



Pacific Northwest Research Station
USDA Forest Service



The Role of the Expert in Transferring Complex Science to Forest Managers

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PNW Station



- **Forest Service Research & Development is one branch of the US Forest Service**
- **R&D organized into six geographic Research Stations, a National Forest Products Lab, and the International Institute for Tropical Forestry**
- **Pacific Northwest Research Station works out of 10 research labs across the states of Alaska, Washington, and Oregon**



PNW Station Mission



...to generate and communicate scientific knowledge that helps people understand and make informed choices about people, natural resources, and the environment.

Major Issues in the Pacific Northwest USA

- Old –growth
- Climate change
- T & E species (Spotted owl, salmon)
- Post fire management (salvage)
- Riparian protection & watershed condition
- Invasive species



Science Understanding

- Much of the science developed to support natural resource planning is complex & difficult to understand
→ Decision making is where integration occurs
- Complex biological systems rarely follow simple pathways & can follow multiple paths to an outcome
- Understanding the science & uncertainty associated with science & projections can be difficult

Science Understanding

- **Organizations possessing expertise to understand new ideas & innovations are more readily able to adopt new science**

Role of the Expert

- **The importance of the expert in transferring complex new technologies & new knowledge has been well documented by numerous studies**
 - **(Baldrige 1989; West, Bahn, and Sinclair 1991; West and Sinclair 1992; Rogers 1998)**
- **Adoption & use best available science in land management planning & decision making is greatly increased by use of experts to help land managers to understand scientific findings & their applications**

Planning

- **Federal land managers must prepare land management plans according to the requirements of the National Forest Management Act**
- **The FS requires managers to consider and demonstrate the use of the “best available science” in decision making**
 - **Science is only one aspect of what the decision maker must consider**

Key Challenges to Transferring Science

- 1) Identification of *experts within the science organization* who can understand the managers questions & needs
- 2) Identification of *experts within the management organization* who can receive science & help transfer knowledge to others who are not experts or specialists
- 3) How to maintain a *credible science organization* & put science knowledge and technology into use



New Position– Science Coordinator

- **Key to successful transfer of science is the Science Coordinator**
- **This position understands management decision making processes AND science information**
- **Position is shared between the science organization & the management organization**

