

Wildlife Linkages Research RTA Wildlife Linkages Project Funding Proposal

1. NAME/ORGANIZATION

Arizona Department of Transportation, Office of Environmental Services
Arizona Game and Fish Department, Research and Habitat Branches

2. PROJECT TITLE

Pima County Wildlife Connectivity Assessment

3. INTRODUCTION

Project Purpose

Arizona is one of the fastest growing states in the nation, and Pima County is similarly and concurrently experiencing explosive human growth. A rapidly-expanding transportation infrastructure accompanies this growth and presents huge challenges to the persistence of many of Pima County's varied, and in some cases unique, wildlife species. Increasing the number of people on Pima County's roads increases the likelihood of wildlife/vehicle interactions, which can be fatal for both animals and people. The direct effect on wildlife from the presence of roadways is obvious through roadkill incidents, but roads also present barriers to animal movements from habitat fragmentation, which in turn leads to animal population declines and even extinctions. The Regional Transportation Authority (RTA) recognized the problems a burgeoning transportation system would have on Pima County's wildlife and was authorized to deal with some of the wildlife/transportation issues in a comprehensive fashion.

Loss of connectivity and other impacts on wildlife caused by transportation networks is by no means inevitable, and the outcome of Pima County's human population growth does not have to result in an increase in barriers to wildlife movement. Although road-widening projects generally increase vehicular traffic, this need not result in more wildlife/vehicle collisions, or a decrease in wildlife movement. As the RTA has recognized, road-widening projects present the greatest opportunity to provide crossing structures to accommodate wildlife movement. Since most of Pima County's roads were not originally designed to accommodate wildlife movement, current road improvement projects can dramatically restore permeability (the ability of an animal to move around in its environment). However, County planners and engineers must be informed of the best locations and designs needed to enhance wildlife permeability and habitat connectivity early in the planning process.

The RTA has already identified roadways and projects that will be constructed or reconstructed on a prioritized basis. However, planners currently have limited information on 1) how to move a variety of species safely across those roadways and 2) where those crossing features should be placed. The first problem of how to move animals across roadways is addressed in other work being done through the RTA. The second problem of where to place crossing features on RTA projects is addressed in this proposal. Identification of key wildlife connectivity areas will allow early input into engineering plans to ensure wildlife connectivity and will also encourage efficient use of resources.

This project represents a Pima County specific application of the Arizona Wildlife Linkages Workgroup (AWLW) in addressing statewide habitat connectivity. The AWWLW is a partnership of organizations that came together in 2003 to address the issues presented by the presence of roads and other barriers to wildlife movement and human safety. A list of AWWLW members is available in section 10 of this proposal. The original Arizona's Wildlife Linkages Assessment (AWLA) from 2006, (available at http://www.azdot.gov/Highways/OES/AZ_WildLife_Linkages/assessment.asp), and map effort was a "broad brush" approach to identifying linkages between habitat blocks and across fracture zones. Further refinement of the coarse scale map is necessary to ensure that all wildlife corridors within what were originally called "habitat blocks" as well as those that may have been inadvertently overlooked during the first assessment are identified and documented. The focus of this refinement is a county-by-county approach in which stakeholders and partners are brought together to further identify crucial habitats and corridors. As in the original report, this is a landscape issue. This refinement effort will assist in reinforcing the commitment to and the efficiency of wildlife connectivity measures undertaken by all stakeholders. This will also expand the proactive approach already begun in transportation projects to include regional development planning efforts. Overall, this project will add to the existing set of identified wildlife linkages and provide a more comprehensive view of connectivity and will focus specifically on Pima County, as is necessary in this time of growth and expansion.

In general, this project will:

- 1) Identify areas within Pima County that need to be protected in order to maintain wildlife permeability across highway corridors, development areas, and other associated infrastructure.
- 2) Organize the gathered material into documents that can be used by the RTA and planners within Pima County to reduce the incidence of wildlife/vehicle collisions and incorporate wildlife connectivity needs into state and regional transportation and development plans.
- 3) Involve local and regional stakeholders to ensure that existing plans, such as the Sonoran Desert Conservation Plan (SDCP), are incorporated into the wildlife corridor identification and prioritization.

