

Lecture 09, 19 Sept 2006
Ch2, SDCP

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

Kevin Bonine
Kathy Gerst



Legal Foundations
SDCP



Lab this Friday:
meet S side BSE 12-1230 on 22 Sept,
return 24 Sept.
(see website for lab readings)

Housekeeping, 19 September 2006

Upcoming Readings

today: [Text Ch.2, ESA, NEPA, SDCP on website](#)

Thurs 21 Sept: [See website \(David Hall, guest\)](#)

Tues 26 Sept: Text Ch. 5

Thurs 28 Sept: Exam 1

Short oral presentations

19 Sept Grant Rogers and Jeremy Daniel

21 Sept Tara Luckau and Allison Buchanan

26 Sept Jacklyn Hendrickson & Larissa Gronenberg

28 Sept Exam 1

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Grant and Jeremy...



3) Is the endangered species act (ESA) the correct approach for US conservation efforts? Why or why not?

-OR-

Why is biodiversity important? How would you defend any one species to a non-conservationist? (due 19 Sept)

Suggestions: Define terms, include examples, avoid pronouns, etc.

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1872 Yellowstone NP
1891 Forest Reserve Act
1916 NPS

1964 Wilderness Act
1965 Land and Water Conservation Fund Act
-acquire lands, use resource revenues

1969/1970 NEPA (EIS)
-think about environment up front

1970 Clean Air Act

1972 Clean Water Act

1973 ESA (species focus)
endangered, threatened, critical habitat
recovery plan

1980 Superfund (1995 Brownfields)

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Successful Laws:

-Inspirational and radical?

-Growth in influence?

-Science and Monitoring?

Does law create social values?

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Litigation

e.g., polluters liable, citizen involvement, NGOs, public comment, transparency

EDF 1968

people have right to clean environment

1978 TVA vs. Hill (Snail darter)

God Squad (economic impact vs. habitat)



Endangered Species Committee

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Conservation Easements

remove development rights --> value decreases so less in taxes

reversible?

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National Environmental Policy Act of 1969 (NEPA)

Requires that all Federal Agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major Federal actions that significantly affect the quality of the human environment."

Federal Hook or Nexus? (land, funds, permits)



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The Story of NEPA

(through the eyes of Dave Prival, Brooke Gebow, and Cori Dolan, March 2004)



Can you identify your classmates?

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"...man and nature can exist in productive harmony..."

- National Environmental Policy Act (1969)

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Under NEPA, if a government agency is planning to do something that will significantly affect the quality of the environment, that agency has to write an...

Environmental Impact Statement

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National Environmental Policy Act of 1969 (NEPA)

- Environmental Assessment (EA)
- FONSI
- Environmental Impact Statement (EIS)



NEPA, NEPA, NEPA!!!!



An EIS includes...

- Project goals and objectives
- Resources that might be affected
- Alternative ways to try to achieve the goals
- Environmental impacts that are likely to occur under each alternative
- Potential mitigation



The public gets to review the EIS and make comments.

The agency has to take these comments into account before deciding upon an alternative.

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Summary

- The EIS is supposed to help agencies decide how they can achieve their goals, taking all environmental impacts into account, with input from the people who are going to be affected (the public).

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NEPA: 3 pages



EIS: 175 pages

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EIS drawbacks?

- The EIS is supposed to help agencies decide how they can achieve their goals, taking all environmental impacts into account, with input from the people who are going to be affected (the public).

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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

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Pre- Endangered Species Act of 1973 Legislation

- Lacey Act - 1900.** Authorized Federal enforcement of state wildlife laws and based on Federal power to regulate interstate commerce.
- Committee on Rare and Endangered Wildlife Species 1964** - consists of 9 biologist - published the first "Redbook" - first Federal list of fish and wildlife considered threatened with extinction.



Pre- Endangered Species Act of 1973 Legislation

- Lacey Act - 1900.**
- Committee on Rare and Endangered Wildlife Species 1964**
- 1966 Endangered Species Preservation Act** - Federal agencies must conserve habitats of native vertebrate species found by the Secretary of the Interior to be in danger of Extinction to the extent "Practicable and consistent" with the primary purposes of the Federal agencies.



