KITT PEAK LINKAGE
WILDLIFE CONNECTIVITY:
WILDLIFE OVERPASSES AND FENCING

State Route 86

Tohono O’odham Nation
Department of Natural Resources
Wildlife and Vegetation Management Program

In partnership with the:

Arizona Department of Transportation
Environmental Services
Tucson District
Urban Project Management

ADOT
ARIZONA'S WILDLIFE LINKAGES

Milepost 130-138
State Route 86

Linkage 86
Kitt Peak
Sky Island Ecoregion
Sonoran Desert Ecoregion

County: Pima
ADOT Engineering District: Tucson
ADOT Maintenance: Three Points
ADOT Natural Resources Management Section: Tucson
AGFD: Region V
BLM: Phoenix District
Congressional District: 7
Council of Government: Pima Association of Governments
FHWA Engineering: A2
Legislative District: 25

Biotic Communities (Vegetation Types):
- AZ Upland Sonoran Desertsrub 9%
- Madrean Evergreen Woodland 28%
- Semidesert Grassland 63%

Land Ownership:
- Private Land 1%
- Tribal Land (Tohono O'odham) 99%

Identified Species:
- Cactus Ferminous Pygmy-owl Glaucidium brasilianum caecorum
- Giant Spotted Whiptail Aspidoscelis burti atictogramma
- Maricopa Leaf-nosed Snake Phyllorhynchus brownii lucidus
- Mule Deer Odocoileus hemionus
- Sonoran Desert Tortoise Gopherus agassizii

Threats:
- Border Security
- Highway (SR 86; SR 386)
- Urbanization
Top Priority Linkages

The resulting prioritization indicates how each proposed potential linkage zone scores relative to other zones with respect to Biological Value (which are plotted as the horizontal axis) and Threat and Opportunity Value (which are plotted as the vertical axis). The potential linkage zones that emerged in the upper right quadrant are clear priorities for more detailed planning and conservation actions depicted in Figure 5-2. It should be noted that we consider all of the identified potential linkage areas important. Future threats and opportunities could shift some potential linkages "upward" and new knowledge could increase our perception of the biological importance of some zones. Because the score of the ADOT 5 and 20-year plans in part drives these results, it is in our best interest to address these highest ranked potential linkages as soon as possible as some of them are slated for roadway development or expansion in the near future.

The following potential linkage zones emerged as the highest priority. The order in this list does not reflect relative importance.

**Linkage 2** Beaver Dam Mountains – Virgin Mountains
**Linkage 10** Mt. Tipton - Mt. Perkins
**Linkage 17** Deadman Mesa/Gray Mountain
**Linkage 26** Northern I-17 Corridor
**Linkage 27** Mogollon Rim - Navajo Nation
**Linkage 28** Petrified Forest North & South
**Linkage 33** Huapai Mountains - Bagdad
**Linkage 35** Prescott National Forest
**Linkage 36** Yeager Canyon – Camp Verde
**Linkage 39** SR 260 west from I-17 to SR 87
**Linkage 41** SR 260 Payson to Heber
**Linkage 42** Arpine-Cibecue
**Linkage 51** Wickenburg
**Linkage 56** US 60 7 Mile to 7 Mile East
**Linkage 66** Superior to Miami - US 60
**Linkage 67** Gila River to El Capitan - SR 77
**Linkage 69** Lugunaas-Muggins
**Linkage 71** North Gila Mountains - South Gila Mountains
**Linkage 72** Sentinel Plain
**Linkage 73** Southeast Kofa to North Maricopas
**Linkage 75** State Route 85
**Linkage 77** Quijotova Valley

**Linkage 86** Kitt Peak
- **Linkage 91** Baboquivari - San Luis Mountains
- **Linkage 92** San Xavier to Sierrita - Santa Rita
- **Linkage 93** Tumacori - Santa Ritas
- **Linkage 94** Galliverto – Winchester - Dragoons
- **Linkage 100** Ft. Huachuca to San Pedro Link

KITT PEAK LINKAGE – One of the top 28 statewide priorities (of 152)
Includes the San Isidro Segment

**L11. Kitt Peak: Comobabi Mountains to Baboquivari/Coyote/Quinlan Mountains**

<table>
<thead>
<tr>
<th>Area Connected:</th>
<th>Comobabi Mountains Wildland Block – Baboquivari/Coyote/Quinlan Mountains Wildland Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species Identified:</td>
<td>Bighorn sheep; Desert tortoise; Eagle; Mountain lion; Mule deer</td>
</tr>
<tr>
<td>Current Threats/Barriers:</td>
<td>Border activities (illegal immigration); Exotic species (buffelgrass); Low density residential development (ranches, grazing etc.)</td>
</tr>
<tr>
<td>Notes:</td>
<td>Projects in this linkage include SR 86 widening (Santa Rosa Ranch and Kitt Peak segments) planned to start in 2012. Two RTA-funded wildlife underpasses will be constructed as part of the widening project, and a RTA-funded wildlife overpass will be constructed in 2013 or 2014. The National Optical Astronomy Observatory (NOAO) Kitt Peak National Observatory is located within this linkage.</td>
</tr>
</tbody>
</table>
KITT PEAK LINKAGE

