



*Independent Scientific Advisory Board
for the Northwest Power and Conservation Council,
Columbia River Basin Indian Tribes,
and NOAA Fisheries*

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Using a Comprehensive
Landscape Approach
for More Effective
Conservation and Restoration



Independent Scientific Advisory Board
ISAB 2011-4 | September 30, 2011

- **Overview of a landscape ecological perspective**

 - Science

 - Challenges in implementation

- **Overview of recommendations**

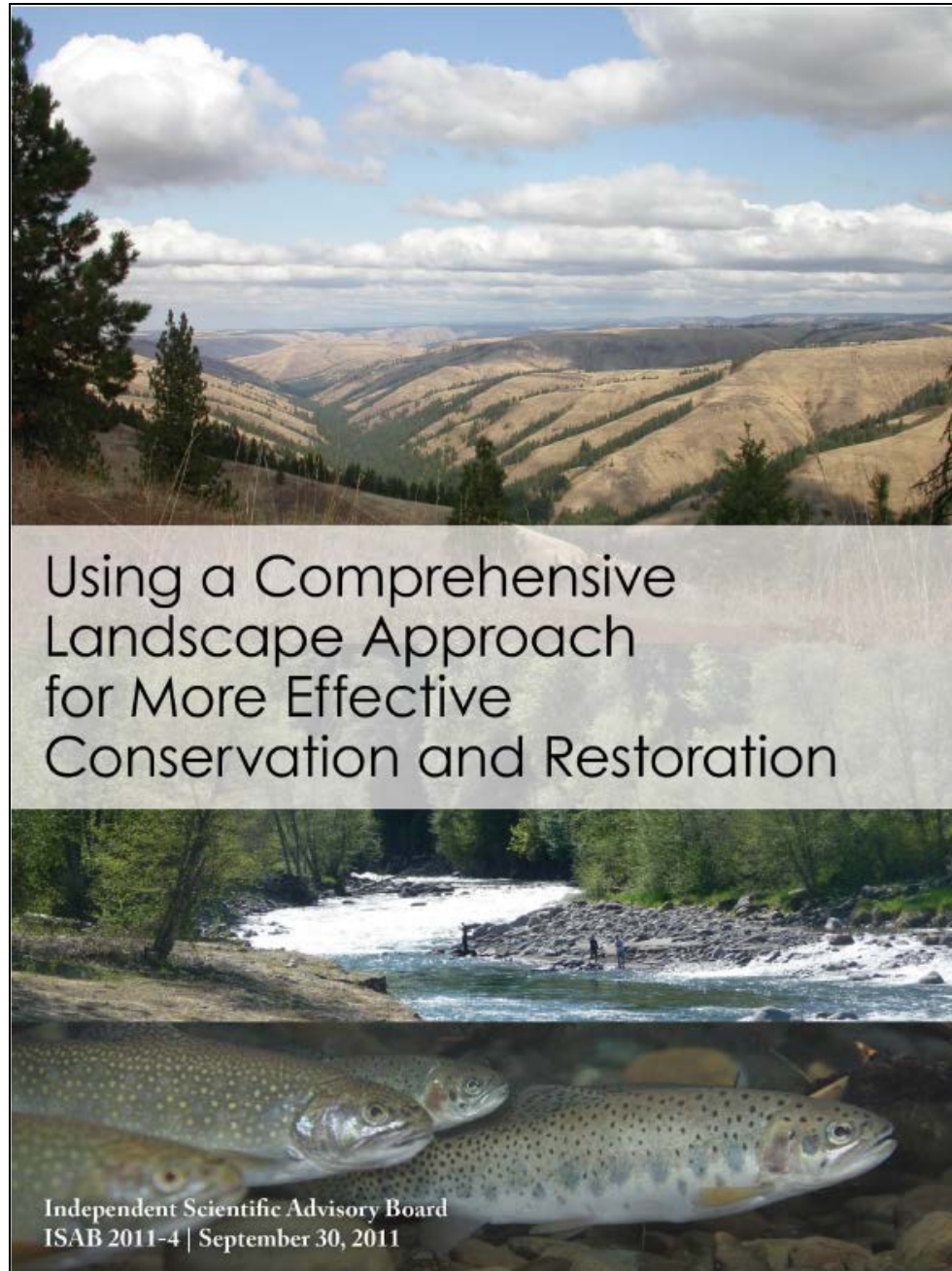
 - Criteria for reviews

 - Steps toward Implementation