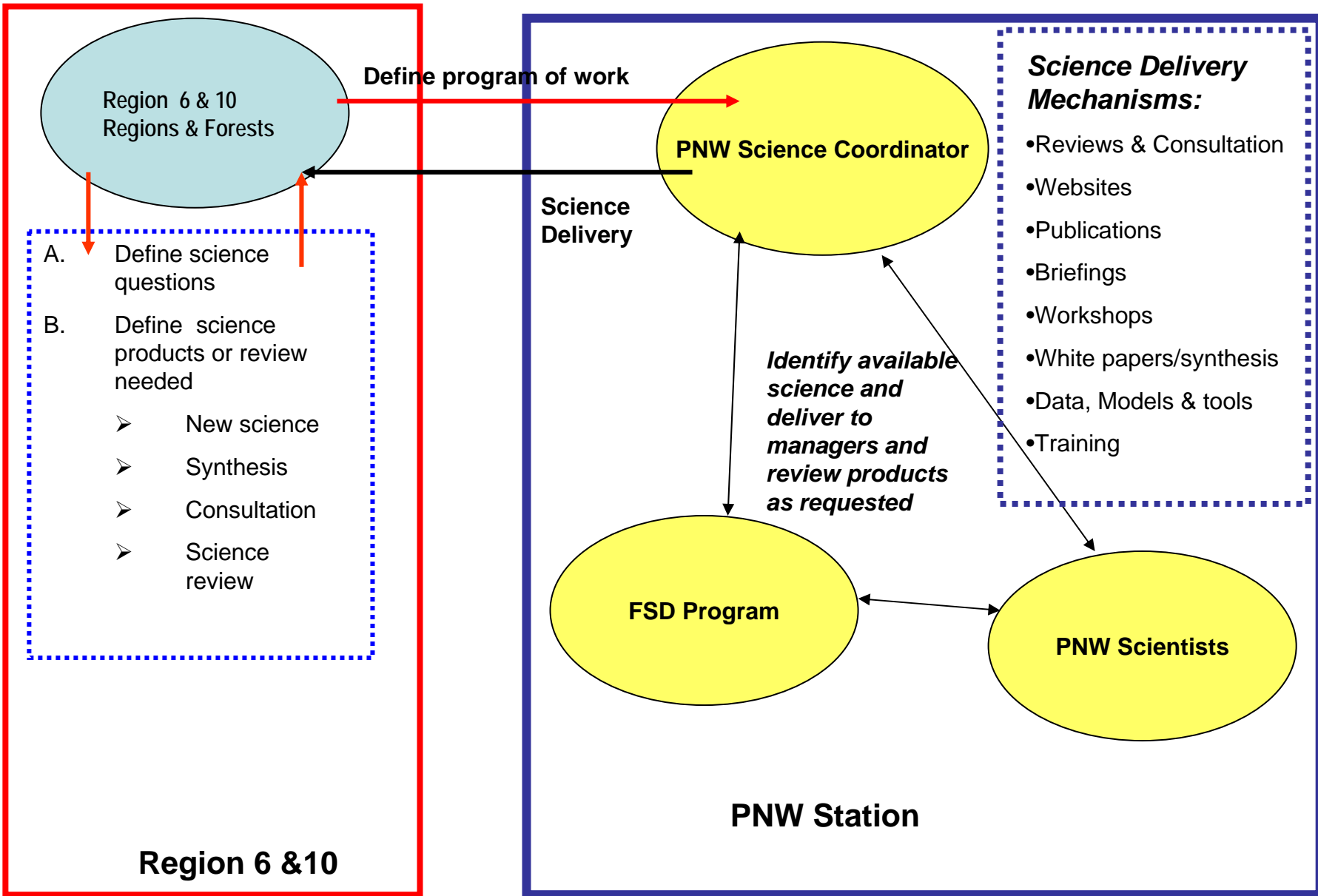


PNW Science Transfer Program

- **Developed a process to coordinate & prioritize requests for PNW support for planning activities:**
 - **Developing new science products**
 - **Synthesizing existing science**
 - **Consulting on available science OR**
 - **Reviewing how science is being used in the plan revision process**

Science Questions

- **Set sideboards to facilitate requests for information, products, & science reviews**
 - Focus discussion
 - Define products requested
 - Define scope of request
 - Help ensure that products delivered by science meet managers expectations



SCIENCE TRANSFER MODEL



Science Reviews

- **Managers need to ensure their decisions are consistent with the best available science**
- **Science Review is one of the primary means to demonstrate consistency with science**
- **Formal science reviews on entire plans are not feasible and cost effective**
 - **Examples: Tongass NF& Columbia Basin**
- **PNW & R6 developed a streamlined science review process in 2004**
 - **Adopted by FSH (1909.12 Ch 41) in 2005**

