

Prepared by:
The Arizona Wildlife Linkages
Workgroup



ARIZONA'S WILDLIFE LINKAGES ASSESSMENT



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Prepared by:

The Arizona Wildlife Linkages Workgroup

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The Arizona Wildlife Linkages Workgroup Mission Statement

“To identify and promote wildlife habitat connectivity using a collaborative, science based effort to provide safe passage for people and wildlife”



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EXECUTIVE SUMMARY



The phenomenal growth of Arizona's human population, economy, and infrastructure present challenges to maintaining natural ecosystems and wildlife populations that constitute an important part of Arizona's wealth. In particular, roads, urbanization, canals, railways, energy corridors and activities of illegal migrants and border security operations not only destroy habitat, but create barriers that isolate wildlife populations and disrupt ecological functions such as gene flow, predator-prey interactions, and migration. Addressing each of these potential barriers one-at-a-time is expensive and inefficient. In each landscape, we must address all these factors concurrently to successfully maintain or restore linkages between habitats and conserve the wildlife and natural ecosystems that Arizona's residents and visitors rely on and benefit from.

Conspicuous evidence of habitat fragmentation is wildlife road kill - a far too common sight along many Arizona roadways. These often fatal encounters have far-reaching effects. Wildlife-vehicle collisions can result in human deaths and injuries, millions of dollars in property damage, loss of game and non-game animals, and sometimes expose the State to liability. Working together, federal, state, county and private stakeholders can minimize these social costs while enhancing opportunities for movement of wildlife between Arizona's habitat areas.

The Arizona Wildlife Linkages Workgroup (AWLW) has taken the first step in that process. The AWLW is a collaborative effort between public and private sector organizations formed to address habitat fragmentation through a comprehensive, systematic approach. Through this partnership and commitment, a statewide assessment was conducted to identify large blocks of protected habitat, the potential wildlife movement corridors between as well as through them, and the factors threatening to disrupt these linkage zones. After four successful workshops and many hours spent coordinating, meeting, mapping and writing, we present our initial findings, methodology and recommendations – a product that is intended to evolve and ultimately be used as a planning instrument.

The *Arizona's Missing Linkages Workshop* held in April 2004 and the follow-up workshops that ensued are the basis for this report and mapping tool. Attendance at the workshops was well represented

with biologists, engineers, planners and land managers from state and federal agencies, universities, consulting firms and private sector conservation organizations. Individuals were divided into groups to address specific geographic regions. They used map transparencies and tailored questionnaires to assist in the identification of habitats, wildlife species, wildlife behavior and needs, *potential linkage zones* (see *Table 4-1*) as well as present and future threats or opportunities for conservation. One of the many products resulting from this process was a computerized geographic information system (GIS) projection graphically displaying the compiled information. There are over 150 potential linkage zones included in the Arizona's Wildlife Linkages Map.

The potential linkage zones represent areas that are important to Arizona's wildlife and natural ecosystems. If integrated into regional planning frameworks, these areas have the potential to be maintained or preserved during this time of prosperity, growth and development. As such, for each potential linkage zone, the AWLW built on information collected from the workshops to further define existing conditions, recording biotic communities, listing species that depend on particular linkages, identifying land ownership within those linkages, and detailing known and anticipated threats.

For further refinement, potential linkage zones were prioritized based on biological importance threats - existing and anticipated - and opportunities for preservation and/or restoration purposes. Biological importance scores depended on the size and habitat quality of the *habitat blocks* (see *Table 4-1*) and on the ability of the potential linkage zones to support special status species, aquatic ecosystems, or seasonal migrations. Threat scores reflect the barrier effect of canals, roads, urbanization and railroads. Opportunity scores indicate ongoing and proposed conservation efforts in the areas, and whether impending major road projects provide an opportunity to increase the permeability of roads. As road construction programs are updated and development in the State progresses, this evaluation and resulting prioritization will need revision.

Our intention in this report is to provide a starting point for detailed consultation and coordination among the organizations and agencies that have a major role to play in maintaining habitat connectivity. To offer flexibility in the use of this report, all the maps within this

document have been created at the same scale so that the transparency of the Arizona's Wildlife Linkages Map included in the front of this document may be used as an overlay. Furthermore, the report was drafted in a manner to allow each individual chapter to be used as a stand-alone tool. For that reason, terminology common throughout the entire document is defined in each section. All technical terms are also collectively defined in the glossary.