Though the County has already identified 6 critical landscape linkages within the SDCP, there is still great need and opportunity to identify gaps and refine linkages. Some of those reasons include:

- 1) The Town of Marana has refined the northern Tucson Mountains to Tortolita Mountains linkage as a part of their draft Habitat Conservation Plan (HCP) process. The Arizona Game and Fish Department conducted a wildlife crossing study at Rattlesnake Pass on Twin Peaks Road and their recommendations for maintaining/improving wildlife linkage will be implemented when private development occurs to the west of the Tucson Mountains. A regional wildlife study will provide impetus for the Town and other entities to create a functional wildlife corridor between the two segments of the Tucson Mountain range.

- 2) Pima County has worked with The Town of Oro Valley and the Arizona State Land Department (ASLD) to refine the southern strand of the Tortolita–Catalina linkage, an area identified as one of 16 most critical within the state and as crucial to the County’s draft Multi-species Conservation Plan.
- 3) Gaps remain within the Tucson Mountains, where roads intersect protected areas. Other concerns include linkages further south (Tohono O’odham/Yaqui Nations) and west to the Ironwood Forest National Monument, constrained by Sandario Road, the CAP canal and other roadways crossing the Brawley/Los Robles Wash complex, where the City of Tucson is pursuing an HCP in the Avra Valley.
- 4) One of the County-identified linkage areas utilizes a crossing under a bridge over I-19 connecting Canoa Ranch (Santa Rita Mountains) with private lands to the west (Cesar) of the freeway and further connecting to county planned open space at the Marley Ranch (Sierrita and Cerro Colorado Mountain Ranges).
- 5) The County-identified linkage connecting the Catalinas to the Santa Ritas has encountered development pressures along Davidson Canyon (Rosemont mine proposal and others, such as the Cal Mat/Portland cement mine) and opportunities exist to broaden strands and further refine the linkage(s).

Ramifications of no action

There is a need to identify potential wildlife connectivity zone locations for use in the design and placement of wildlife crossings in RTA transportation planning. We anticipate that the information gained by these workshops will be incorporated into a wide variety of roadway plans in the Sonoran Desert. If this project is not implemented, roadway engineers may inadvertently design roads that continue to seriously affect wildlife movement and may result in increased collisions between vehicles and wildlife. While previous efforts have identified wildlife movement areas, we recognize that the results were not comprehensive; not having a complete list of where existing wildlife connectivity zones are located, analyzed within the context of jurisdictional land use plans, may lead to further fragmentation of wildlife connectivity and habitat throughout the RTA area of concern. Being able to present this information early on in the planning process saves time and money compared to having to retrofit roads and introduce areas for wildlife connectivity after a community is already platted.

4. OBJECTIVES

This project proposal focuses on the following objectives:

- 1) Conduct a partner/stakeholder workshop to exhaustively identify key wildlife, crucial habitats, and permeability corridors across Pima County.
- 2) Conduct a second partner/stakeholder workshop to verify the mapped corridors resulting from the first workshop and to gather input from stakeholders about upcoming transportation and development projects in addition to biological information that will allow the RTA, AWLW, local

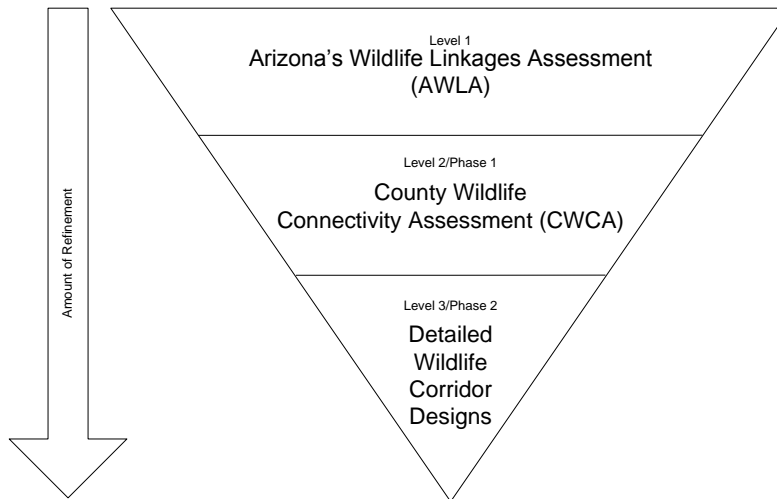
- project partners and stakeholders to create a list of wildlife connectivity areas requiring immediate action and detailed corridor analysis.
- 3) Produce a mid-level document and associated GIS datasets that will be made available to planners and developers to encourage them to include wildlife considerations into transportation and development plans. This document will serve as a starting point for detailed consultation and coordination among the organizations and agencies that play a major role in maintaining habitat connectivity in Pima County.
 - 4) Produce fine-scale reports and associated GIS datasets for the connectivity areas indicated as needing detailed corridor analysis.
 - 5) Enhance and integrate interagency coordination in addressing habitat connectivity and highway/wildlife conflicts in Pima County.

