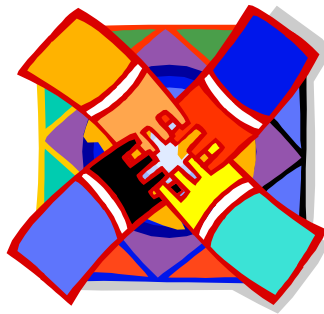


ACTION LEARNING SCENARIO #4

The Role of USGS Science in Structured
Decision-Making Processes (at DOI and Elsewhere)



Champions:

Sue Haseltine, Ken Williams, and Dan Ashe

Team Leader:

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Coach:

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Leadership 201

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Champions: Sue Haseltine (Associate Director for Biology), Ken Williams (Chief, USGS Cooperative Research Units), and Dan Ashe (U.S. Fish & Wildlife)

There is a recognized need in the DOI agencies for a more structured approach to decision making in natural resource conservation and management. A structured approach helps decision makers to focus attention on what is to be done, why it should be done, and how it will be done, through the identification of decision alternatives and assessment of their projected consequences with respect to objectives. There are wide-ranging opportunities for USGS involvement with the DOI management agencies in this potentially valuable way of addressing decision making. However, our involvement to date has been quite limited, suggesting that new mechanisms are needed to facilitate a larger supportive role for USGS scientists in structured decision making (SDM).

In general, SDM can be thought of as the decomposition of a decision process into its component parts, which then can be carefully analyzed and reconstituted into a more informed and acceptable process. Activities in a structured approach to decision making include the following:

- identifying the problem to be addressed
- specifying objectives that capture the values of stakeholders, for use in assessing the consequences of potential decisions
- identifying the range of decision alternatives from which a decision is to be selected
- projecting the consequences of alternative decisions in terms of outputs and biological impacts
- accounting for tradeoffs among multiple objectives
- identifying key uncertainties in the consequences of decisions
- measuring risk tolerance
- coordinating current and future decisions to account for future impacts of present decisions
- engaging the relevant stakeholders in the decision-making process

In natural resource management, decision-making is framed in the context of natural resource systems, with decisions producing outputs and influencing future resource conditions. Decisions in turn are guided by objectives (and tradeoffs among objectives), which aid in comparing alternatives and informing the selection of a decision. The projected consequences of alternatives often include immediate outputs (e.g., harvest yields, reintroduction costs, etc) as well as future resource conditions (e.g., population size, species richness, extinction probabilities, etc). Because environmental factors and other stochastic influences can alter the responses of natural resources to decisions, a

careful analysis accounts not only for outputs and resource impacts, but also uncertainties about those outputs and impacts. Finally, natural resource management almost always involves multiple stakeholders, each with his or her own perspectives and values, who together expect to participate in decision making. This combination of features strongly suggests that structured decision making may be applicable for most natural resource systems.

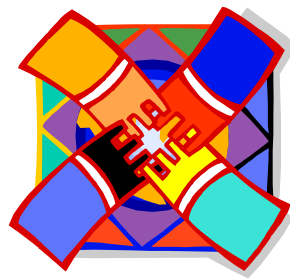
Scientific input can be important in many of the activities included in SDM, and USGS can play an important role in providing science support for DOI management agencies as they adopt a more structured approach to their decision making. However, most management agencies currently lack an institutional capability to engage in structured decision making, and USGS itself has only limited experience in SDM. Most scientists within USGS have specialized scientific expertise, but are not trained in the methods and techniques such as modeling, risk analysis, and utility assessment that are required for SDM.

An important question is how USGS can provide the technical support needed by DOI agencies in these circumstances. In particular:

- How can we expand the needed expertise within USGS to meet a large and growing demand for structured decision making?
- How can we facilitate the connection of scientists in USGS who have the relevant expertise with people in the other DOI agencies who have a need for that expertise?
- How can technical assistance to agency partners be promoted by the USGS senior leadership?
- How can institutional arrangements be effected (through training, encouragement by leadership, allocation of fiscal resources, etc) that will allow a culture of structured decision making to develop in both USGS and the DOI management agencies?
- Working with our partner agencies, what steps can USGS take to better utilize USGS science to support decision making in the management agencies?

Background Reading Materials:

- Gregory, RS and RL Keeney, 2002. Making smarter environmental management decisions, *J Amer. Water Res. Assoc.* 38(6): 1601-1611.
- Ken Williams powerpoint presentation. 2006 Structured Decision-making Workshop, USGS-FWS, NCTC
- Lynn Maguire paper What Can Decision Analysis Do for Invasive Species Management?, 2006 Structured Decision-making Workshop, USGS-FWS, NCTC



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