

# SECTION XI CONTRIBUTOR'S CONNECTIVITY EFFORTS



## Arizona Department of Transportation

The Arizona Department of Transportation (ADOT) has a unique and important role in maintaining connectivity across landscapes. ADOT is responsible for over 6,000 centerline miles of roadway. In recent years, ADOT has been faced with the challenge of providing a modern and safe highway system to a rapidly growing commuter population. It has been well documented that transportation corridors can result in habitat fragmentation. Under the Department's strategic goal of protecting the natural environment, ADOT is partnering with other state and federal agencies on projects to help minimize negative effects as well as enhance connectivity through the transportation corridors.

A wider, safer highway for motorists can create a problem for native wildlife. Temporary and permanent fencing is used to divert wildlife away from construction areas and from the roadway itself to safer areas. For example, tortoise fencing has been installed on several highways including US 93, Interstate (I) 8 and State Route (SR) 86 (done in partnership with the Tohono O'odham Nation). Wildlife crossings are also designed into highway structures to provide alternatives for wildlife to cross the roadway.

On SR 260, the highway is being upgraded from a two-lane route to a four-lane divided highway. ADOT is using a comprehensive package of measures to keep elk off the highway, including wildlife underpasses, wildlife-proof fencing, escape ramps and one-way gates. ADOT is collaborating with the Federal Highway Administration (FHWA), the USDA Forest Service Tonto National Forest and the Arizona Game and Fish Department (AGFD) on this project. The project is being completed in segments allowing research to be conducted by the Arizona Game and Fish Department and findings to be utilized adaptively benefiting both wildlife and ADOT. Once completed, this project may represent one of the most comprehensive efforts in North America to reduce the risk of wildlife-vehicle collisions and enhance wildlife movement

across and beyond the highway. This project has all ready received national acclaim by being awarded the *FHWA Exemplary Ecosystem Initiative Award* in 2003. The lessons learned from this project can be applied to other highway upgrades such as the US 93 expansion.

Since the first improvement project began on US 93, ADOT has made the protection of the environment a priority. Working with partners including the Bureau of Land Management (BLM), Federal Highway Administration (FHWA), Arizona Department of Environmental Quality (ADEQ) and locally elected and appointed officials, ADOT has designed and incorporated mitigation into highway construction projects to protect flora and fauna and preserve unique landscapes. Research is currently being conducted on bighorn sheep herds in the area to determine the best locations for wildlife crossings – a necessary mitigation.

ADOT has voluntarily worked with other agencies and wildlife organizations in recent years to integrate wildlife and other environmental information into its transportation plans and early project development procedures. Arizona is considered to be a leader among states addressing the issue of conflicts between traffic wildlife and has received national attention as an example of positive environmental stewardship. ([www.azdot.gov](http://www.azdot.gov))

## Arizona Game and Fish Department

AGFD serves the people of Arizona as steward of the State's fish and wildlife resources through various funding sources, including Sportfish and Wildlife Restoration Funding (Federal Aid from the U.S. Fish and Wildlife Service), and other federal and state funding. The Department's mission is to conserve, enhance and restore Arizona's diverse wildlife resources and habitat through aggressive protection and management programs. Research is important in determining the best methods to conserve wildlife and habitat. More specifically, the Department has been a leader in research to determine ways to mitigate the impacts of roadways and other connectivity issues on wildlife. From the award winning SR 260 project to projects on such diverse species as the flat-tailed horned

lizard and desert bighorn sheep, AGFD is recognized nationally and internationally as a leader in wildlife connectivity research. Such research will add to the body of knowledge on how to establish or maintain wildlife habitat linkages.

In addition, the Arizona Game and Fish Commission currently owns or manages more than 266,870 acres of land statewide, which includes wildlife areas, fish hatcheries, shooting ranges, and regional offices. These lands were acquired for the conservation and protection of habitat values for a diversity of game and non-game species, including habitat for threatened and endangered species.

Also, under provisions of the Fish and Wildlife Coordination Act, the National Environmental Policy Act, the Endangered Species Act, the Clean Water Act, and interagency agreements, the Department has been actively involved in planning efforts for many land and water development projects. AGFD strives to ensure that fish and wildlife resource concerns are considered during the initial planning phase of these projects. The Department's concerns involve the protection and/or conservation of all wildlife, including those species that are federally or state listed and those that are not listed. AGFD also oversees the state's hunting and fishing license program, and therefore has a vested interest in maintaining access for hunting and sport fishing.

Currently, guidance to AGFD's management of game and non-game species is provided by the strategic plan Wildlife 2006, which will also lay the groundwork for the development of a subsequent strategic plan, Wildlife 2012. Wildlife 2006 was developed to assist AGFD in meeting the obligations for managing Arizona's wildlife under Arizona Revised Statutes, Title 17. In conjunction with Wildlife 2006, the Department has now developed the Comprehensive Wildlife Conservation Strategy (CWCS), which is a requirement to receive State Wildlife Grant (SWG) federal funding. Both Wildlife 2006 and the CWCS will guide wildlife management through the next decade.