Important to taking the next step in preserving or restoring habitat connectivity is the physical design and construction of linkages. To help facilitate these applications, this report outlines the methodology used to create specific linkage designs within potential linkage zones. In the coming years, the AWLW intends to develop linkage designs for each potential linkage zone through a combination of GIS analysis and fieldwork. This analysis coupled with a feasibility study on linkage protection will further define the present potential linkage zones into smaller, more site-specific delineations and is intended to aid in conservation and planning efforts. Linkages ranking highest in our prioritization will be addressed first. Future assessments will identify additional potential linkage zones.

This report represents the results of the first statewide wildlife linkages assessment. We hope to elevate the current level of awareness of wildlife connectivity areas and issues in Arizona. The tools in this report will allow land managers to incorporate the identified wildlife linkage zones into their management planning processes to address habitat fragmentation due to highways and other human development. We expect to facilitate the integration of the potential linkage zones presented in this report and those identified in the future into early project planning efforts. We acknowledge that this is only the first step in a continuing process of defining critical habitat connectivity areas.

Now more than ever, decision makers have a responsibility to protect and maintain wildlife linkages to sustain Arizona's diverse wildlife species and wild landscapes. We firmly believe that government agencies and citizens working together with a comprehensive, landscape-scale approach can achieve these conservation goals while accommodating the growth of Arizona's population, an expanding economy, and associated infrastructure.

- The Arizona Wildlife Linkages Workgroup





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Nothing in this report obligates the Arizona Department of Transportation, Arizona Game and Fish Department, Bureau of Land Management, Federal Highway Administration, Northern Arizona University, Sky Island Alliance, USDA Forest Service, US Fish and Wildlife Service or the Wildlands Project to commit or transfer any funds. Specific work projects or activities that involve the transfer of funds, services, or property among the various agencies and organizations referred to in this report will require separate agreements and be contingent upon the availability of appropriated funds. Appropriate statutory authority must independently authorize such activities. This report does not provide such authority. Negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations.

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LIST OF ACRONYMS



AASHTO	American Association of State Highway and Transportation Officials	DDT	Dichlorodiphenyltrichloroethane	NEPA	National Environmental Policy Act
ADEQ	Arizona Department of Environmental Quality	DOD	Department of Defense	NFWF	National Fish and Wildlife Foundation
ADOT	Arizona Department of Transportation	DPS	Department of Public Safety	NMBCA	Neotropical Migratory Bird Conservation Act
ADWR	Arizona Department of Water Resources	EDTM	Efficient Transportation Decision Making	NMFS	National Marine Fisheries Service
AG	Attorney General	EIS	Environmental Impact Statement	NPS	National Park Service
AGFD	Arizona Game and Fish Department	EPA	U.S. Environmental Protection Agency	NRCS	Natural Resources Conservation Service
AHR	Americans for Our Heritage and Recreation	EQIP	Environmental Quality Incentives Program	PAG	Pima Association of Governments
AHS	Arizona Highway System	ESA	Endangered Species Act	PARC	Partners in Amphibian and Reptile Conservation
ALRIS	Arizona Land Resource Information System	FHWA	Federal Highway Administration	PCA	Patch Configuration Analysis
AORCC	Arizona Outdoor Recreation Coordinating Commission	FMPO	Flagstaff Metropolitan Planning Organization	PTI	Pulling Together Initiative
A.R.S.	Arizona Revised Statutes	FRPP	Farm and Ranch Land Protection Program	RMP	Resource Management Plan
ASH	Arizona Service Highway	FSA	USDA Farm Service Agency	SEAGO	South Eastern Arizona Governments Organization
ASLD	Arizona State Land Department	FWCA	Fish and Wildlife Coordination Act	SEPM	Spatially Explicit Population Model
ASP	Arizona State Parks	GIS	Geographic Information System	SCWCs	State Comprehensive Wildlife Conservation Strategy
ATIS	Arizona Transportation Information System	GPS	Global Positioning System	SLIF	State Lake Improvement Fund
AWLW	Arizona Wildlife Linkages Workgroup	GRP	Grassland Reserve Program	SR	State Route
AZ	Arizona	HCP	Habitat Conservation Plan	SWG	State Wildlife Grant
BBN	Bring Back the Natives	HFRP	Healthy Forests Reserve Program	TDML	Total Maximum Daily Load
BIA	Bureau of Indian Affairs	I	Interstate	TNC	The Nature Conservancy
BLM	Bureau of Land Management	km	Kilometer	TU	Trout Unlimited
BOR	Bureau of Reclamation	LCCA	Least Cost Corridor Analysis	U.S.	United States
CAB	Conservation Acquisition Board	LIP	Landowner Incentive Program	USAF	U.S. Air Force
CACOG	Central Arizona Council of Governments	LRSP	Local, Regional and State Parks	USC	United States Code
CAP	Central Arizona Project	LWCF	Land and Water Conservation Fund	USDA	U.S. Department of Agriculture
CCAA	Candidate Conservation Agreements with Assurances	MAG	Maricopa Association of Governments	USDOl	U.S. Department of Interior
CCC	Commodity Cooperation Corporation	MBTA	Migratory Bird Treaty Act	USFWS	U.S. Fish and Wildlife Service
CERI	Craighead Environmental Research Institute	MFP	Management Framework Plan	USGS	U.S. Geological Service
CFR	Code of Federal Regulations	MOU	Memo of Understanding	WACOG	Western Arizona Council of Governments
CIG	Conservation Innovation Grants	MP	Milepost	WCS	Wildlife Conservation Society
Corps	U.S. Army Corps of Engineers	MSCGP	Multistate Conservation Grant Program	WHIP	Wildlife Habitat Incentives Program
CRP	Conservation Reserve Program	NACOG	Northern Arizona Council of Governments	WHPRP	Wildlife Habitat Policy Research Program
CSP	Conservation Security Program	NAU	Northern Arizona University	WMA	Weed Management Area
CWA	Clean Water Act	NAWCA	North American Wetlands Conservation Act	YMPO	Yuma Metropolitan Planning Organization
CWCS	Comprehensive Wildlife Conservation Strategy				
CYMPO	Central Yavapai Metropolitan Planning Organization				