- **Focus on two recommendations**

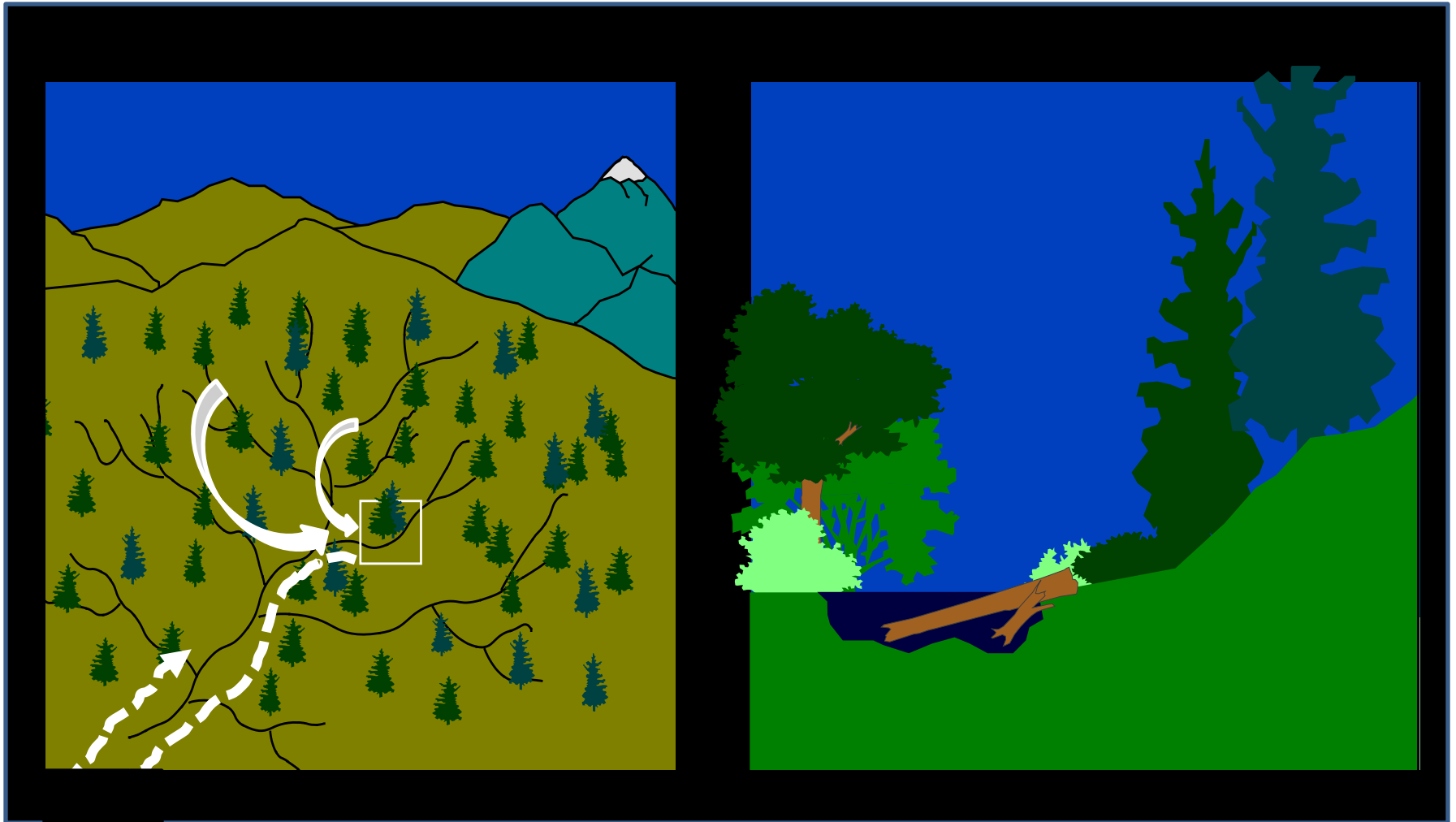
 - Improve adaptive management

 - Goal for abundance and diversity



A Landscape Ecological Perspective for Restoration

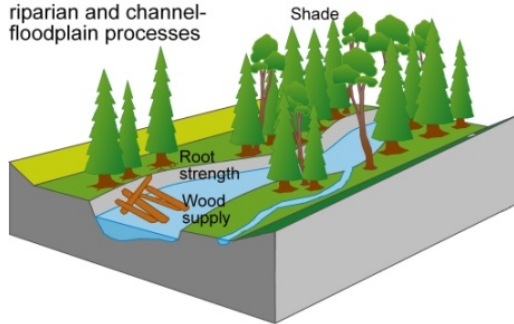
Changing Perspectives..Context and History Matter...



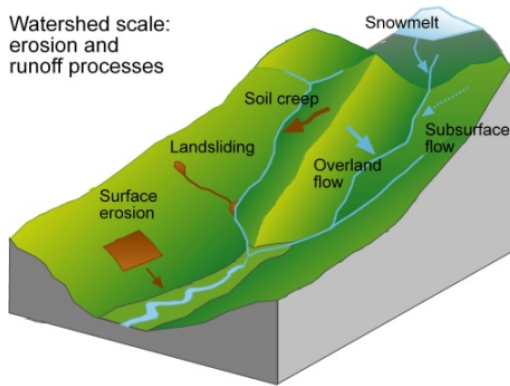
A Landscape Ecological Perspective for Restoration

Landscape processes create habitats and a “template” for diversity

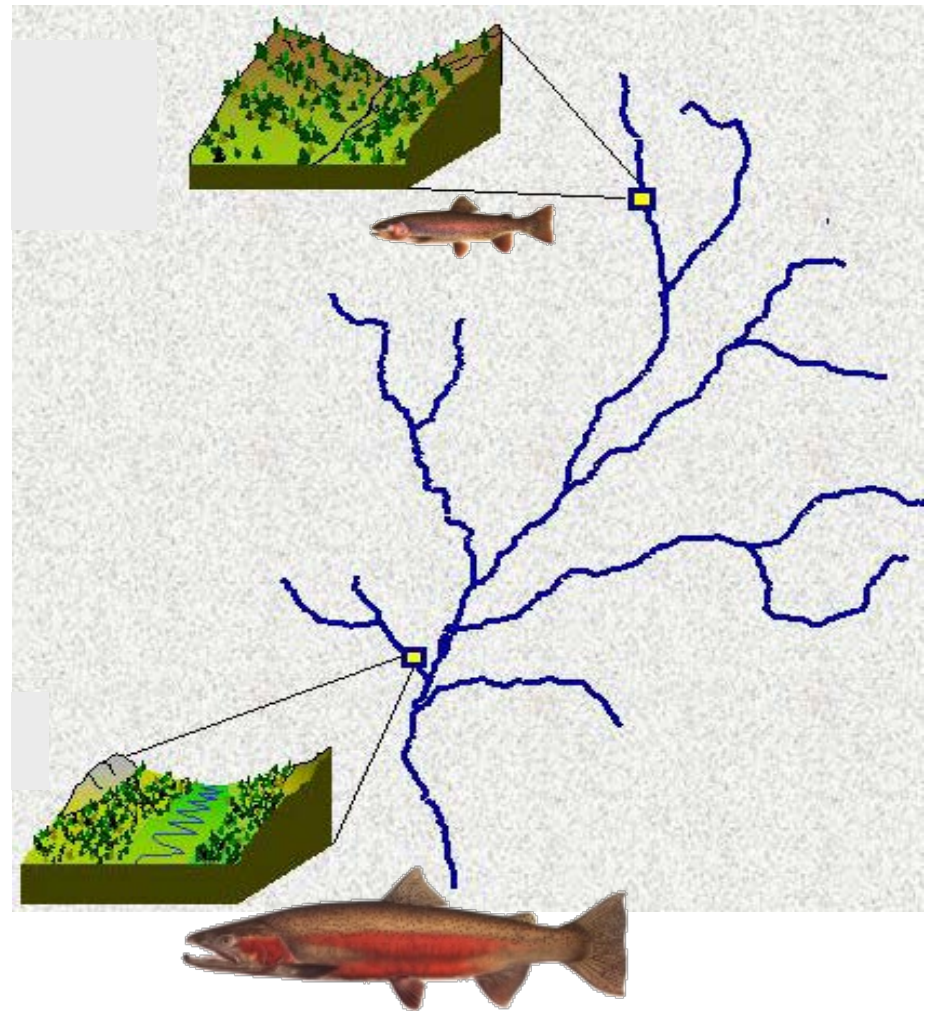
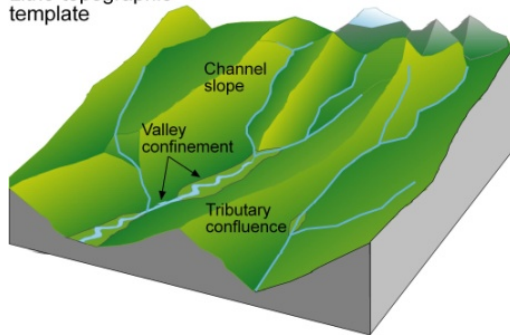
Reach scale:
riparian and channel-
floodplain processes