**Pre- Endangered Species Act of 1973
Legislation**

- *1969 Endangered Species Conservation Act* - extended protection to invertebrates, and extended the Lacey Act's prohibitions to cover **interstate commerce** in illegally taken reptiles, amphibians, and certain invertebrates. Also took **Global View** - authorized Secretary to make a list of species threatened with worldwide extinction and with limited exceptions permitted the Secretary to prohibit imports of such species or their products into the U.S.



**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

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



Mount Graham Red Squirrel *Tamiasciurus hudsonicus grahamensis*





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Mount Graham Red Squirrel *Tamiasciurus hudsonicus grahamensis*

- Restricted to:
 - Spruce-Fir
 - Transition
 - Mixed Conifer
- Above 8000 ft



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



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



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"

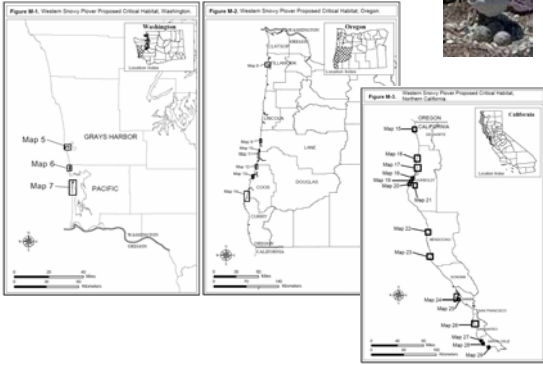
MOAs

Safe Harbor Agreements

Need to include and motivate private landowners

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western snow 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 snow 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.

http://www.fws.gov/pacific/sacramento/ca/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



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1937 Whaling

1950 Birds

1958 Benelux (birds)

1973 Baltic Sea

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

1982 Antarctic Marine Resources



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CITES:



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Habitats and Ecosystems...

1971 Ramsar Wetlands (Iran)
119 countries
500 listed wetlands

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

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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

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Conservation Imperialism?

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

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http://www.pima.gov/cmof/sdcp/

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Date: August 14, 2006

To: The Honorable Chairman and Members
Pima County Board of Supervisors

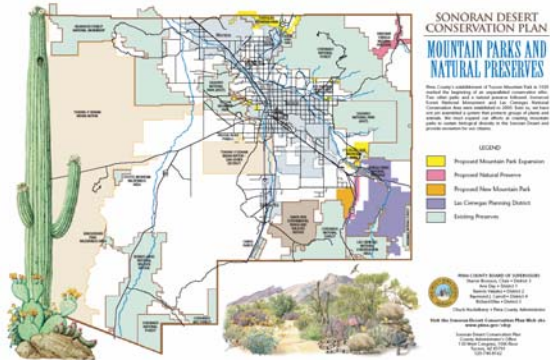
From: C.H. Huckelberry
County Administrator *[Signature]*

Re: Draft Multi-Species Conservation Plan

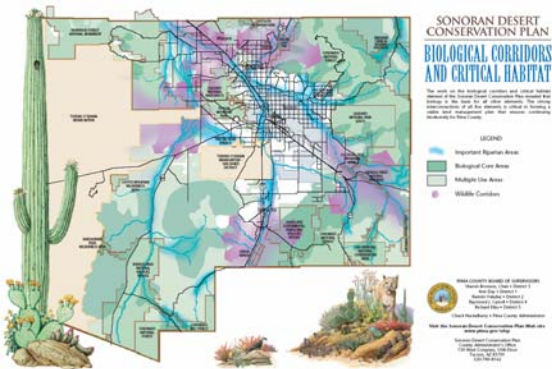
Introduction

Attached is the draft Multi-Species Conservation Plan that Pima County will submit to the United States Fish and Wildlife Service for a Section 10 permit. The permit package will also contain the Environmental Impact Statement, which belongs to the Service, and an Implementation Agreement that delineates obligations in a phased approach. Earlier drafts of the Multi-Species Conservation Plan have been published in 2003, 2005, and in January of 2006 as part of the extensive process of developing scientific information and inviting public review and comment.