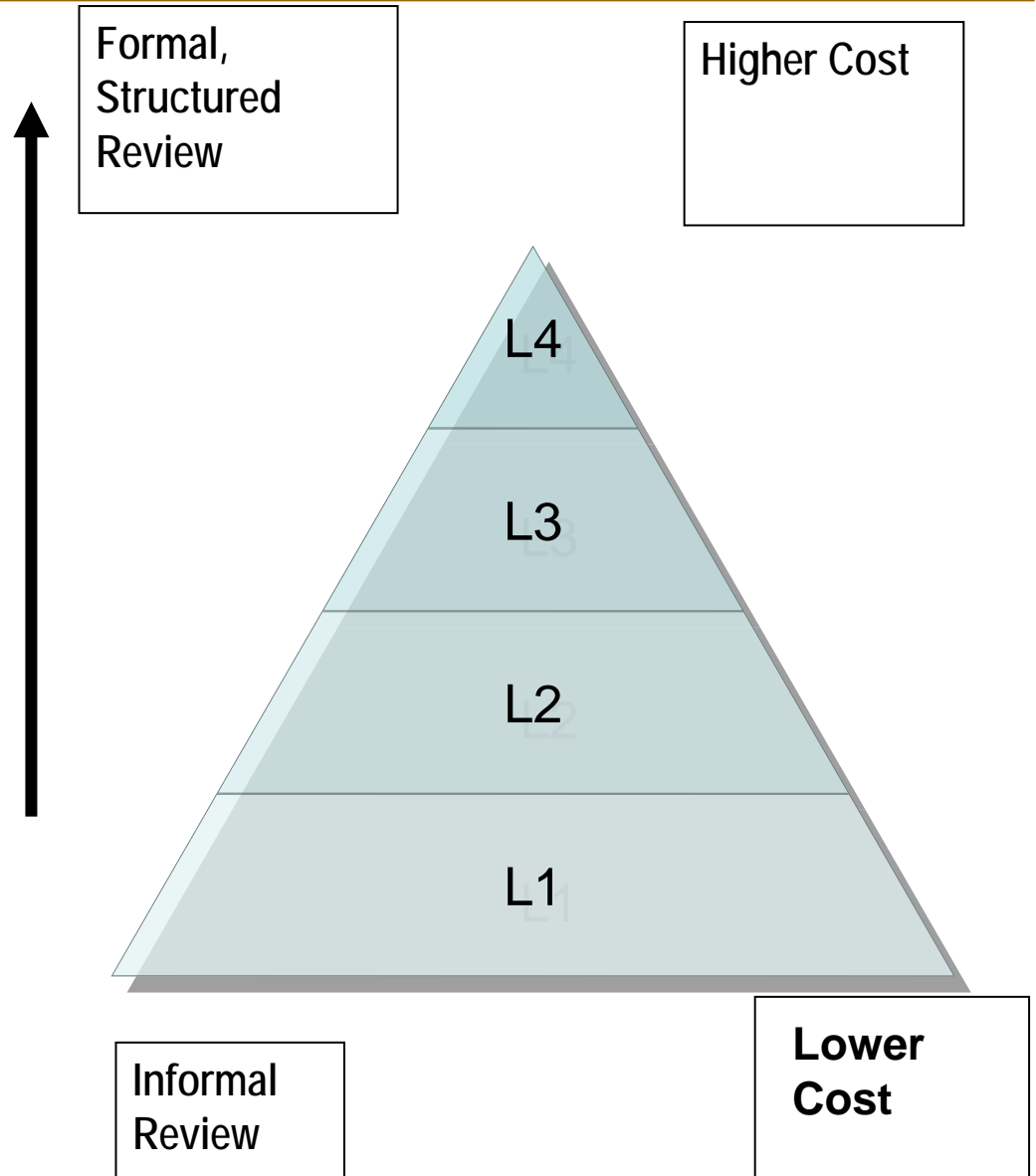
Science Reviews

- **Evaluate documents supporting land management decisions to determine:**
 - **whether current & appropriate scientific information has been adequately considered, interpreted & summarized,**
 - **that consequences, uncertainties and risks are disclosed**

Levels of Science Review

Most reviews will occur at Levels 1- 3.

Level 4 reviews will be limited.



Levels of Science Review (SR)

Levels of Science Review	Definition	Professional Technical Specialist	Internal FS R&D Scientist	External Scientist	Examples
Level I	Informal discussion	X	X	?	Phone call or quick discussion for advice prior to task Example: Consult on use of model or data
Level II	Informal review	X	X	?	Quick review or meeting to review product Example: Review Regional LSR direction
Level III	Formal review	?	X	X	Formal request to provide detailed review of product Example: Climate change
Level IV	Formal, structured review		X	X Most credible	Iterative, formal process to provide detailed review of plan components Example: Aquatic Riparian Conservation Strategy



Science Review Process

- 1) Forest submits request for review
- 2) SC works with Forest to refine question to focus the review
- 3) SC organizes reviewers, sends review package out, & compiles information
- 4) PNW performs policy review & issues reviews to Forest
- 5) Forest reviews comments & documents how the comments were considered (reconciliation letter)
- 6) Documentation posted in the administrative record

Climate Change Example



Climate Change Review

Focus Questions:

- 1) To what extent does the proposed approach incorporate accepted scientific consensus on ways to model climate change scenarios for a subregional (forest cluster) planning effort?
- 2) What assumptions should be considered regarding effects of climate change on Plan revision decisions?
- 3) What differing viewpoints exist regarding these assumptions?

Climate Change Review

Considerations (Options)

- Use Forest-level Potential Nat Veg model - Get peer review & acknowledge limitations
- Use science based regional process-based and empirical models (MC1 and MAPSS) – acknowledge limitations
- No climate change modeling at Forest level
 - Use regional climate change info
 - Develop assumptions for plan revisions to allow flexibility
 - Work with science community to develop more local models

Climate Change Review

- **Review Conclusions**

- No consensus on how to model climate change at Forest level
- Existing models have limitations & research is needed
- Reviewers had concern with using PNV model s suggested by Forest
- High degree of uncertainty associated with application of CC models at forest level
 - Suggest managing landscape to create resiliency and flexibility

Summary Conclusions

- The science community is challenged to communicate complex science findings to managers so they can incorporate the “best available science” into land use decisions
- We have found that the expertise in the user community is critical to understanding and using new knowledge
 - ➔ Need experts in science organization to hand off the science (**science coordinator**)
 - ➔ Need experts in management community to receive science (**technical experts**)

Conclusions

- **The PNW Station R6 science transfer model has been very successful & continues to expand**
 - **Now in R10 (Alaska)**
 - **Working with other research stations to help them with the process**
- **Key to success is the Science Coordinator (or translator) who works closely with regional land managers & Forests**



Thank you

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