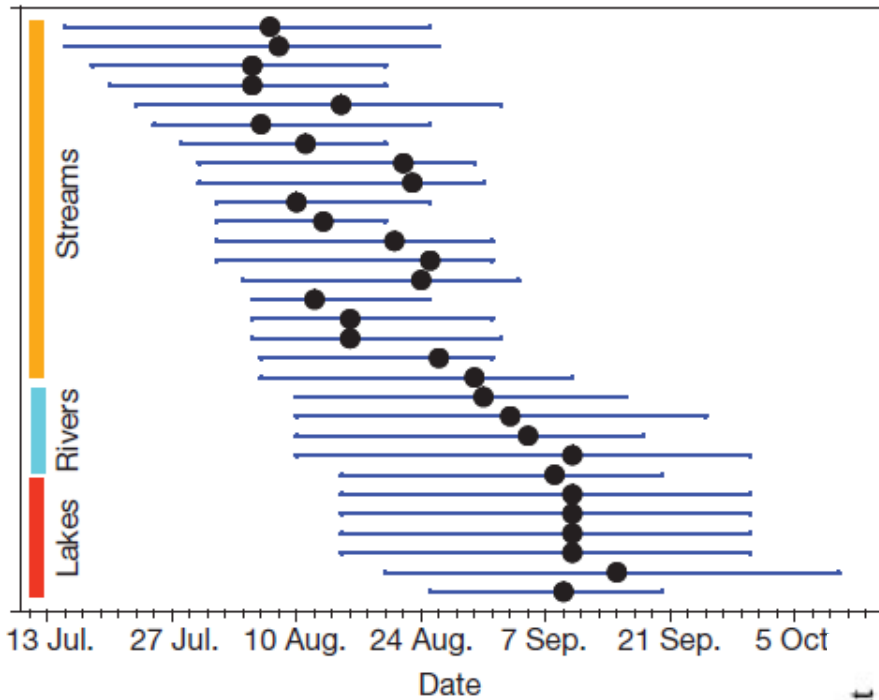
Watershed scale:
erosion and
runoff processes



Litho-topographic
template



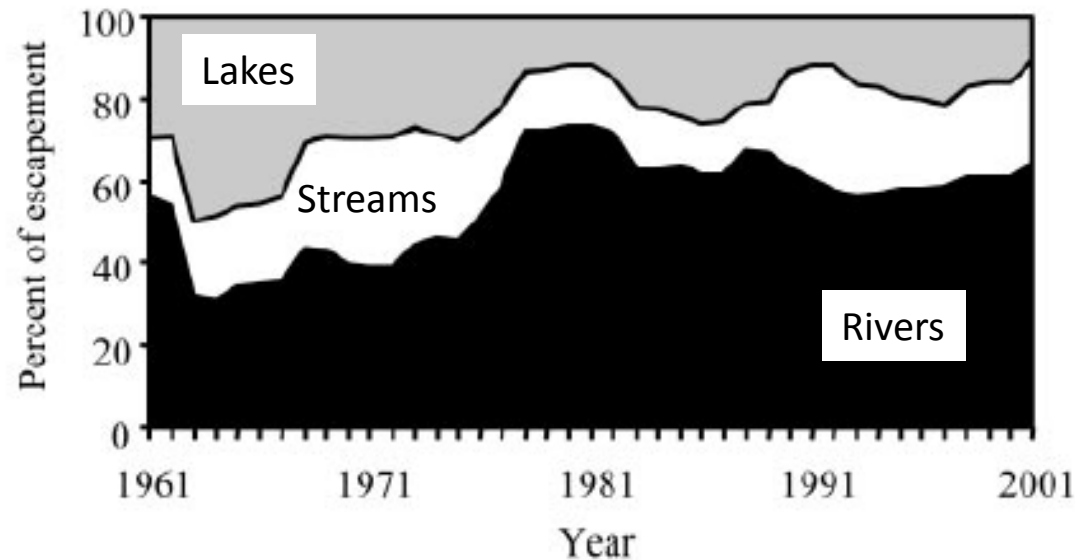
A Landscape Ecological Perspective for Restoration



Schindler et al., 2010

Hilborn, et. al. 2003

*Diversity is critical to resilience
the “portfolio effect”*



Guidance for Implementation in Restoration and Recovery

NOAA Technical Memorandum NMFS-NWFSC-42



Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units

June 2000

“Abundance
Diversity
Spatial Structure
Growth Rate”

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Northwest Power and Conservation Council

Columbia River Basin Fish and Wildlife Program



“Abundant
Diverse
Productive”
and “Resilient”

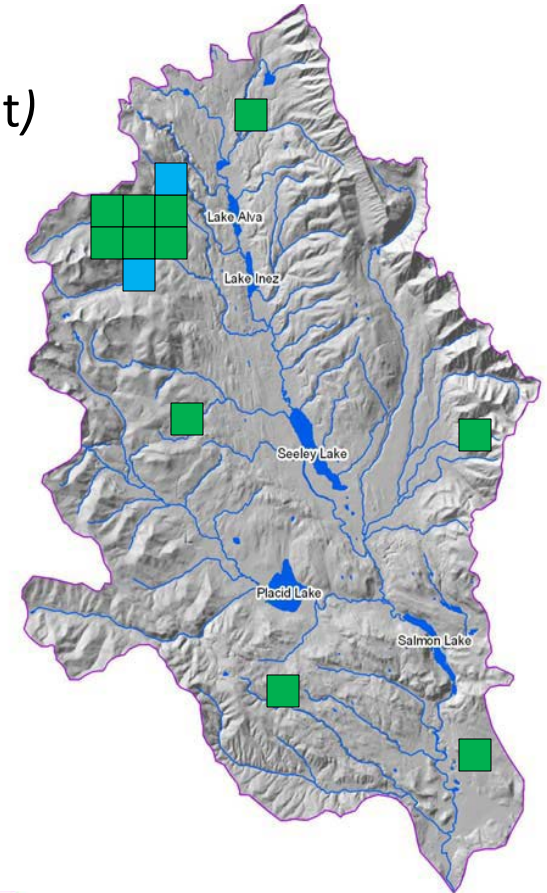
Council Document 2009-09

A Landscape Ecological Perspective for Restoration

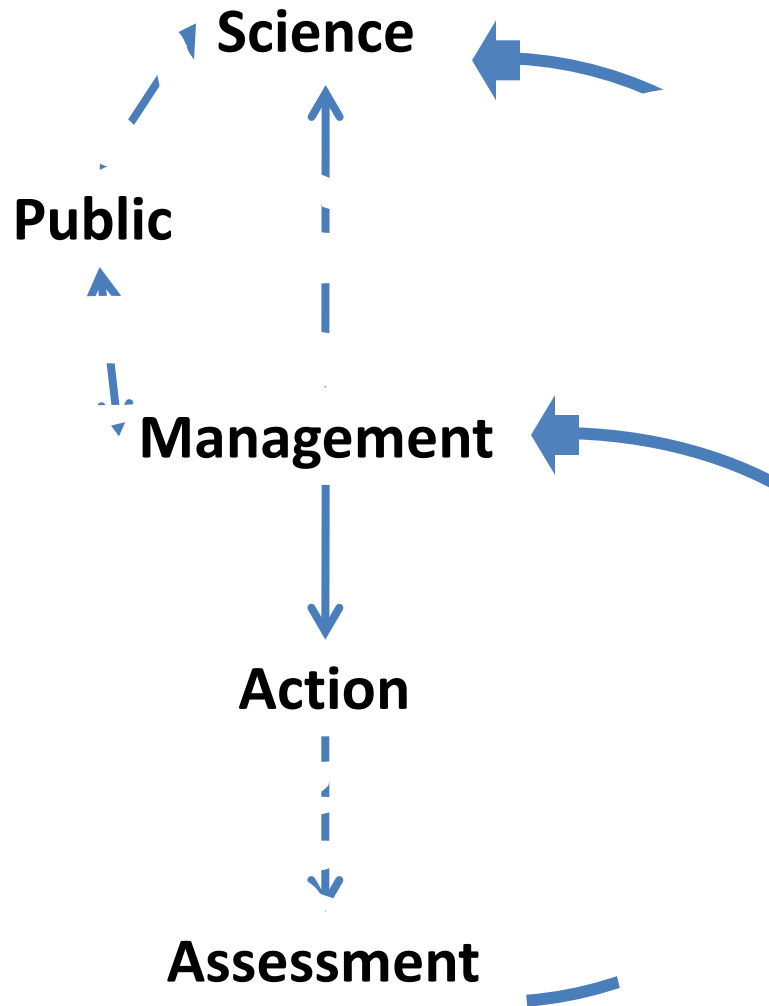
Context Matters but application lags....