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Biological Basis of the Sonoran Desert Conservation Plan



Thanks to Bob Steidl and others...

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SDCP Biological Goal

Ensure the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County...



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Approach

- Select elements for planning
- Establish quantifiable goals
- Develop explicit rules for reserve design process
- Organize, synthesize, and acquire information
- Evaluate
- **Establish, Monitor, Manage**



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Planning Alternatives

- **Biotic** elements
 - Vertebrates
 - Vegetation communities
- **Abiotic** elements
 - Land cover, land form, elevation, aspect, etc.
- **Unique** elements

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Select Species

- Regionally “**vulnerable**” species
- Short-list of 55 species

Species chosen should have little influence on ultimate reserve design



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Species List

- 9 mammals 7 bats
- 8 birds 6 riparian
- 7 reptiles 3 riparian
- 2 frogs all riparian
- 6 fish all riparian
- 16 invertebrates mostly snails
- 7 plants 2 riparian

>60% of plants and vertebrates associated with riparian environments

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Species Information

- Natural history accounts
- Species-environment matrix
- Decide best method by which to achieve goals for each species
- Less helpful if:
 - either rare or common
 - on lands that are protected or off-limits
 - limited natural-history information
- Reduced from 55 to 44 species

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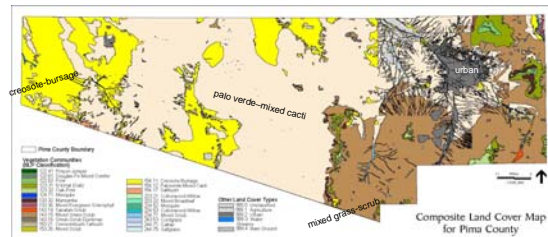
Land Cover

- Vegetation communities
- Abiotic / physical
- Urban, suburban, rural land-uses
- Ownership and level of protection
- Threats



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Land Cover



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Species Distributions

- Based on models rather than known locations or published distributions
- Developed to predict species distributions based on potential habitat
- Input and evaluation by experts
 - Habitat associations, known distribution
- Iterate
- Combine to identify areas of high species richness

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Species-Environment Matrix

<u>Variable</u>	<u>No. Attributes</u>
Vegetation	29
Urban	9
Meso-riparian	9
Xero-riparian	13
Streams	8
Shallow groundwater	1
Springs	2
Elevation	13
Slope	9
Aspect	8
Landform	15
Carbonates	3
<u>Geology</u>	<u>1</u>

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Matrix Rank Scores

Western Yellow Bat (*Lasiurus ega*)

<u>Elevation (m)</u>	<u>Score</u>
195 - 600	2
600 - 800	3
800 - 1200	3
1200 - 1400	3
1400 - 1800	2
1800 - 2000	** mask **
2000 - 2800	** mask **



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Elevation Scores



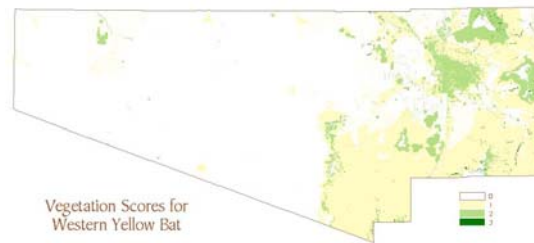
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Hydrology Scores



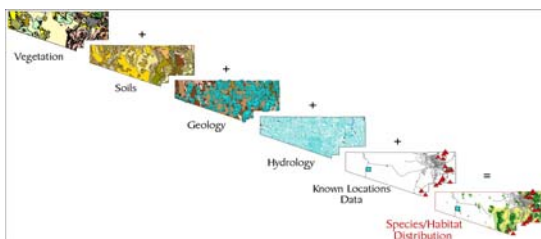
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Vegetation Scores