• At the northern end of the Baboquivari Mountain Range

• Strategically located landscape bridge between “sky islands” extending from Mexico northward
KITT PEAK LINKAGE

• State Route 86
• Mileposts 130-138
KITT PEAK LINKAGE
CONNECTIVITY FOR HIGHLY MOBILE WILDLIFE SPECIES

- Desert bighorn sheep
- Mule deer
- Mountain lion
KITT PEAK LINKAGE

PERMEABILITY FOR LOWER MOBILITY WILDLIFE SPECIES

• Javelina
• Spotted whiptail lizard
• Leaf-nosed snake
• Desert tortoise
RECENT JAGUAR CRITICAL HABITAT DESIGNATION
with Conservation Agreement designation for Tohono O’odham Nation

Kitt Peak Linkage
STATE ROUTE 86 WILDLIFE-VEHICLE COLLISIONS
(Milepost 120-140; 2000-2010)

KITT PEAK LINKAGE
Wildlife-Vehicle Collision “Hot Spot”

Source: ADOT
CURRENT STATUS OF RTA-FUNDED KITT PEAK LINKAGE PROJECT
WIDENING PROJECT ALONG KITT PEAK LINKAGE

PROJECT OF OPPORTUNITY

• Kitt Peak & Santa Rosa projects presented an opportunity to address wildlife connectivity needs integrated with widening in a *cost-effective* manner
• Future reconstruction projects likely will not occur in next 20+ years
• Failure to seize this opportunity will forego addressing a priority linkage

Examples from ongoing San Pedro Segment construction – State Route 86
RTA- FUNDED PROJECT STATUS

• Both precast arch underpasses implemented – awaiting final grading
• No wildlife fence funded – will LIMIT effectiveness in meeting connectivity and highway safety objectives (based on AGFD research)
• Monitoring cameras (8) to be installed by June 2014

Santa Rosa Underpass MP 131.2

Kitt Peak Underpass MP 134.9
Evaluated the San Isidro widening project for connectivity options
CURRENT KITT PEAK LINKAGE PROPOSAL

Identified no underpass sites, but did identify a viable overpass site at MP 127.5.
Construct prior “approved” but unfunded Kitt Peak and Santa Rosa segment elements:
- Overpass at MP 133.5 (orange dot)
- 43,360 LF of wildlife fence (green line)
- 8 escape ramps and 2 cattle guard extensions

Construct San Isidro Segment elements:
- Overpass at MP 127.5 (yellow dot)
- 46,417LF of wildlife fence (green line)
- 8 escape ramps, and 1 cattle guard extension
Average passage structure spacing for all segments = 2.5 miles

Several large concrete box culverts will accommodate passage for smaller animals.

### State Route 86 Mileposts by Construction Project Segment

<table>
<thead>
<tr>
<th>Wildlife Passage Measure</th>
<th>San Isidro Segment</th>
<th>Santa Rosa Segment</th>
<th>Kitt Peak Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125 126 127 128</td>
<td>129 130 131 132</td>
<td>133 134 135 136</td>
</tr>
<tr>
<td>Underpass</td>
<td></td>
<td>MP 131.2</td>
<td></td>
</tr>
<tr>
<td>Overpass</td>
<td>MP 127.5</td>
<td></td>
<td>MP 134.9</td>
</tr>
<tr>
<td>Wildlife Fencing</td>
<td>MP 126.7 – 131.0</td>
<td></td>
<td>MP 131.0 – 135.2</td>
</tr>
<tr>
<td></td>
<td>(4.3 miles)</td>
<td></td>
<td>(4.2 miles)</td>
</tr>
</tbody>
</table>
CURRENT KITT PEAK LINKAGE PROPOSAL

Wildlife-Vehicle Collision Reduction

Passage structures and wildlife fence should reduce MP 124 – 136 wildlife-vehicle collisions by 80%
KITT PEAK LINKAGE RTA FUNDING REQUEST

• TWO OVERPASSES

  Overpass, fencing, escape ramps, and cattle guard extension construction costs $3,314,393

  Survey and clearances $450,000

  Final Design $565,328

  Construction mobilization, traffic control, contingencies, and administration (RTA & ADOT) $2,320,075

  TOTAL RTA REQUEST* $6,649,796

*Cost estimates developed by ADOT engineers and reviewed by RTA with eye to ensuring adequate funding to accomplish work
PHASED IMPLEMENTATION APPROACH

• PHASE 1 - Near-Term (Change Order to Existing Contract)
  Expedite design and construction of wildlife fence, escape ramps and cattle guard extensions on Kitt Peak and Santa Rosa segments
  Cost: $946,565

• PHASE 2 - Mid-Term
  Engineering, design and survey of overpass(es) and San Isidro Segment wildlife fence, escape ramps, and cattle guard extensions if approved
  Cost: $915,680

• PHASE 3 - Long-Term
  Construct overpasses and San Isidro Segment wildlife fencing, escape ramps, and cattle guard extensions
  Cost: $4,787,460
EFFECTIVENESS MONITORING

Tohono O’odham Nation and ADOT Environmental Services will cooperate on monitoring of overpass and underpass structure use by wildlife

*Nation awarded US Fish & Wildlife Service Tribal Wildlife Grant funding to enhance/supplement wildlife connectivity projects on SR86*
THANK YOU!