- ***Tradeoffs in space*** (critical habitats, networks of habitat)
- ***Tradeoffs in time*** (process not structure)
- ***Strategic priorities*** (build from strengths, critical mass)

find synergies, collaborate, leverage support



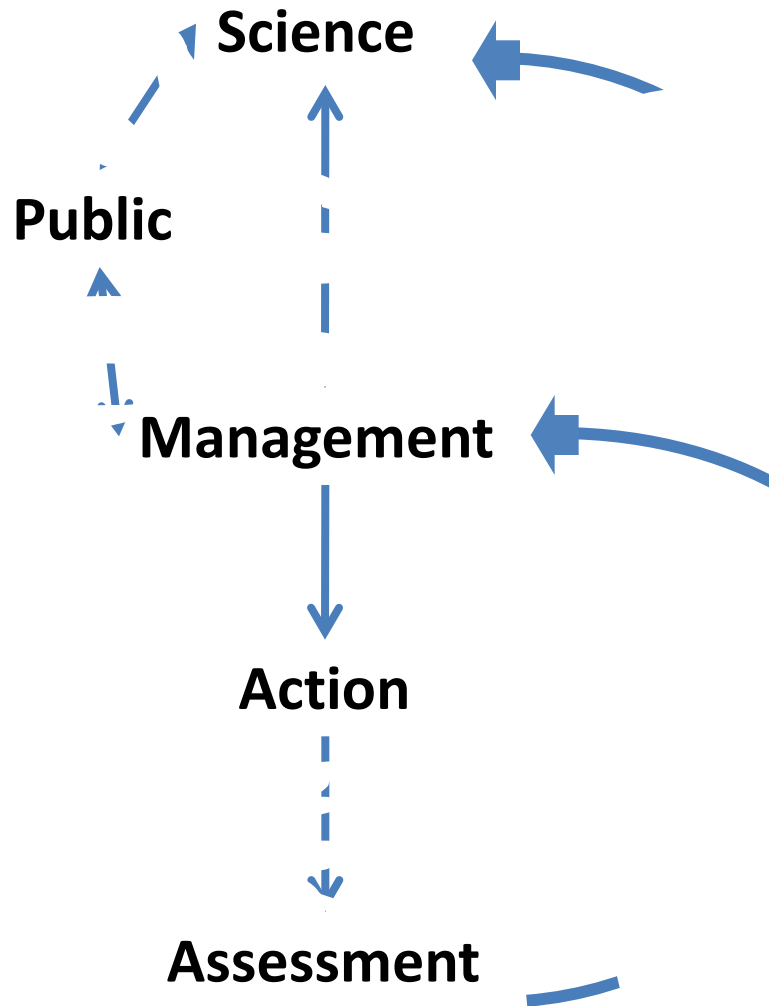
Challenges to Implementation



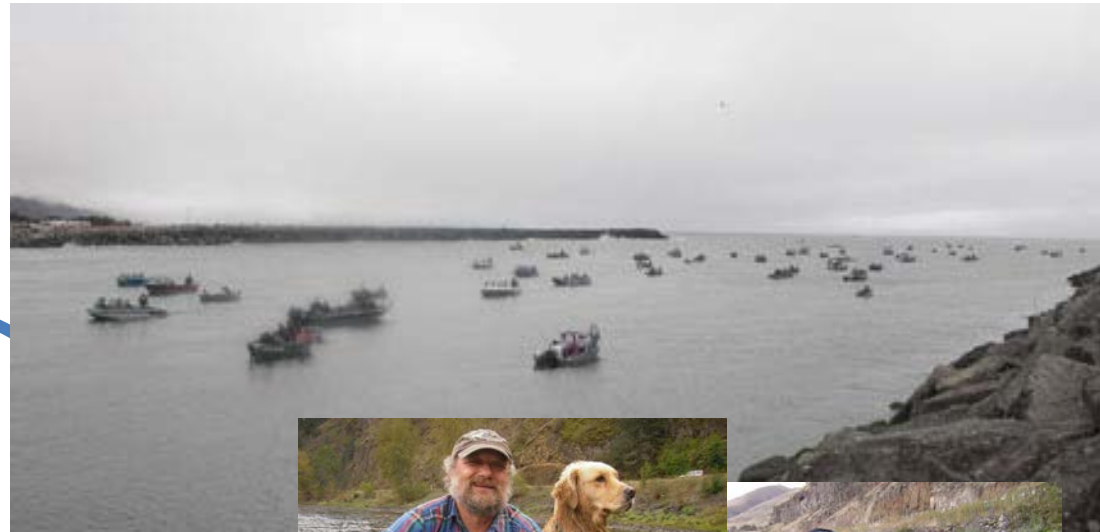
- Broad engagement and public support



