Decision support for forest management

Course syllabus for 20 March to 5 April 2019

Course taught by Dr. Keith M Reynolds, USDA Forest Service, Pacific Northwest Research Station

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| Lecture | Description |
| 1a | Sets the context for contemporary decision support in forest management by reviewing social, economic, environmental, and science trends in North America and Europe, starting in the late 1800s. Concepts and principles of ecosystem management, adaptive management, and sustainable forest management are presented, put in historical context. |
| 1b | The first part of the lecture traces the origins of decision support, presents a fundamental model for decision making, and defines what is meant by a decision support system. The balance of the lecture introduces a broad array of modeling approaches (both historical and contemporary) used in decision support systems. For each approach, basic concepts and principles are described, methods are briefly illustrated, and advantages and disadvantages are summarized. |
| 2 | An in-depth look at the Ecosystem Management Decision Support (EMDS) system. EMDS is presented as a general framework for building decision support applications. Major topics discussed are 1) use of knowledge-based modeling for environmental assessment, 2) use of multi-criteria decision models for planning, 3) the complementarity of the two methods, and 4) spatial decision support for multi-scale management problems that can be large, abstract, and complex. |
| 3 | Introduction to multi-criteria decision analysis (MCDA). Concepts and principles of structured decision making are presented first. Students learn the mechanics of how to build decision models based on the analytic hierarchy process and multi-attribute rating technique, using the Criterium DecisionPlus software in a computer lab. |
| 4 | Introduction to logic (knowledge-based) modeling with NetWeaver. Concepts and principles behind logic modeling were addressed in lectures 2 and 3. In this lecture, the emphasis is on the mechanics of building logic models, which may be done in a computer lab.  |
| 5 | Major applications of the EMDS system are presented, including decision support applications for 1. Watershed analysis
2. National criteria and indicators for forest sustainability
3. National forest fuels analysis (broad scale, simple models)
4. Mid-scale forest fuels analysis (fine scale, more complex models)
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| 6 | Future directions in development of spatial decision support systems for forest management. In the first part, a brief recap of system features is presented that have made the EMDS system successful for the past 20 years. Most of the lecture looks at ways in which the power of contemporary decision support systems can be enhanced through implementation of various components that support features such as web services, provenance tracking, and workflow management for automation and customization, etc. The lecture concludes with a quick introduction to the FORSYS COST action and its follow-on community of practice. |