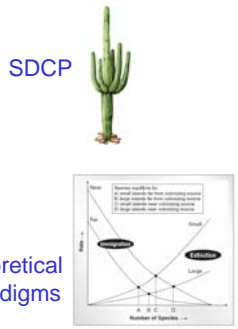


Lecture 13, 03 Oct 2006  
 SDCP, CH5 Paradigms

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

Kevin Bonine  
 Kathy Gerst



Theoretical Paradigms

Lab this week:  
 meet SATURDAY south side BSE at 7am (return 6pm)  
 (see website for lab readings)

1

Housekeeping, 03 October 2006  
 Thank David Hall

Upcoming Readings  
 today: Text Ch.5, Biogeography excerpt

Thurs 05 Oct: Text Ch 6 (Hans-Werner Herrmann)  
 Tues 10 Oct: Text Ch. 5&6  
 Thurs 12 Oct: Text Ch. 7

Short oral presentations  
 03 Oct Leslie Wood & Ben Collins  
 05 Oct Ami Kidder & Shannon Langdon  
 10 Oct Viola Sanderlin & Crystal Reich  
 12 Oct Robert Dietz

2

Global Climate Change Lecture Series

All lectures will take place at UA Centennial Hall.

All lectures begin at 7pm and are free to the public. Call 520.621.4090 for more information.

- Tuesday, October 17  
 Global Climate Change: The Evidence  
 Malcolm Hughes, Professor of Dendrochronology
- Tuesday, October 24  
 Global Climate Change: What's Ahead  
 Jonathan Overpeck, Director of the Institute for the Study of Planet Earth and Professor of Geosciences
- Tuesday, October 31  
 Global Climate Change: The Role of Living Things  
 Travis Huxman, Assistant Professor of Ecology and Evolutionary Biology
- Tuesday, November 7  
 Global Climate Change: Ocean Impacts and Feedbacks  
 Julia Cole, Associate Professor of Geosciences
- Tuesday, November 14  
 Global Climate Change: Disease and Society  
 Andrew Comrie, Dean of the Graduate College and Professor of Geography and Regional Development
- Tuesday, November 21  
 Global Climate Change: Could Geoengineering Reverse It?  
 Roger Angel, Regents' Professor of Astronomy
- Tuesday, November 28  
 Global Climate Change: Designing Policy Responses  
 Paul Portney, Dean of the Eller College of Management and Professor of Economics

<http://cos.arizona.edu/climate/>

3



Leslie Wood & Ben Collins



Elephant Conservation

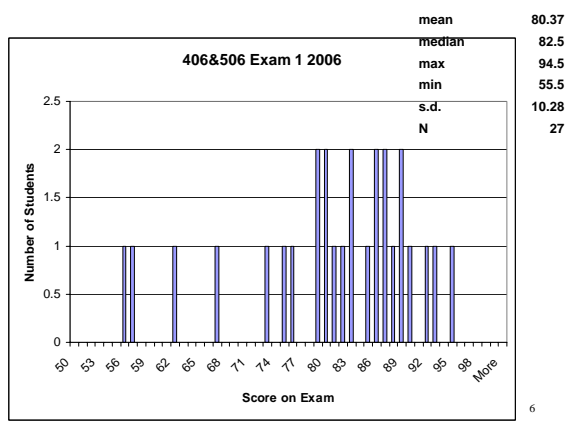
4

10 October Question 4

Which unit of biology deserves protection? Why?

New Question!...

5



6

Habitats and Ecosystems...

1971 Ramsar Wetlands (Iran)  
 119 countries  
 500 listed wetlands

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

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

7



<http://www.pima.gov/cmo/sdcp/>

9

Date: August 14, 2006

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

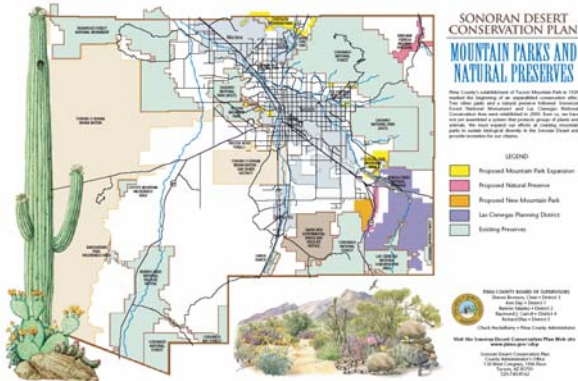
From: C.H. Huckelberry  
 County Administrator

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.

10



11

Biological Basis of the Sonoran Desert Conservation Plan



Thanks to Bob Steidl and others...