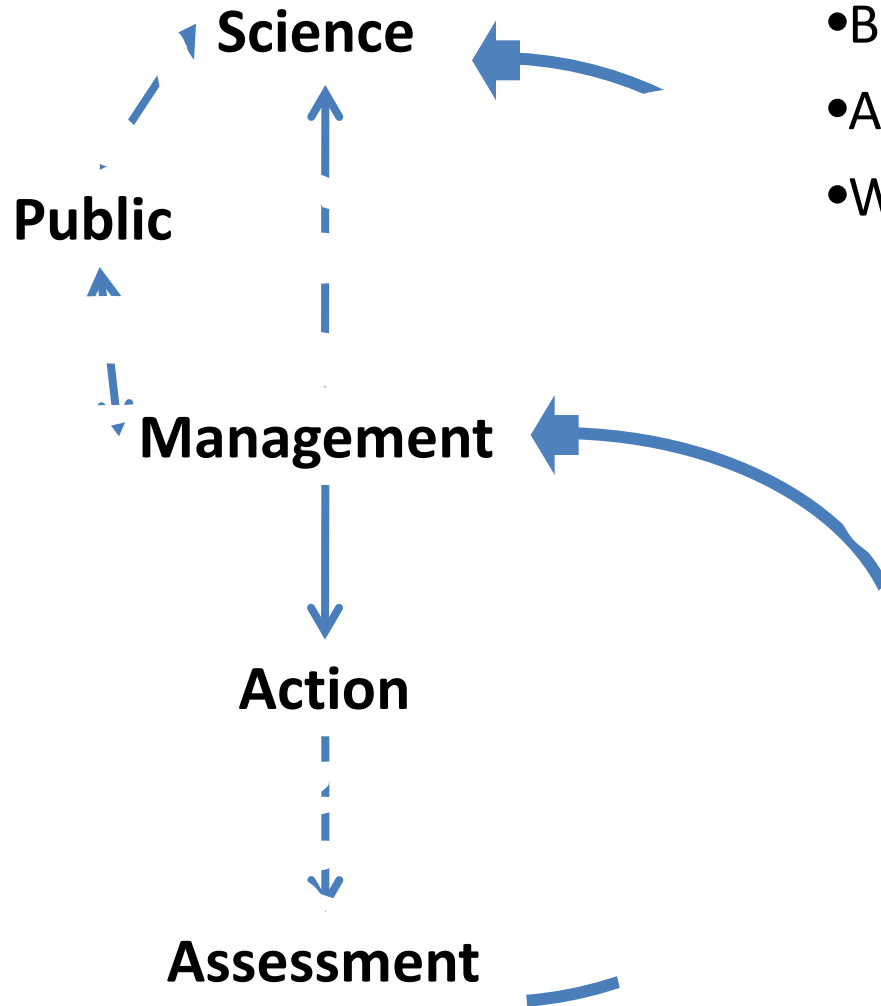
Challenges to Implementation



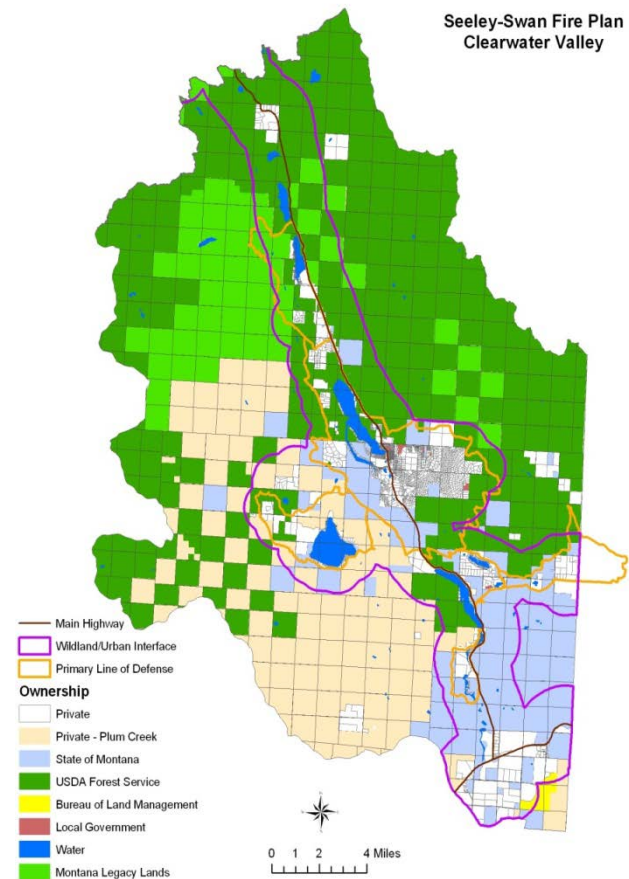
- Broad engagement and public support
- A vision of *abundance* **and** *diversity*



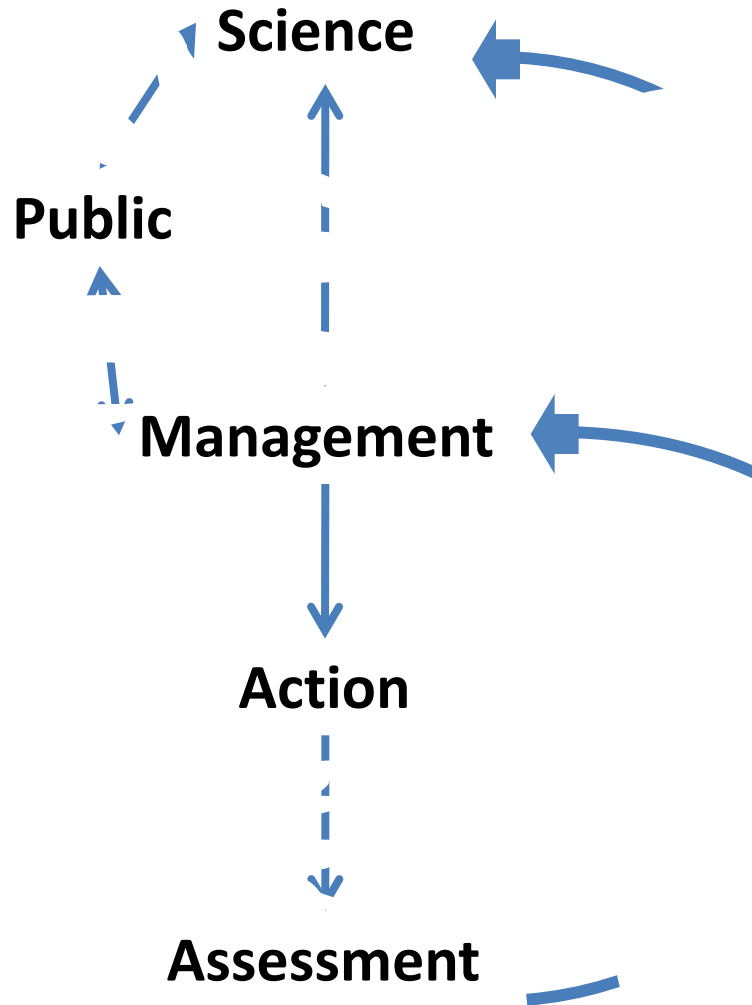
Challenges to Implementation



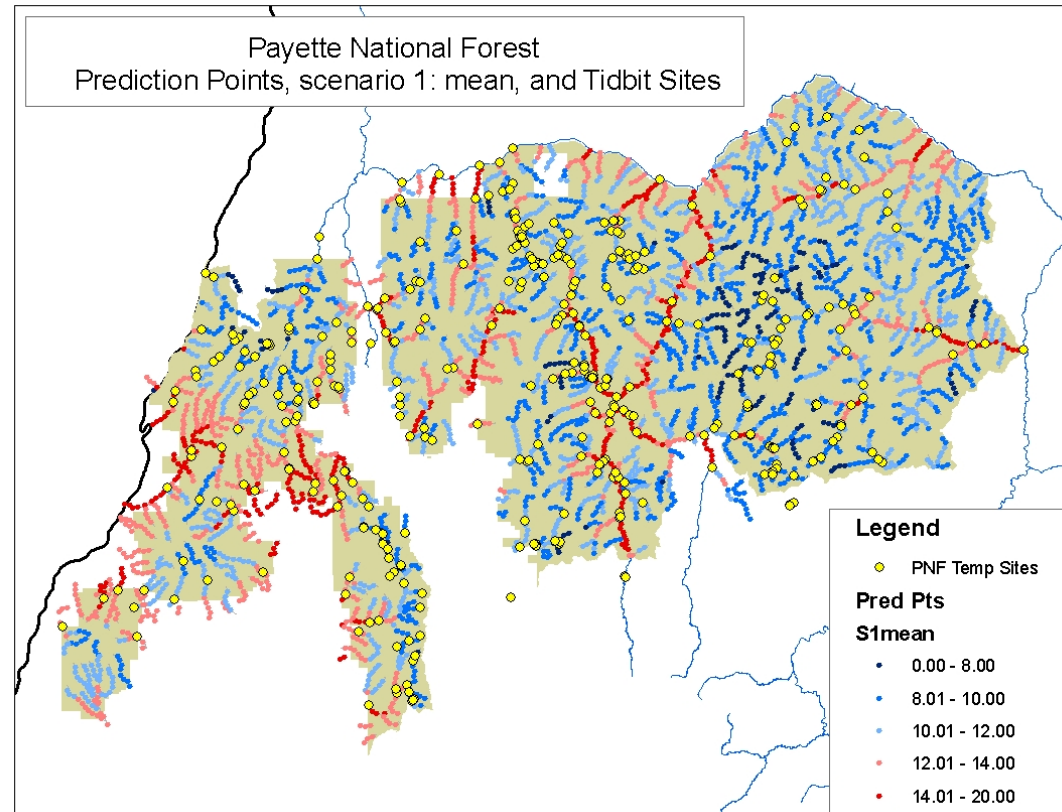
- Broad engagement and public support
- A vision of *abundance* **and** *diversity*
- Working across boundaries