## Bureau of Land Management

The Bureau of Land Management (BLM) Arizona manages approximately 12.2 million surface acres of public land, and realizes that public involvement is critical. The land-use planning process, which allows the public to get involved in the process, gives BLM employees a blueprint about how the public land should be managed. BLM Arizona's mission is to sustain the health, diversity and productivity of the public land, and land-use planning is a vital area of involvement. BLM Arizona has six Resource Management Plans (RMPs), and one Management Framework Plan (MFP), plus several land-use plan amendments. National Environmental Policy Act (NEPA) documents, which are associated with the land-use plans, help BLM managers to understand the impact their decisions can have on humans, as well as the environment. BLM over the next few years will be preparing several new RMPs where old ones are outdated and where National Monuments have been created through Presidential proclamation. BLM planning schedules and more information can be found at [www.az.blm.gov/LUP/planning.htm](http://www.az.blm.gov/LUP/planning.htm).

BLM Arizona involves the public in the planning process right from the start. While collaborating with tribal, state and local governments, interested parties are invited to participate so their needs can be addressed. When a draft RMP/draft EIS is ready for review and public comment, BLM makes copies available to all Field Offices and on the Internet. We encourage involvement in the planning process to help determine how the public lands will be managed. Involvement by everyone who is interested in the public lands will help ensure that the best overall possible plan is developed.

To date, conservation of habitat and linkages has been addressed in RMPs, such as Lower Gila South and Kingman, and is being addressed in new RMPs, such as Agua Fria/Bradshaw/Harquahala and Lake Havasu. The information developed from the Missing Linkages Workshop can be used for these and future planning efforts to help BLM make decisions on land tenure (retention, acquisition, disposal) and to make land use allocations for wildlife in linkage areas.

## Comprehensive Wildlife Conservation Strategy

All 50 States, U.S. Territories, and the District of Columbia are producing their own Comprehensive Wildlife Conservation Strategy (CWCS) plans, which is in response to funds made available by Congress in 2001 through the State Wildlife Grant Program (SWG). The CWCS will identify threats to wildlife and natural habitats and the measures that will be used to address those threats. Guiding principles for developing State CWCS plans were established by state fish and wildlife agencies working with the International Association of Fish and Wildlife Agencies and the Teaming with Wildlife committee and can be found in *Appendix X* within the CWCS plan. To continue to be eligible for SWG Program funding, all States and Territories must have their CWCS plans submitted and accepted by the U.S. Fish and Wildlife Service by October 1, 2005. ([http://www.gf.state.az.us/w\\_c/cwcs.shtml](http://www.gf.state.az.us/w_c/cwcs.shtml))

The Arizona Game and Fish Department is currently developing a CWCS plan that will provide a foundation to guide wildlife management and conservation over the next decade. The guiding principles for this plan emphasize broad participation within and amongst the various state and federal agencies, other conservation partners, private landowners, the public, and any other entity that may have a stake in fish and wildlife management. Arizona's CWCS will address the full wildlife spectrum with an emphasis on identifying and managing the "wildlife and biotic communities of greatest conservation need."

The CWCS will also assess related threats and stressors to assist in the prioritization of goals, objectives, strategies and activities for particular wildlife habitat areas. The Wildlife Linkage Workshop also identified threats to the linkages and prioritized those linkages based on threat and habitat quality levels. It's anticipated that the linkages identified in the Wildlife Linkage Workshops will dovetail into the CWCS plan and provide a linkage assessment that will complement CWCS wildlife habitat areas. Ultimately, the linkage assessment should assist in the identification and prioritization of wildlife conservation strategies.

## The Federal Highway Administration

The Federal Highway Administration (FHWA) is responsible for ensuring that Federally financed highways are planned and constructed in compliance with the National Environmental Policy Act and all other applicable Federal and state laws and regulations. Therefore, as value-added investments for the nation's transportation systems, streamlining project development and promoting environmental stewardship are important objectives in the performance of FHWA's mission to deliver the Federal-aid and Federal Lands Highway Programs. Partnering our objectives with other federal and state agencies, early in project planning helps meet both objectives by improving the quality of transportation decisions and the value and reliability of environmental commitments. In turn, the predictability and efficiency of the environmental review process is increased, reducing expensive project delays. Early agency and public involvement, along with the integration of important data, such as State Comprehensive Wildlife Conservation Plans, fosters cost-effective investments for environmental solutions that can be incorporated into project designs early when costs and delays can be minimized.

