Lecture 11, 26 Sept 2006
Ch2, SDCP

Conservation Biology
ECOL 406R/506R
University of Arizona
Fall 2006

Kevin Bonine
Kathy Gerst

SDCP

Legal Foundations

Lab this Friday:
meet in BSE 328 on 29 Sept
(see website for lab readings)

1

Housekeeping, 26 September 2006

Thank David Hall

Upcoming Readings

today: Text Ch.2, ESA, NEPA, SDCP on website

Thurs 28 Sept: Exam 1
Tues 03 Oct: Text Ch. 5&6
Thurs 05 Oct: Text Ch 6 (Hans-Werner Herrmann)

Short oral presentations
26 Sept Jaclyn Hendrickson & Larissa Gronenberg
28 Sept Exam 1
03 Oct Leslie Wood & Ben Collins
05 Oct Ami Kidder & Shannon Langdon

2

Hey folks, I'm giving a talk about the 15-month trip to Latin America that I took a few years ago, and it would be great to see some friendly faces out there. The talk is on Wednesday, September 27 at noon at the U of A, Biosciences East, Room 225. Thanks! - Dave

Reptiles, Amphibians, and Intestinal Bacteria of Latin America

3

Jaclyn Hendrickson & Larissa Gronenberg

Harpy Eagle Case Study…

6

Web of Science: TS=(biodiversity and ecosystem* and function* and conservation)

Title: **Habitat loss, trophic collapse, and the decline of ecosystem services**
Author(s): Dobson A, Lodge D, Alder J, Cumming GS, Keymer J, McGlade J, Mooney H, Rusak JA, Sala O, Wolters V, Wall D, Wi[illegible], Xenopoulos MA
Source: **ECOLOGY 87 (8): 1915-1924 AUG 2006**
Document Type: Article
Language: English
Cited References: 66 **Times Cited: 0**
Abstract: The provisioning of sustaining goods and services that we obtain from natural **ecosystems is a strong economic justification for the conservation of biological diversity. Understanding the relationship between these goods and services and changes in the size, arrangement, and quality of natural habitats is a fundamental challenge of natural resource management. In this paper, we describe a new approach to assessing the implications of habitat loss for loss of ecosystem services by examining how the provision of different ecosystem services is dominated by species from different trophic levels. We then develop a mathematical model that illustrates how declines in habitat quality and quantity lead to sequential losses of trophic diversity. The model suggests that declines in the provisioning of services will initially be slow but will then accelerate as species from higher trophic levels are lost at faster rates. Comparison of these patterns with empirical examples of ecosystem collapse (and assembly) suggest similar patterns occur in natural systems impacted by anthropogenic change. In general, ecosystem goods and services provided by species in the upper trophic levels will be lost before those provided by species lower in the food chain. The decrease in terrestrial food chain length predicted by the model parallels that observed in the oceans following overexploitation. The large area requirements of higher trophic levels make them as susceptible to extinction as they are in marine systems where they are systematically exploited. Whereas the traditional species-area curve suggests that 50% of species are driven extinct by an order-of-magnitude decline in habitat abundance, this magnitude of loss may represent the loss of an entire trophic level and all the ecosystem services performed by the species on this trophic level.**
Author Keywords: **biodiversity; conservation; ecosystem function; ecosystem services; food web; Little Rock Lake; species-area; species loss; trophic collapse**

7

ESA

The endangered species program
http://www.fws.gov/endangered/

"Taking"
Shoot, Shovel, Shut Up

Led to Habitat Conservation Planning (HCP)
Incidental Take Permits (e.g., SDCP with mitigation)

San Bruno Mtns
-negotiate, compromise, all parties involved

"No Surprises"
MOAs
Safe Harbor Agreements

Need to include and motivate private landowners

8

Endangered Species Act of 1973, as Amended

- **Largest controversy involved whether protection should be extended to plants.**
- **Not seen as a large economic issue. Passed Senate unanimously, passed House overwhelmingly**
- **Signed into law on December 28, 1973**

Endangered Species Act of 1973, as Amended

- **Jointly administered by Secretaries of Interior and Commerce (Fish and Wildlife Service and National Marine Fisheries Service)**
- **Amended many times.**