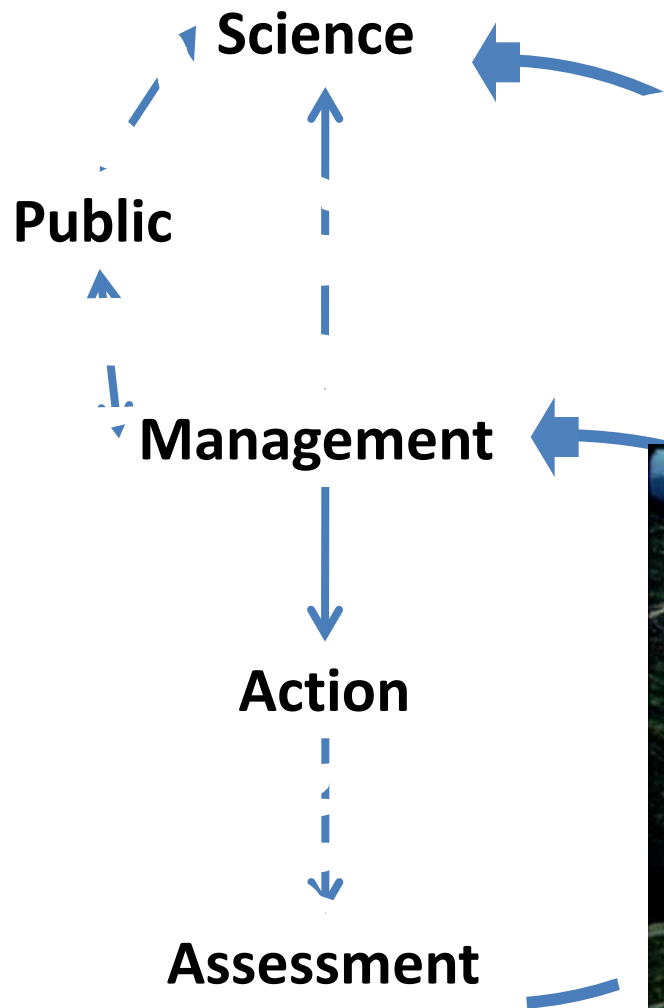
Challenges to Implementation



- Broad engagement and public support
- A vision of *abundance* **and** *diversity*
- Work across boundaries
- Link science and management



Challenges to Implementation



- Broad engagement and public support
- A vision of *abundance* ***and*** *diversity*
- Work across boundaries
- Link science and management
- Adaptive management and learning





General Recommendations

- **Broaden Socioeconomic Engagement:** Engage the public and diverse social groups associated with the landscape and build socioeconomic understanding.
- **Build from Landscape Ecology:** Incorporate a strategic approach with a foundation in the concepts of comprehensive landscape ecology.
- **Organize for Integration and Collaboration:** Develop organizations that support collaboration, integration, and effective governance and leadership.
- **Foster Adaptation, Use Adaptive Management:** Promote adaptive capacity based on active learning through assessment, monitoring, innovation, experimentation, and modeling, combined with a clear process to share new information and revise objectives, strategies, and actions in response to that information.

Use as Evaluation Criteria

1. How well does [the plan] engage the public and diverse social groups associated with the landscape and build socioeconomic understanding?
2. How well does [the plan] incorporate the concepts of comprehensive landscape ecology?
3. How well does [the plan] develop organizations that support collaboration, integration, and effective governance and leadership, at appropriate social and ecological scales?
4. How well does [the plan] promote adaptive capacity based on active learning through assessment, monitoring, innovation, experimentation, and modeling? Does it include a clear process to share new information and revise objectives, strategies, and actions in response to that information?

How well does [the plan] engage the public and diverse social groups associated with the landscape and build socioeconomic understanding? (Socioeconomic Engagement)

- Inclusion of diverse perspectives toward conservation and restoration; in-depth communication about values, incentives, and actions; discussions that seek areas of cooperation, complementarities, and development of beneficial strategies and actions
- Breadth of engagement activities -- meetings, print, radio, TV, social media, web,.... – to reach a large audience
- Early solicitation of public involvement that encourages debate and discussion of alternatives
- Action plans with outreach components, advisory groups, extension, volunteer programs, and learning activities

How well does [the plan] promote adaptive capacity based on active learning via assessment, monitoring, innovation, experimentation, and modeling; does it include a process to share new information and revise plans and actions in response to that information?

- Use of statistically robust measures of high level indicators that assess specific outcomes
- Recognition that landscapes are dynamic, with changing ecological and socioeconomic conditions; understanding that uncertainty and change are the norm and that society continually faces novel situations and surprises
- Leadership and vision to promote continual experimentation and learning to increase knowledge
- An active experiential learning component to help people gain knowledge about ecology of the landscape and inclusion of procedures for diffusion of innovation
- A process that directly integrates results into revised and improved goals, strategies, and actions
- Assessment of socioeconomic and ecological outcomes; measures such things as public trust, knowledge of scientific principles, and identifies individuals or groups affected positively or negatively by actions

Recommendations

1. Build broader public support.

- Improve involvement of county and city planners and governments.
- Increase diversity of participants.
- Increase active and experiential learning (e.g., citizen science, monitoring, adaptive management).
- Encourage use of scenarios, modeling, and assessment to develop context.
- Align ecological and socioeconomic incentives.

Adaptive Capacity and Resilience

Resilience is the capacity to absorb and adapt to “disturbance” or change while maintaining essential functions. (basis of self-sustaining)

Socioeconomic adaptive capacity is built thorough diversity, experimentation, active learning, diffusion of innovations.

Analogous ecological and evolutionary processes control adaptation, resilience, and adaptive capacity in Nature.

Adaptive management is a powerful tool for building socioeconomic and ecological/environmental adaptive capacity.