In response to increasingly creative approaches to transportation and resource conservation planning and development, today's FHWA regulations offer the flexibility to move beyond the traditional project-by-project approach – particularly in the planning phase, and focus on entire surface transportation systems, not just single facilities. Transportation agencies can enter into tailored agreements with other agencies to provide for advance impact mitigation and help ensure that transportation projects proceed with substantial predictability and, through partnerships, innovative conservation strategies can leverage funding, materials, landowner coordination, and/or real estate to a project from non-government organizations that can serve as part of the required non-Federal match, saving State funds while leveraging needed conservation dollars.

Today, FHWA and transportation agencies also fund and perform research to determine vital parameters and processes in ecosystems and species life cycles; enhancing the state of scientific knowledge and, therefore, the confidence of decision makers. FHWA has developed and participates in national conferences and programs that recognize and award excellence in environmental stewardship for a wide variety of natural habitats and ecosystems. Though our natural resource websites located at [www.fhwa.dot.gov/environment/](http://www.fhwa.dot.gov/environment/), we showcase numerous examples



of ecological stewardship, both at home and abroad. In addition to underwriting environmental research and education programs through a national network of University Transportation Centers, FHWA also works closely with various committees of the National Academies' Transportation Research Board ([www.trb.org](http://www.trb.org)) to bring cutting-edge environmental research to transportation and environmental practitioners.

## The Nature Conservancy

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Working throughout the Americas, Asia and the Pacific Islands, we employ a scientific, systematic analysis to identify places large enough in scale and rich enough in plant and animal species to ensure meaningful conservation results. At each place, we employ a range of non-confrontational strategies tailored to local circumstances. The result is a network of tangible successes - places protected at an appropriate scale with the cooperation of local partners.

For the Arizona Missing Linkages Workshop, The Nature Conservancy provided results of our conservation assessments for the five ecoregions that lap into Arizona. Those assessments involved working with many partners to compile data on the distribution and ecology of hundreds of species and all natural ecological systems, with the goal of identifying priority areas for the conservation of biological diversity (now available online at [www.azconservation.org](http://www.azconservation.org)).

## Northern Arizona University

Northern Arizona University offers undergraduate and graduate education in many fields related to conservation and planning, including Forestry, Environmental Science and Policy, Applied Indigenous Studies, Civil and Environmental Engineering, Biological Sciences, Geography, Public Planning, and Environmental Education. NAU also conducts environmental research and outreach through these academic units and the Merriam-Powell Center for Environmental Research, Centennial Forest, US Forest Service Rocky Mountain Research Station, Biological Resources Division of US Geological Survey, Colorado Plateau Cooperative Ecosystem Studies Unit, Ecological Restoration Institute, and Center for Sustainable Environments. The University has a special mission to

serve the educational and research needs of Native American communities.

The Beier Lab of Conservation Biology, within the School of Forestry at NAU, is actively engaged in research on wildlife corridors, and scientific approaches to the design of linkages. In addition to research on wildlife movement in fragmented landscapes, the lab has been involved since 1999 with collaborations among diverse stakeholders to design and implement plans to conserve connectivity over large landscapes in southern California. The lab is currently assisting the development of a three-nation migratory corridor for elephants in West Africa and creating linkage designs for high priority potential linkage zones in Arizona.

## The Sky Island Alliance

Sky Island Alliance is a membership-driven conservation organization based in Tucson, Arizona with the overall goal to protect and restore the native biological diversity within the Sky Island region. Through the Wildlife Monitoring Program, Sky Island Alliance identifies at-risk landscape-level wildlife corridors within the region and conducts within those corridors long-term wildlife monitoring and data collection that can be used to guide local and state management decisions related to the preservation and restoration of bio-regional connectivity.

The Monitoring Program is particularly concerned with the movement of four large, wide-ranging mammals: black bear (*Ursus americanus*), mountain lion (*Puma concolor*), jaguar (*Panthera onca*), and Mexican gray wolf (*Canis lupus baileyi*) and two smaller species, bobcat (*Lynx rufus*) and coati (*Nasua narica*). Sky Island Alliance chose to monitor top predators primarily based on their large spatial requirements and reliance on wildlife corridors linking the mountain ranges of the Sky Island ecoregion. To date four possible wildlife corridors with potential threat from urban development have been identified for monitoring. These study areas include: the Tumacacori-Santa Rita corridor, the Cienega Creek Watershed, the Dragoon-Whetstone Corridor, and the north/south spine of the Peloncillo Mountain range. The Wildlife Monitoring program relies on volunteers to collect data on wildlife presence. These "citizen scientists" conduct track surveys along pre-established transects. In addition to the track surveys, Sky Island Alliance collaborates with Arizona Department of Transportation, Natural Resources Management Section, to analyze data from remote cameras installed under bridges and in culverts along the main highways that bisect project areas. Currently cameras have been installed along State Route 90 and SR 80 in the Dragoon/Whetstone corridor. In addition,

plans are underway to install cameras along Interstate 19 in the Tumacacori/Santa Rita corridor.

