Biological Basis of the Sonoran Desert Conservation Plan

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
  • Vertebtrates
  • 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  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
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

Land Cover

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>
</tr>
<tr>
<td>Elevation</td>
<td>13</td>
</tr>
<tr>
<td>Slope</td>
<td>9</td>
</tr>
<tr>
<td>Aspect</td>
<td>8</td>
</tr>
<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>195 - 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>** mask **</td>
</tr>
<tr>
<td>2000 - 2800</td>
<td>** mask **</td>
</tr>
</tbody>
</table>
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
**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**

- Species richness
- Species richness xeroriparian
- Special elements
- Recovery areas
- Scientific research areas

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**Initial Reserve Boundary**

- Reserve System Boundary (March 2013)

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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**

- Summary of High Potential Habitat
- 5 or More Priority Vulnerable Species
**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