- Tension in balance of abundance, productivity, diversity
- Actions that build adaptive capacity, diversity, and resilience need more emphasis

Recommendations

2. Rebalance the vision for restoration.

- Develop goals for diversity and resilience.
- Refine and expand the HLIs. (e.g., include diversity and resilience)
- Integrate hatchery production and habitat restoration.

Recommendations

3. Establish leadership in linking science and management.

- Support communities of practice and peer learning networks.
- Explore options for a restoration extension service.

Recommendations

4. Work across boundaries.

- Explore strategies for subbasin-scale planning.
- Expand partnerships and collaborations with individuals, leaders, and groups (e.g., landowners, managers, educators, government officials, private groups).
- Examine collaborative experiments in large scale restoration (seek successful techniques).
- Implement adaptive management experiments (increase learning about ecological and socioeconomic dynamics and contingencies).

Adaptive Capacity & Adaptive Management

- **Adaptive capacity** results in ability to respond to future change.
-
- **Adaptive management** is the process of monitoring, modeling, and assessment that supports learning and insight for change.
-
- **Adaptive management** is a way to build **adaptive capacity**. Adaptive capacity can be developed by advances in understanding and application of landscape ecology, socioeconomic engagement, integrated collaboration and governance to help people and organizations work together, and adaptive management, where learning results from and is used to adaptively adjust actions.

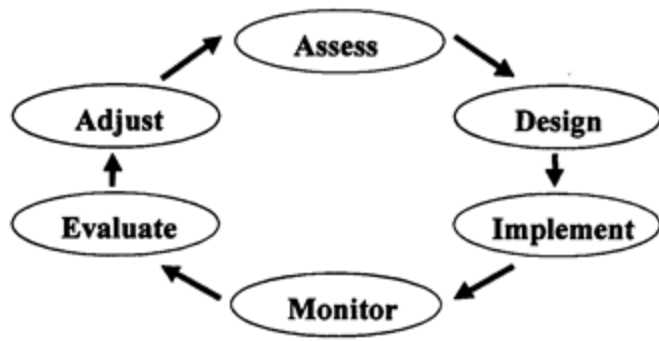


Figure V.1. The adaptive management cycle (from Waste 2006).

- "However beautiful the strategy, you should occasionally look at the results."

- Winston Churchill

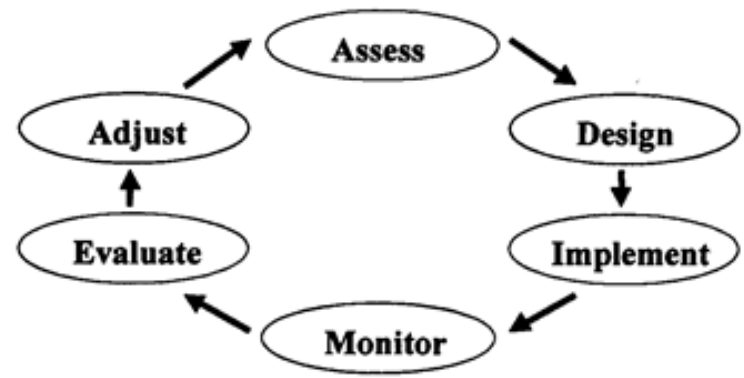


Figure V.1. The adaptive management cycle (from Waste 2006).

- "Failure is the tuition you pay for success."

- Walter Brunell

Recommendations

5. Reinvigorate and extend adaptive management.

- Implement adaptive management experiments (increase learning about ecological and socioeconomic dynamics and contingencies).
- Revisit guidance on where and what to measure (e.g., diversity, socioeconomic conditions and perceptions)
- Increase active and experiential learning (e.g., citizen science, monitoring, adaptive management).
- Include citizen science.
- Evaluate restoration in a landscape context (monitor and evaluate at the large scales at which populations and diversity are maintained).

Recommendations

6. Develop best practices.

- Develop a preliminary list of best practices.
- Develop best practices for specific actors (e.g., resource managers, county and city planners, various types of landowners and households).
- Use policy to align actions with goals.

Recommendations

7. Strengthen social science participation in ISAB and IEAB.

Integrate ecological and human sciences on advisory boards.

- Increase interaction, collaboration, and cooperation of the ISAB and IEAB.
- Increase social science representation on the ISAB.
- Broaden social science representation on the IEAB.

Linking science, management, and public partners

Common results of adaptive management

- “... in both scientific literature and land management ... are very few examples where the approach has been applied in its entirety to real-world conservation problems” (Keith et al. 2011).
- “... it remains primarily an ideal rather than a demonstrated reality” (George Stankey 2007:56).
- “... conflicts over ecological values are likely to be one of the main impediments to policy design for adaptive management and ecosystem restoration” (Carl Walters 1997).

ISRP emphasis on adaptive management

- Review of Research, Monitoring and Evaluation and Artificial Production Projects, June 2011 (with July 2011 addition)
- *Retrospective Report 2007: Adaptive Management in the Columbia River Basin, ISRP 2008-04 (April 2008);*
- *ISRP 2006 Retrospective Report, ISRP 2007-1 (March 2007);*
- *Independent Scientific Review Panel's Retrospective Report 1997-2005, ISRP 2005-14 (August 2005).*



Adapting the road to adaptive management to engage the public with science and management

- ✓ Worry less about experimenting & testing boundaries, do more testing of assumptions and interactions.
- ✓ Include the public in all phases of adaptive management.
- ✓ Create opportunities for active engagement and education.



A scientific foundation in socioeconomics is available to complement efforts

- Values theory
- Adoption-diffusion theory
- Portfolio theory
- Active education theory
- Social network theory
- Cost-effectiveness theory
- Communication theory
- Public choice theory
- Collaborative research
- Etc.



Consider greater public engagement in the adaptive management process

Disseminate lessons learned

Include active education



Get volunteers

Save \$ & engage in citizen science

- Goals
- Knowledge
- Technology

EVALUATE

MONITOR

Adaptive Management

PLAN

ACT

Public review

Invite early public participation

Involve landowners & managers

Identify guidelines & best practices

Watershed councils build community by bringing together people from various backgrounds to solve local problems, engaging diverse stakeholders in the decision making process.

Backgrounds

Agriculture 500+

Business Industry 520+

County Government 300+

Environmental NGO 370+

Federal Government 420+

Industrial Timber 130+

Local Government 190+

Small Woodlot Owners 190+

Sporting and Recreation 450+

State Government 375+

Tribes 80+

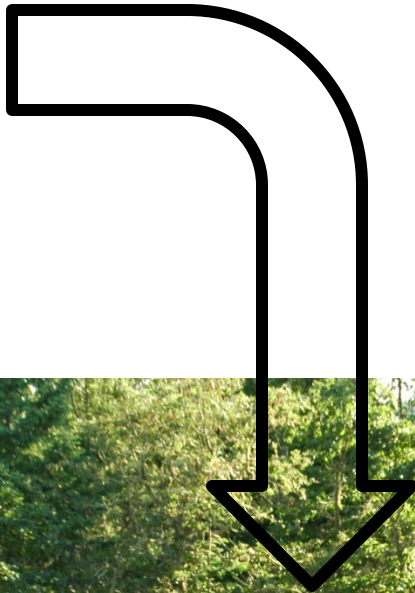
Universities and Schools 7000+

Other 1050+



(Network of Oregon Watershed Councils 2011)