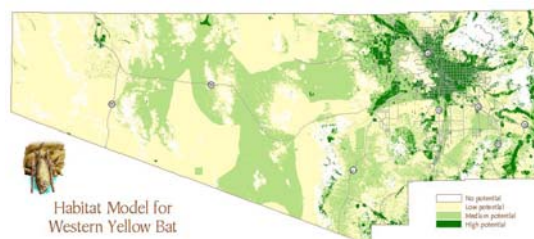
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Generate Distribution



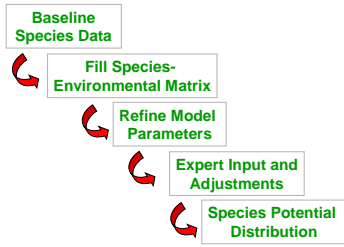
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Habitat Model



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Iterative Process



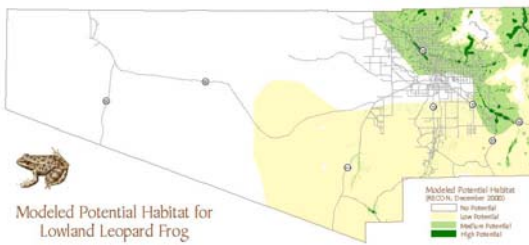
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Initial Model



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Intermediate Model



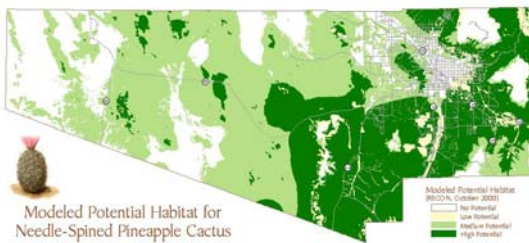
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Final Model + known locations



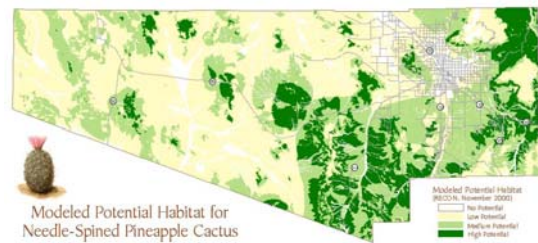
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Initial Model



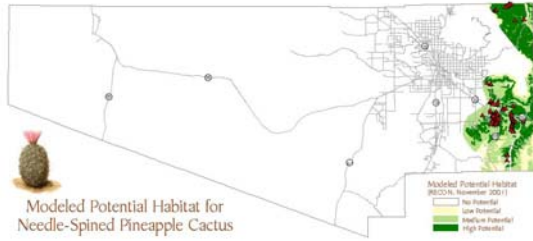
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Intermediate Model

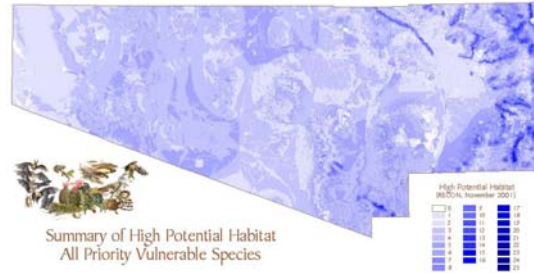


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Final Model + known locations



