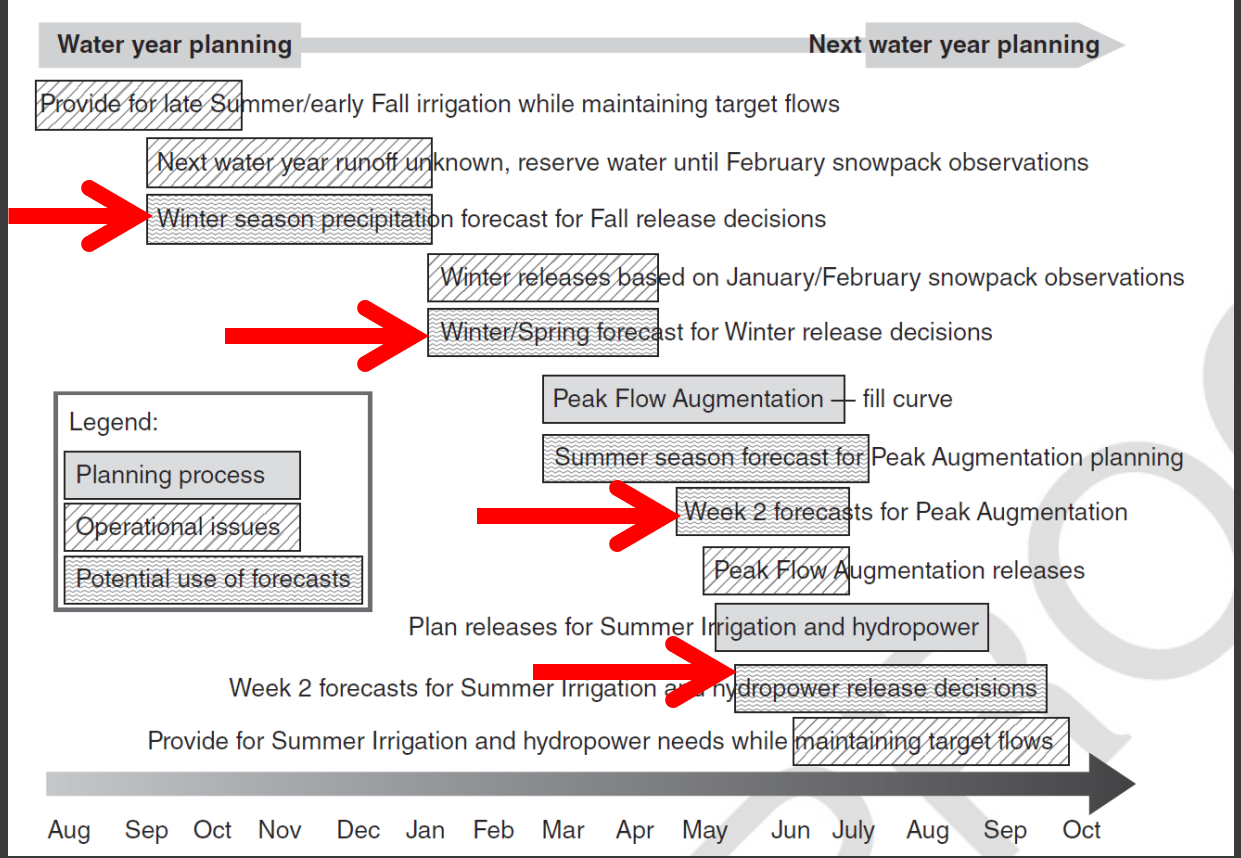
The SW CSC Host University Network



Funding: USGS / NCCWSC

1. Core agreement with University of Arizona & SW CSC consortium
   - Supports administration of hosting agreement and grants program
   - Supports activities among university consortium partners
   - Workshops, conferences, etc. (in partnership with university consortium)

2. USGS Staff and Grants program (USGS)
   - ~Annual Requests for Proposals
   - Direct-funded projects
   - Eligible PIs: USGS scientists; faculty within consortium universities
   - Must involve collaboration with practitioners, stakeholders
   - Must address well-articulated needs



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