## USDA Forest Service

"Caring for the land and serving people" is the Forest Service motto. Forest Service employees redeem that pledge in several important ways: first, through stewardship of the national forests and grasslands; second, through cutting-edge research programs that promote conservation, recycling, and new technologies that support ecologically sustainable development; and third, through State and private forestry programs that help deliver the benefits of conservation to hundreds of communities and States across the Nation. In this new century of service, the Forest Service will continue to play a leadership role in the United States and abroad for the lasting benefit of this and future generations.

The Forest Service was created a century ago as an agency with a unique mission: to sustain healthy, diverse, and productive forests and grasslands for present and future generations. President Theodore Roosevelt entrusted the care of the forest reserves — later known as the national forests and grasslands — to the U.S. Department of Agriculture. When the Forest Service was created, the Nation had about 760 million acres of forestland. Today, there are still nearly 750 million acres of forestland. Sustaining our forestland area during the last century while the U.S. population grew by nearly 300 percent is a remarkable conservation success story. However, some serious threats to the health of the Nation's forests exist today: heavy fuel loading and resulting high intensity stands replacing fires, insect infestations and plant diseases, loss of open spaces and wild forest areas, invasive species disrupting natural ecosystems, and the growing impact of unmanaged recreation on forests and grasslands.

Today, the Forest Service manages 191 million acres of national forests and grasslands and contributes to the sound management of more than 500 million additional acres of forestland through technical and financial assistance to private landowners, other Federal agencies, and State and local governments. The 1964 Wilderness Act gave legislative protection to the burgeoning national wilderness system. Today, about 35 million acres of national forest land is designated as wilderness — lands designated by Congress for preservation and protection in their natural condition.

In keeping with ecosystem management, the Forest Service is moving toward broader-based management of a full complement of



native wildlife and plant species. Management is routinely targeted to species assemblages and communities such as upland early associate species, wetland habitats, dead and dying tree associated species (almost 30 percent of the vertebrate species on National Forest System lands), fire-adapted communities and old growth species. Management is directed toward maintaining biodiversity for all wildlife that is not endangered or threatened, and within the capabilities of long-term sustainability, managing for species at higher levels to meet public demand. Frequently, this means providing for a better mix of successional stages for landscape level biodiversity, or protecting especially important habitats like wetland and riparian areas.

The national forests and grasslands provide: 80 percent of the elk, mountain goat, and bighorn sheep habitat in the lower 48 States; as much as 12 million acres of waterfowl habitat; 28 million acres of wild turkey habitat; and habitat for 250 species of neotropical migratory birds.

A constantly updated web site helps those dealing with wildlife and transportation issues. "The Wildlife Crossings Toolkit" is designed for professional wildlife biologists and engineers faced with integrating our highway infrastructure and wildlife resources. What is the Wildlife Crossings Toolkit and how do I use it? The Toolkit is a searchable database of case histories of mitigation measures, and articles on decreasing wildlife mortality and increasing animals' ability to cross highways. Who created the Toolkit? The Toolkit project was initiated by the USDA Forest Service, San Dimas Technology and Development Center. The website was created by Utah State University's Jack H. Berryman Institute with support from the S.J. and Jessie E. Quinney Foundation. Other partners include the Federal Highway Administration and Western Transportation Institute. Who is the Toolkit designed to serve? Professional wildlife biologists and engineers can use the Toolkit interdisciplinary to creatively solve challenges associated with highways.

For further information on the Wildlife Crossings Toolkit go to: <http://www.wildlifecrossings.info/beta2.htm>.

## The Wildlands Project

The Wildlands Project's efforts include the scientific mapping and on-the-ground implementation of Wildlands Network Conservation Plans throughout North America, including the "Spine of the Continent" region of the Rocky Mountains from Canada to Mexico. Currently published wildlands networks in this region, created through partnerships with many regional organizations, include the "Heart of the West" Wildlands Network in Wyoming and Utah; the Southern Rockies Wildlands Network in Colorado; the New Mexico Highlands Wildlands Network in north-central New Mexico; and the Sky Islands Wildlands Network in southeastern Arizona and southwestern New Mexico.

The GIS mapping and conservation-planning document developed by the Wildlands Project and partners for the Sky Islands region of Arizona was utilized by the Arizona Wildlife Linkages Workgroup in preparation for the Arizona's Missing Linkages Workshop, and a presentation on the Sky Islands Wildlands Network was made by Wildlands Project Southwest Director Kim Vacariu at the workshop. Kim Vacariu has been a member of the Arizona Wildlife Linkages Workgroup since its inception and has contributed many hours of time to the project, attending meetings and organizing workshops.

The protection of cross-highway wildlife linkages is a primary focus of the Wildlands Project's implementation efforts in Arizona.