Endangered Species Act of 1973, as Amended

- **Section 3. Definitions**
- **Section 4. Determination of endangered species and threatened species (Listing)**
- **Section 5. Land acquisition**
- **Section 6. Cooperation with States**
- **Section 7. Interagency cooperation**
- **Section 8. International cooperation**
- **Section 8A. Convention implementation**
- **Section 9. Prohibited Acts**
- **Section 10. Exceptions**
- **Section 11. Penalties and enforcement**
- **Section 12. Endangered Plants**

Thanks to
Paul Barrett
and
Sherry Barrett

12

Section 4, ESA

Listing Species Pursuant to the Endangered Species Act of 1973, As Amended

5 Listing Factors

1. **The present or threatened destruction, modification, or curtailment of its habitat or range;**

2. **Overutilization for commercial, recreational, scientific, or educational purposes;**

3. **Disease or predation;**

4. **The inadequacy of existing regulatory mechanisms;**

5. **Other natural or manmade factors affecting its continued existence.**

Section 7, ESA

Interagency cooperation

Section 10, ESA

Exceptions

10(a)(1)(A) – Recovery Permits

10(a)(1)(B) - HCP

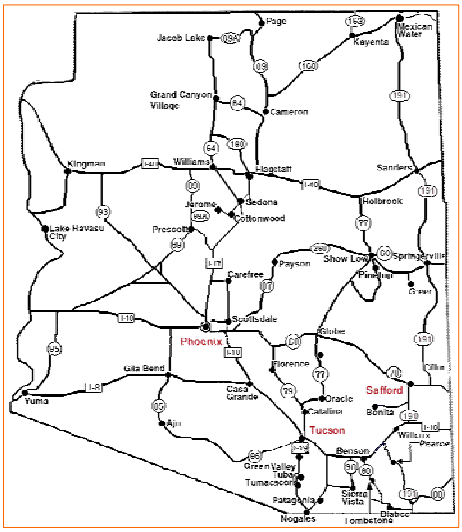
Recovery Planning

Mount Graham Red Squirrel
Tamiasciurus hudsonicus grahamensis

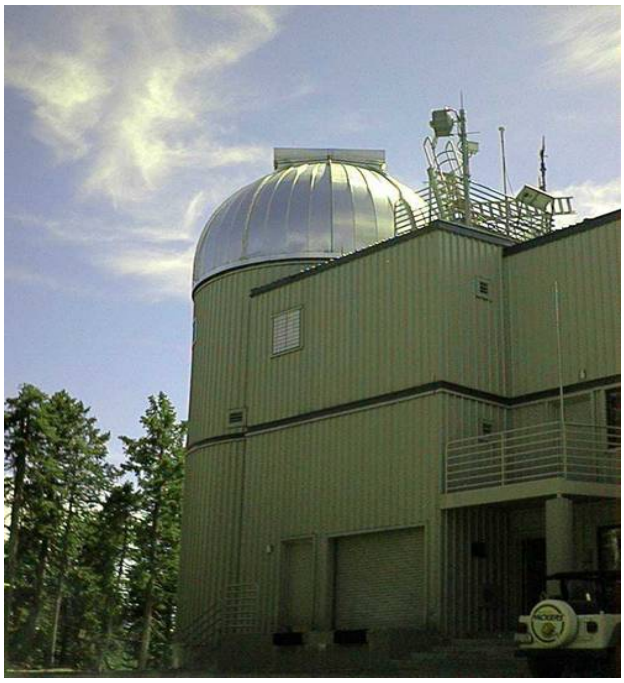
- **Listed as endangered in 1987**

18

Mount Graham Red Squirrel
Tamiasciurus hudsonicus grahamensis



19



20

Mount Graham Red Squirrel
Tamiasciurus hudsonicus grahamensis

- **Restricted to:**
  - **Spruce-Fir**
  - **Transition**
  - **Mixed Conifer**

- **Above 8000 ft**

21

Revised Mount Graham Red Squirrel
(Tamiasciurus hudsonicus grahamensis) Recovery Plan

