Structured Decision Making

USGS Patuxent is a recognized world-leader in the application of structured decision making to problems in natural resource management. Scientists at Patuxent are adept at a number of the key skills required in SDM, including objectives elicitation, model development, decision analysis, optimization, monitoring design, and facilitation. In addition, Patuxent scientists train other Federal, State, and academic colleagues in the methods and delivery of SDM.

- *What is structured decision making (SDM)?* Structured decision making is an approach for careful and organized analysis of natural resource management decisions. Based in decision theory and risk analysis, SDM encompasses a simple set of concepts and helpful steps, rather than a rigidly-prescribed approach for problem solving. Key SDM concepts include making decisions based on clearly articulated fundamental objectives, recognizing the role of scientific predictions in decisions, dealing explicitly with uncertainty, and responding transparently to societal values in decision making; thus, SDM integrates science and policy explicitly. Every decision consists of several primary elements – management objectives, decision options, and predictions of decision outcomes. By analyzing each component separately and thoughtfully within a comprehensive decision framework, it is possible to improve the quality of decision-making. The core SDM concepts and steps to better decision making are useful across all types of decisions: from individuals making minor or personal decisions to complex public sector decisions involving multiple decision makers, scientists and other stakeholders. In turn, an array of simple to highly quantitative analytical methods is available for structured decision analysis.

- *How does SDM relate to Adaptive Resource Management (ARM).* For those decisions that are iterated over time, actions taken early on may result in learning that improves management later, provided that an appropriate monitoring program is in place to provide the feedback. Adaptive management, then, is a special case of structured decision making for decisions that are iterated or linked over time.

- *Recent applications by Patuxent scientists include:*
  - Maximizing bull trout conservation through workload allocation
  - Multi-species management of the horseshoe crab and shorebird populations in Delaware Bay
  - White-nose syndrome management
  - Wolf recovery in North America
  - Habitat management for multiple wetland bird objectives on National Wildlife Refuges
  - Conservation and management decisions for mountain plovers throughout the annual cycle
  - Northeast Regional Science Committee research funding
  - Assessing multiple-scale monitoring needs for waterbird management
  - Endangered species of the Edwards Aquifer, Texas
  - Steller's eider reintroduction

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