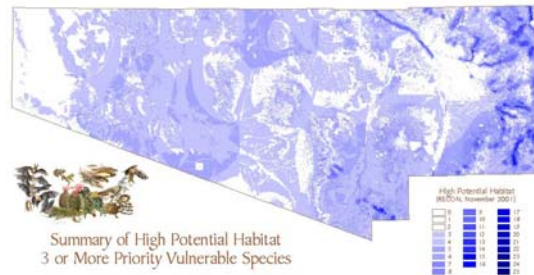
Species Richness, 1 or more



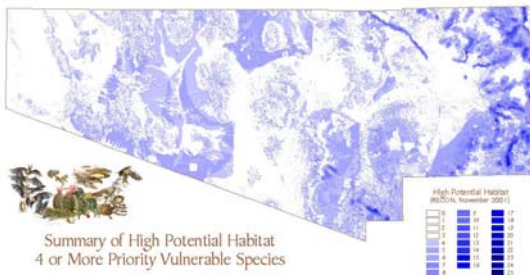
Species Richness, 2 or more



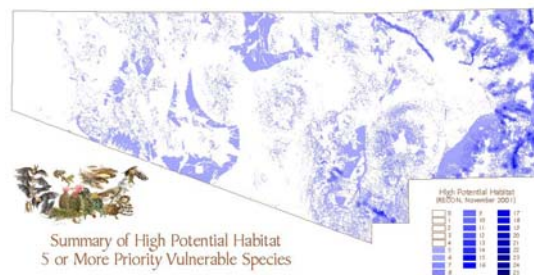
Species Richness, 3 or more



Species Richness, 4 or more



Species Richness, 5 or more



Design Principles

- Comprehensive conservation
- Species richness as foundation
- Contiguousness and Connectivity
- Intactness
- Opportunity and Realism



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Other Considerations

- Special elements
- Areas needed to meet species goals
- Landscape linkages
- Recovery areas for endangered species
- Areas identified by The Nature Conservancy as significant for conservation



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Special Elements

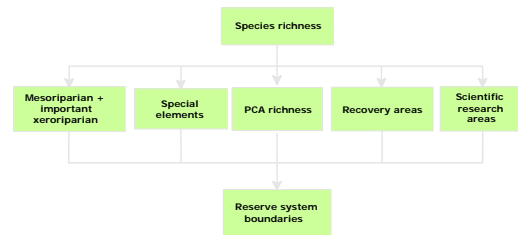


Pygmy Owl Habitat

Saguaro and Ironwood communities

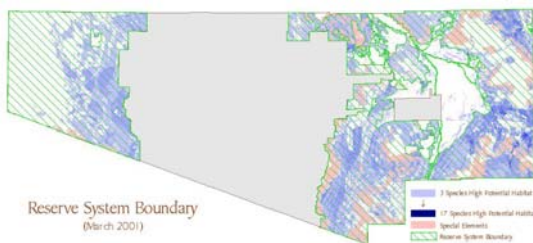
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Reserve Building



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Initial Reserve Boundary



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Conservation Lands System

- Biological Core
- Multiple Use
- Scientific Research
- Recovery Areas
- Agriculture Within Recovery Areas
- Existing Development



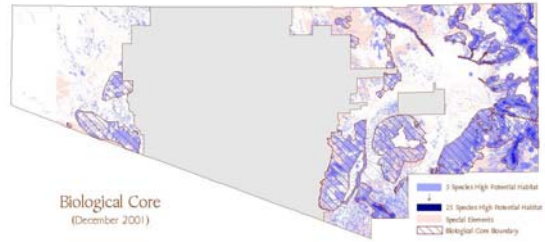
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Species Richness, 5 or more



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Biological Core



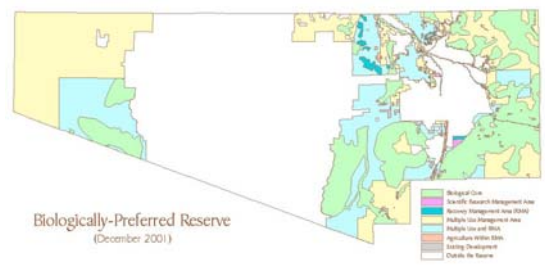
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Species Richness – Expert Opinion



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Biologically Preferred



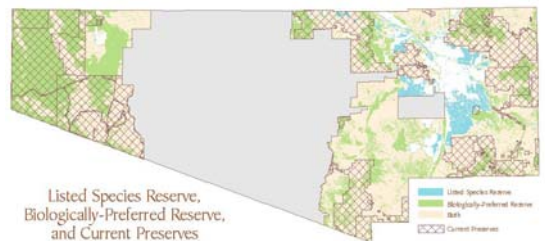
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Riparian as Foundation for Linkages



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Only Listed Species



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Monitoring and Adaptive Management

- **Assess** status and trends of representative organisms
- Information to assess land-management practices
- Careful and efficient design
- **Long-term** financial commitment