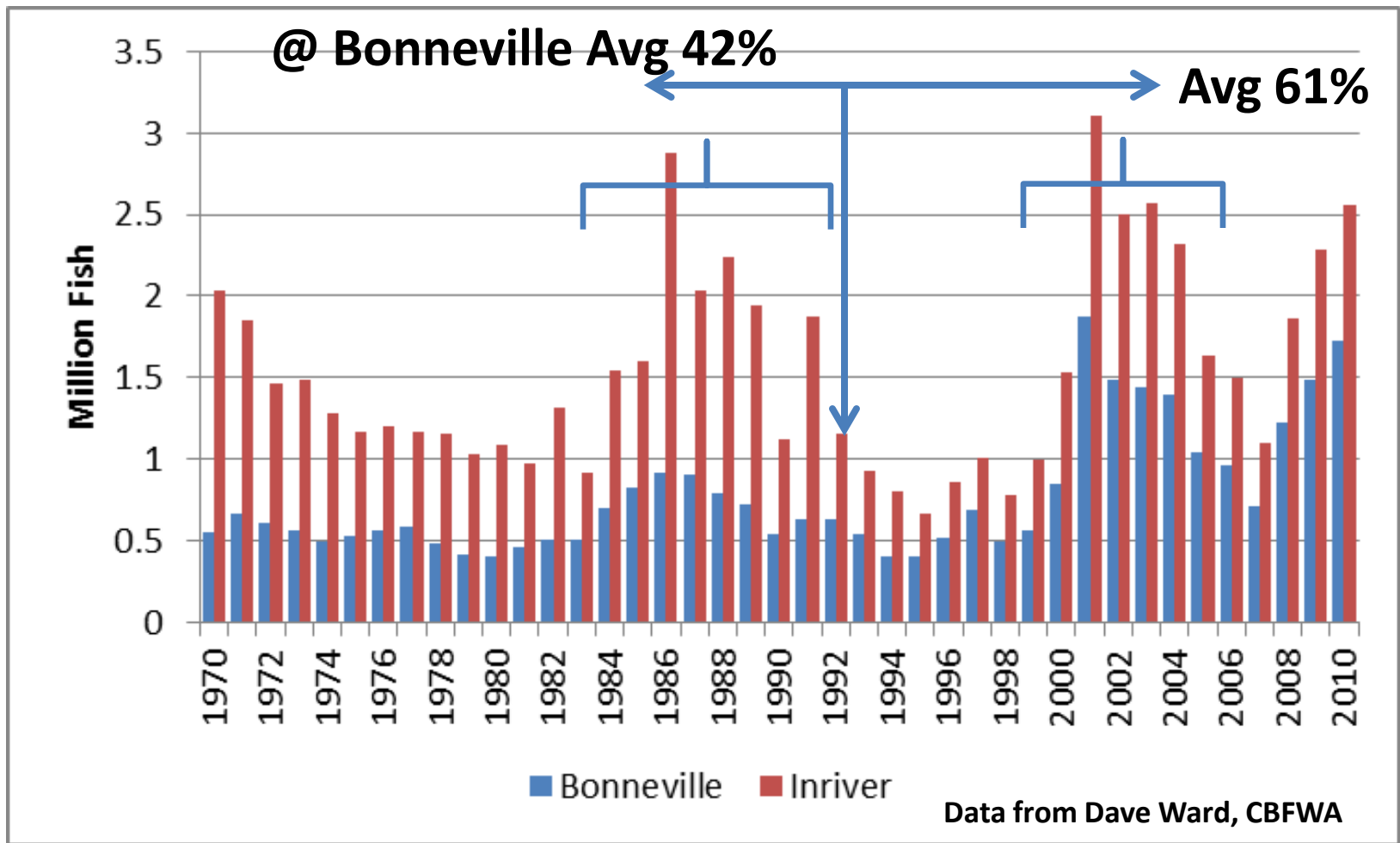
Remember social networks amplify



The Fish and Wildlife Program Goal: A vision for abundance and diversity

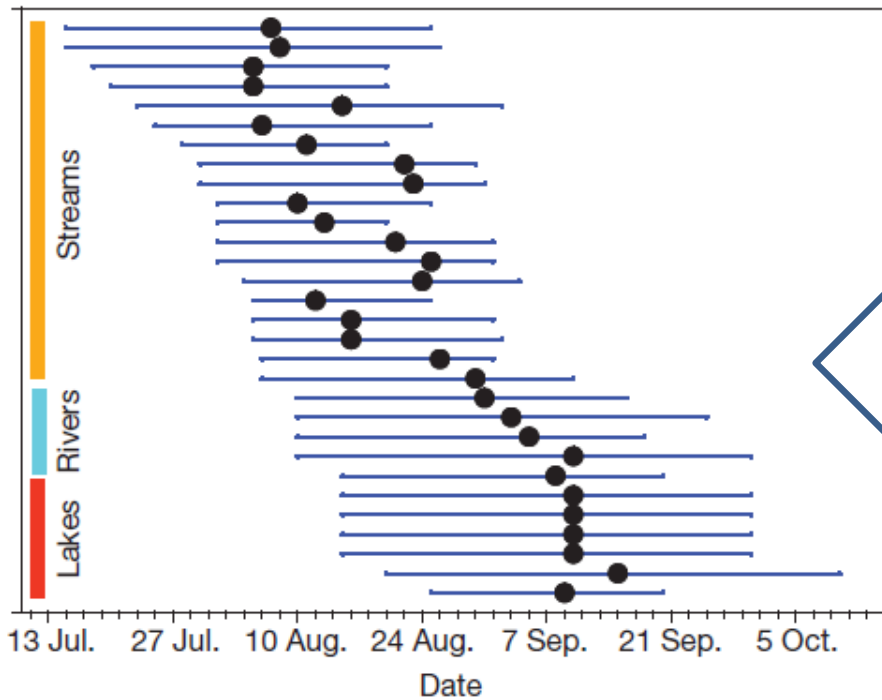


“... increasing total adult salmon and steelhead runs to an average of 5 million annually by 2025 in a manner that emphasizes the populations that originate above Bonneville Dam and supports tribal and non-tribal harvest, ...” (p. 11, Fish and Wildlife Program).



From 1970-2010, the Bonneville slope is 2.0%, the inriver slope is 1.4%. In 25 yrs, a 2% rate of increase adds about 1 million fish.

“Restore the widest possible set of healthy, naturally reproducing and sustaining populations of salmon and Steelhead ...” (p. 11, Fish and Wildlife Program).



Give diversity equal weight with abundance.

Seven Recommendations

1. Build broader public support.
2. Rebalance the vision for restoration.
3. Establish leadership in linking science and management.
4. Work across boundaries.
5. Reinvigorate and extend adaptive management.
6. Develop best practices.
7. Strengthen social science participation in ISAB and IEAB.

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“...the Columbia and its tributaries run through climatic conditions and topography as varied as any river in the world – from alpine to desert to rainforest”

– Northwest Power and Conservation Council, Columbia River Basin Fish and Wildlife Program



“Landscape shapes culture”

- Terry Tempest Williams

Questions? Comments?