12

## SDCP Biological Goal

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



13

## Approach

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



14

## Select Species

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

*Species chosen should have little influence on ultimate reserve design*



15

## 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**

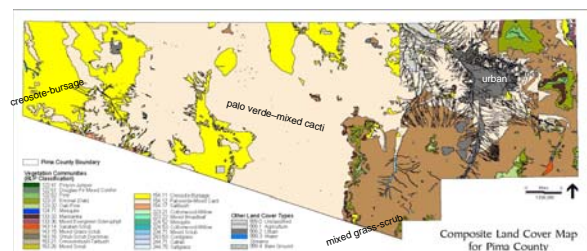
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## Species Information

- **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



18

## 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**

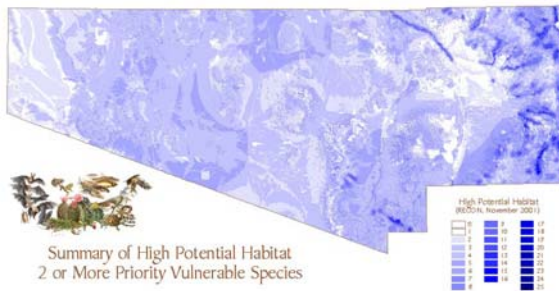
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## Species Richness, 1 or more



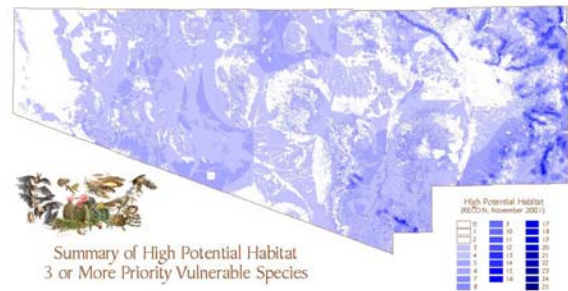
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## Species Richness, 2 or more



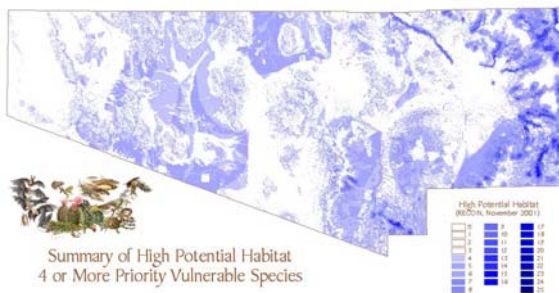
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## Species Richness, 3 or more



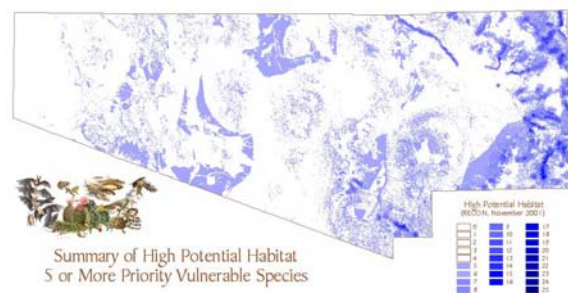
22

## Species Richness, 4 or more



23

## Species Richness, 5 or more



24

## Biological Core



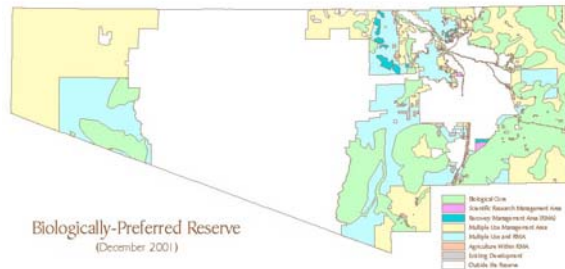
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## Species Richness – Expert Opinion



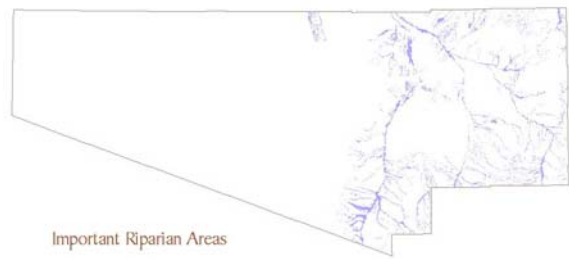
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## Biologically Preferred

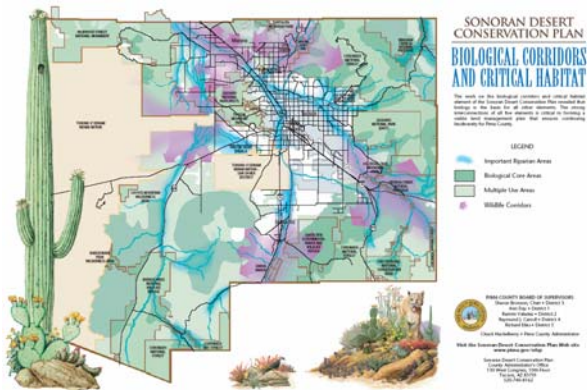


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## Riparian as Foundation for Linkages



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## Chapter 5 (Paradigms...)

- Genetic Diversity (MVP, PVA)
- Island Biogeography
- Metapopulations
- Habitat Heterogeneity
- Disturbance



## Chap 6 – Genetics of Conservation Biology

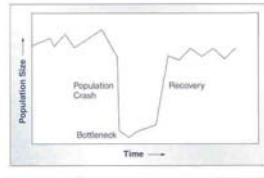
30

## Genetic Diversity

### Small Populations

- reduced gene flow
- inbreeding depression
- drift
- stochasticity
- effective population size ( $N_e$ )

### Declining Populations



**Figure 5.2**  
A graphical representation of population size before, during, and after a population bottleneck.

## Effective Population Size

- $N_e = 4N_mN_f / N_m + N_f$
- Eg: a population of seals with 6 males and 150 females?
- $N_e = (4*6*150)/(6+150) = \sim 23$