GLOSSARY



HABITAT BLOCK: an area of land that consists of important wildlife habitat and can reasonably be expected to remain wild for at least 50 years. Habitat blocks are primarily comprised of lands within National Forests, National Parks, National Wildlife Refuges, large military reservations, tribal lands and lands managed by Bureau of Land Management or Bureau of Reclamation. Although some of these lands contain bombing ranges, barracks, reservoirs, and other non-natural elements, they still have a long-term prospect of serving as wildlife habitat. We recognize that tribal sovereignty retains the right to develop those lands. Habitat blocks also include private lands that are managed for conservation, such as Nature Conservancy preserves and some large ranches whose owners are committed to long-term conservation. All other private lands and land owned by Arizona State Land Department (which has no conservation mandate under current law) have for the most part been excluded. (Note: To keep maps readable, some habitat block polygons include small private and state inholdings that may not be conserved).

FRACTURE ZONE: areas of reduced permeability between habitat blocks. These regions are largely State Land, private holdings and transportation corridors. Roads, canals, urban areas, railroads, or border security operations limit or prevent animal movement, or threaten to do so in the foreseeable future in these zones. Most fracture zones need significant restoration to function as reliable linkages. Portions of the fracture zone are designated as potential linkage zones (see definition below). Resource agencies and conservation groups should continue to protect and enhance washes, streams, and rivers as major corridors in all areas of the fracture zone, including improvements to culverts and bridges to promote wildlife permeability.

POTENTIAL LINKAGE ZONE: a portion or subset of the fracture zone or habitat block identified as an area critical to wildlife movement. Threats must be managed if connectivity is to be maintained or restored. We emphasize that these polygons depict planning areas within which a functional linkage(s) must be designed and conserved. In most cases, only a small fraction of the proposed potential linkage zone will be included in the linkage design (*Section X*), which will be developed in future detailed analyses.

RIPARIAN HABITAT/LINKAGE ZONE: streams that historically supported riparian communities and perennial water flow (in some cases pools linked by subsurface flow for much of the year). Each potentially provides essential habitat for aquatic species, and critical landscape connectivity for both aquatic and terrestrial animals (*Section VIII*).



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