2. Introduction and Literature Review (25 points)
Due 07 March 2005 (Deadline extended to 10 March 2005)

Now is your opportunity to explain in detail the environmental implications of the topic you have chosen.

In a 5-7 page paper, you should explain the following:

- What are the current issues surrounding the topic you have chosen?

These websites can help you understand what meant by primary and peer-reviewed literature:

http://www.usd.edu/lhsl/ref/PublicationProcess.pdf
http://www.bergen.cc.nj.us/Library/userguide/IV_A_prim_sec.html
http://www.lib.ecu.edu/Reference/workshop/primary.html

These websites can help you understand what meant by primary and peer-reviewed literature:

- Tables and graphs of costs, benefits, effects on the environment, etc. are a useful addition here and are also very useful in the end presentation.
- Describe how the changes you recommend fit into the bigger picture. Where do the resources involved come from? What is their impact? What are the associated costs? For example, if I were recommending the University purchase vegetables from a local grower, instead of an international conglomerate, whose jobs would be impacted? How much more food is being shipped from far away as opposed to from close to Tucson, etc.

Your literature cited section should include at least 10 sources. At least half of these should be from peer-reviewed and/or primary literature. Use the parenthetical citation format of your syllabus. At least half of your citations should be from refereed journals.

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1. To steal and pass off (the ideas or words of another) as one's own
2. Use without crediting the source

Plagiarize

(Miller Chapters 10, 6, SDCP, Biosphere Reserves)

Buffelgrass Removal at Tumamoc Hill, 05 March 2005

Saturday, March 5, 2005 - 10 am - 4 pm

Researchers from the University of Arizona and community volunteers will gather on Saturday, March 5 to fight a foreign invader. The goal is to save Tumamoc Hill from buffelgrass.

Buffelgrass - brought here from Africa for cattle forage - has the potential to be the most destructive plant pest known in the Sonoran Desert, says Desert Lab researcher Travis Bean. Tumamoc Hill is overrun with buffelgrass, which not only competes native plants for water and soil nutrients, but increases the risk of brush fires in dangerous levels through increased fuel loads. In addition, a gene flow cycle that transfers virus vectors among landuses into buffelgrass monocultures.

Tumamoc Hill on Tucson’s west side is home to the historic Desert Laboratory and an 860-acre nature preserve. For more than 100 years the Desert Lab has been dedicated to studying plants, animals and the environment of North American deserts.

The mission of the Desert Lab has become even more important in recent years. Expanding populations in the Southeast have increased the stress on natural environments that surround its growing cities.

On eradication day, researchers will show how to recognize buffelgrass, and demonstrate approved techniques to remove it, including rock picks and herbicides.

The event is Saturday, March 5, 10 a.m. to 4 p.m. Parking is available at nearby St. Mary’s Hospital. Winter in Tucson still means plenty of sunshine most days, so wear protective clothing, including sunscreen, a hat and gloves, and sturdy shoes to navigate the rugged hillside.

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For more information, or to volunteer with the eradication project, call Travis Bean at the Desert Lab at 629-9455, or e-mail.
ESA (Endangered Species Act)

“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

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

Section 10

Exceptions

10(a)(1)(A) – Recovery Permits
10(a)(1)(B) - HCP

Need to include and motivate private landowners
Biological Basis of the Sonoran Desert Conservation Plan

Thanks to Bob Steidl and others…

SDCP Biological Goal

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

Approach

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

Planning Alternatives

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

Select Species

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

Species chosen should have little influence on ultimate reserve design

Species List

- 9 mammals
- 8 birds
- 7 reptiles
- 2 frogs
- 6 fish
- 16 invertebrates
- 7 plants

7 bats
6 riparian
3 riparian
all riparian
all riparian
mostly snails
2 riparian

>60% of plants and vertebrates associated with riparian environments
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

Land Cover

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

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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

Species-Environment Matrix

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

Matrix Rank Scores

Western Yellow Bat (*Lasiurus ega*)

<table>
<thead>
<tr>
<th>Elevation (m)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>185 - 600</td>
<td>2</td>
</tr>
<tr>
<td>600 - 800</td>
<td>3</td>
</tr>
<tr>
<td>800 - 1200</td>
<td>3</td>
</tr>
<tr>
<td>1200 - 1400</td>
<td>3</td>
</tr>
<tr>
<td>1400 - 1800</td>
<td>2</td>
</tr>
<tr>
<td>1800 - 2000</td>
<td><strong>mask</strong></td>
</tr>
<tr>
<td>2000 - 2800</td>
<td><strong>mask</strong></td>
</tr>
</tbody>
</table>
Elevation Scores

Hydrology Scores

Vegetation Scores

Generate Distribution

Habitat Model

Iterative Process

- Baseline Species Data
- Fill Species-Environmental Matrix
- Refine Model Parameters
- Expert Input and Adjustments
- Species Potential Distribution
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
- Contiguosity and Connectivity
- Intactness
- Opportunity and Realism
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

Special Elements

Reserve Building

Initial Reserve Boundary

Conservation Lands System

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

Species Richness, 5 or more
Biological Core

Species Richness – Expert Opinion

Biologically Preferred

Riparian as Foundation for Linkages

Only Listed Species

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
Biosphere Reserves (UN)

Where?

- Core
- Buffer
- Transition

Why?

Organ Pipe Cactus National Monument
Pinacate Biosphere Reserve
Gulf of California Biosphere Reserve

Sonoran Desert National Park?