Multi-Species Management Using Modeling and Decision Theory: Applications to Integrated Natural Resources Management Planning

05-264

Background:

Department of Defense (DoD) natural resource managers regularly face compelling and competing demands for conservation funds, and military mission land use needs can mean tough choices about where and how natural resources are managed. The Sikes Act Improvement Act (16 USC 670 *et. seq.*) requires the preparation of Integrated Natural Resource Management Plans (INRMPs) to guide natural resource management on DoD installations with significant natural resources. It specifies that the military mission be integrated and balanced with natural resources management resulting in no net loss of military training as a result of plan implementation. DoD instruction 4715.3 requires an ecosystem approach to natural resources management. In addition to the Sikes Act, the DoD must comply with the Endangered Species Act (7 USC § 136, 16 USC § 1531 *et seq*.) which requires that agency actions not jeopardize the continued existence of species listed under the Act and directs agencies to use their authority to conserve those species.

Objective:

The purpose of this project is to familiarize DoD natural resource managers with the potential of a decision theoretic approach using population models to address competing demands and consequent trade-offs in natural resources management and to provide recommendations as to how to go about it.

Summary of Approach:

The first component of the approach proposed here was to construct population models, based on current knowledge, to guide future data collection and to quantitatively evaluate the effects of alternative management strategies on a range of locally at-risk species. The results of the modeling component feed into a decision-theoretic framework to optimize decisions under multiple objectives and competing goals. This framework will be based on assessing goals, objectives and values of individual stakeholders and the decision maker and then selecting the optimal management strategy. The ultimate decision framework will assist in developing cost-effective management strategies that optimize the persistence of the targeted species while maintaining the military mission. The military mission is incorporated in two ways. The first is in crafting management alternatives for analysis that are compatible with the mission, and the second is in the decision framework that explicitly lays out the trade-offs between mission opportunities, species persistence and cost.

Benefit:

This proposed framework can assist in shifting from single-species to multiple species management by setting up formal, transparent and repeatable methods to do so. It can be used to highlight the trade-offs between conservation targets and between conservation targets and military land uses. It can be used to support cumulative effects analyses. This approach can incorporate and augment established spatial decision support tools such as NatureServe (NatureServe 2005). The integration of population dynamics into an established spatial approach to conservation management will enable decision making that takes species life history attributes into account and can detect more subtle effects than a spatial system alone.

Accomplishments:

We produced a detailed report and specific recommendations for incorporating decision theory and population modeling into natural resources management. This report is currently posted in the Conservation Section of the DENIX website www.denix.osd.mil.

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