-Technical Subteam

- **Squirrel biologists**
- **Silviculturalist**
- **Fire Ecologist**
- **Forest health specialist**
- **Conservation biologists**
- **Population biologists**
- **Entomologists**

22

Revised Mount Graham Red Squirrel
(Tamiasciurus hudsonicus grahamensis) Recovery Plan

-**Implementation Subteam**

- **Forest Service**
- **AGFD**
- **Local Governments**
- **Steward Observatory**
- **Local Interests (Summerhome Associations)**
- **Nongovernmental Organizations**
- **Native American Tribes**

24

The endangered species program
http://www.fws.gov/endangered/

ESA

"Taking"
Shoot, Shovel, Shut Up

Led to Habitat Conservation Planning (HCP)
Incidental Take Permits (e.g., SDCP with mitigation)

San Bruno Mtns
-negotiate, compromise, all parties involved

"No Surprises"
MOAs
Safe Harbor Agreements

Need to include and motivate private landowners

25

western snowy plover

The U.S. Fish and Wildlife Service has completed a final rule designating 32 units of critical habitat along the coast of California, Oregon, and Washington for the Pacific coast population of the western snowy plover, a Federally threatened species. The critical habitat units total 12,145 acres, nearly 40 per cent less acreage than an earlier critical habitat plan the Service adopted in 1999.

Of the designated units, 24 are in California (7,472 acres), five are in Oregon (2,147 acres), and three are in Washington (2,526 acres). Of the total acreage, 2,479 acres (20 percent) are on Federal lands; 6,474 acres (53 percent) are owned by states or local agencies; and 3,191 acres (26 percent) are private.

Compared to the 1999 plan, today's action designates more critical habitat units but generally smaller ones, based on increased knowledge of the species' needs and better mapping. This new rule designates 32 units covering 12,145 acres, compared to 28 units covering 19,474 acres in the 1999 plan.

The rule will take effect 30 days after publication.

Some 2,859 acres of proposed critical habitat in six units were deleted based on the projected cost of designating critical habitat. An economic analysis prepared by Industrial Economics Inc. projected that critical habitat could cost between $273 million and $645 million, with the biggest costs due to beach recreation losses. More than three-quarters of the loss was found to occur in five proposed California critical habitat units, located on Coronado 's Silver Strand, Morro Bay, Pismo Beach, and two on Monterey Bay.

In addition, 615 acres were deleted because of management plans and commitments -- such as Habitat Conservation Plans -- and 1,621 acres were deleted because they are covered by military land management plans or national security needs.

27

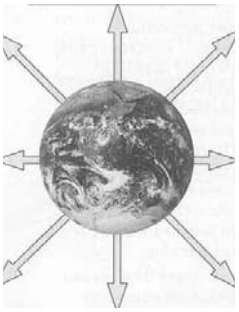
http://www.fws.gov/pacific/sacramento/ea/news_releases/2005%20News%20Releases/WSP_fCH2005_NR.htm

International Conservation Laws and Treaties

Implementation, Compliance, Effectiveness

Fewer people and larger industry = easier

Intent and Capacity to comply
-incentives vs. coercion



28

1937 Whaling

1950 Birds

1958 Benelux (birds)

1973 Baltic Sea

1973 CITES (trade or species?)
Appendix I, II, III

1982 Antarctic Marine Resources

29

CITES:

30

Habitats and Ecosystems...

1971 Ramsar Wetlands (Iran)
- 119 countries
- 500 listed wetlands

1972 UN (UNEP)
- United Nations Environmental Program
- -include social issues

31

1992 Earth Summit (aka Rio Summit)

-Agenda 21

(environment, social issues, poverty, technology transfer, sustainability, water, pollution)

-178 Governments
-Developed countries aid developing
-Sustainable Development
-Polluter Pays

-Convention on Global Warming
-Convention on Biodiversity

32

1972 US Marine Mammal Protection Act

dolphins
tuna
international trade

1989 US Sea Turtle Act

shrimp
TED's
international trade
GATT (general agreement on tariffs and free trade)

Unilateral vs. cooperative?

-WTO - trade over environment
-Leadership vs. Imperialism

33