

Conservation of Biological Diversity at the Landscape Scale

RNG 527

February 21, 2008

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Readings (available online):

Barbault, R. (1995). Biodiversity dynamics: from population and community ecology to a landscape ecology point of view. Landscape and Urban Planning, 31: 89-98.

Groves et al. (2002). Planning for biodiversity conservation: putting conservation science into practice. BioScience 52: 499-512.

Please be familiar with the concept of metapopulations. The following is a definition from the Fish and Wildlife Service:

Metapopulation. This is a network of semi-isolated populations with some level of regular or intermittent migration and gene flow among them, in which individual populations may go extinct but then be recolonized from other populations (Meffe and Carroll 1994). A metapopulation implies that genetic exchange between population subsites (demes) is occurring through dispersal or linkage corridors. Populations must be within reasonable dispersal distance from one another.

We will also be looking at species recovery plans as an example of a common method of conserving biodiversity. There are different challenges in conserving for single species as opposed to ecosystems or areas. I would like to explore what some of those differences might be. We will be looking at case studies for the following two species:

http://ecos.fws.gov/docs/recovery_plans/2003/030916b.pdf (Northern Idaho ground squirrel)

http://ecos.fws.gov/docs/recovery_plan/000630.pdf (MacFarlane's four o'clock)

Joel, Amanda and Penny: Please read the recovery plan for MacFarlane's four o'clock, focusing specifically on the following sections:

Introduction

Part II, Section D: Habitat and

Section G: Reasons for Decline

Part III, the Recovery Narrative, parts 1-6 (this covers pages 23-32 of the final section)

Adam, Katie, Andi and Steve: Please read the recovery plan for the Northern Idaho ground squirrel, focusing specifically on the following sections:

Introduction

Part I, Section C: Habitat and

Section F: Reasons for Decline

Part II, Section C: Strategy

Part III, the Recovery Narrative, parts 1-3 (this covers pages 29-39 of the final section)

Questions for each group:

- What components of your plan deal specifically with landscape-scale strategies?
- In what way does your plan offer ecosystem benefits beyond those of the targeted species?
- What parts of your plan are at odds with protecting other species, resources, or ecosystem functions?
- Are there important questions or concerns regarding the species or its landscape that are not addressed by the plans?
- How were the questions of different land ownership addressed under your plan?

Both plans acknowledge that the targeted areas encompass both government-owned and private lands, and a distinction is made suggesting similar strategies depending on land ownership:

1. Government land ownership w/ management objectives in place
2. "Conservation" or "environmental" organization ownership
3. Private land ownership with conservation easements, habitat management plans

General discussion questions:

What is the difference between landscape diversity and species diversity?

Barbault proposes that landscape ecologists should assume the central role in conserving biodiversity, because biodiversity measures are closely linked to landscape traits. Agree or disagree? What are the limits to conserving biodiversity at the landscape scale?

Is the landscape scale appropriate for addressing specific species? Will smaller-scale, targeted efforts still be needed to address threatened and endangered species? Is protection of a single species an effective strategy for conserving biodiversity in a broader, more general sense?

How does land ownership affect different conservation strategies and options? What are the possible strengths and weaknesses of different ownership groups? How can each of them address multi-species or ecosystems processes concerns?

Main Points:

1. Single species conservation plans have the potential to protect areas that benefit a wider range of species and ecosystem processes than those targeted. However, single species plans are ultimately limited in their ability to conserve overall biodiversity.

2. The landscape-scale includes components that are important to conserving biodiversity in the long-term.
3. Conserving biodiversity at the landscape scale is difficult because of the likelihood of varying land ownership and the high costs of monitoring.
4. Land ownership is a fundamental question affecting the scale at which conservation projects can be implemented and their probability of success.

Interesting additional papers:

Franklin, J.F. (1993). Preserving biodiversity: species, ecosystems, or landscapes? *Ecological Applications* 3(2): 202-205.

Levin, P.S. and Levin, D.A. (2002). The real biodiversity crisis. *American Scientist* 90: 6-8.

Redford, K. et al. (2003). Mapping the conservation landscape. *Conservation Biology* 17: 116-131.