5. APPROACH

Overview:

The main goal of this project is to identify continuous corridors of land throughout Pima County which—if integrated with habitat restoration, conservation, and crossing structures such as underpasses and overpasses across potential barriers—will best maintain or restore the ability of wildlife to move between crucial habitat blocks. This effort will be known as the Pima County Wildlife Connectivity Assessment (Pima CWCA) and will fit in with a larger effort by the AWLW to identify wildlife corridors and linkages across the state.

Building on the work reported in the AWLA and other connectivity identification efforts, the Pima CWCA will further identify and refine wildlife corridors using stakeholder input and Geographic Information System (GIS) techniques. This effort is represented by a hierarchical approach, as shown in the schematic below, where the AWLA represents corridors at the broadest geographic scale (Level 1), identifying areas within which corridors need to be placed in order to maintain connectivity. The CWCAs (Level 2) are then completed using the same stakeholder input approach as in the AWLA, but with a focused countywide extent, which will allow for direct input from local planners, developers, and conservation groups on areas important for wildlife connectivity within the county. The Detailed Wildlife Corridor Designs (Level 3) are the finest geographic scale, and are created for the connectivity areas chosen in 4.4 above. These reports will provide such information as representations of the biologically best corridors for the species in the area as well as recommendations and guidance for maintaining connectivity including the placement of roadway crossing structures, the role of fencing and the potential use of other mitigation measures.



General Project Approach:

As stated above, the Pima CWCA process will build upon the AWLA. To produce the statewide AWLA map, stakeholders convened at a two-day workshop and identified areas where corridors need to be created or maintained in order to promote connectivity. The next two levels constitute the scope of this proposal. *Phase 1* of this proposal is comprised of the Pima CWCA, which will identify wildlife corridors across Pima County within and between crucial habitats at a more refined scale than the initial effort and will identify corridors within larger “potential linkage zones”. This exhaustive identification will include both areas that currently function as corridors and areas on the landscape that are in need of having connectivity restored. The identification of wildlife corridors within crucial habitat blocks is critical to maintaining habitat connectivity in the face of the imminent expansion of the population and the associated infrastructure necessary to accommodate such growth—areas that are currently intact may be fragmented in the near future unless wildlife movement patterns and needs are considered. The Detailed Wildlife Corridor Designs represent *Phase 2* of this proposal and are at the finest geographic scale (i.e., connecting mountain range A to mountain range B). These will provide representations of the biologically best corridors for a selected suite of focal wildlife species to move between and within crucial habitat blocks.

Phase One will consist of the following elements:

- Two workshops will be held to 1.) gather stakeholder input and 2.) validate GIS interpretation of input. These workshops will also allow us to compile information characterizing each corridor.
- At the end of Phase One for Pima County, a report, map, and GIS dataset of wildlife corridors/crucial habitat blocks will have been created.

Phase Two will build on Phase One and will consist of the following elements:

- Pima RTA, partner agencies, AWLW, and local stakeholders will use information gathered at workshops to assess which corridors should be further refined through GIS modeling.
- Model five corridors and ground-truth model results with field verification and wildlife telemetry data where available.

- At the end of Phase Two, reports, maps, and GIS datasets will be completed for each of the five modeled corridors in a format similar to the Arizona Missing Linkage Reports developed by the Corridor Design team at Northern Arizona University (www.corridordesign.org).

Detailed Project Approach:

- Partners: Pima County RTA, Pima County, Town of Marana, Town of Oro Valley, Town of Sahuarita, City of Tucson, Coalition for Sonoran Desert Protection, Desert Watch, Sonoran Institute, and the AWLW (including ADOT and AGFD),.
- Stakeholders: USFWS, USFS, BLM, ASLD, DOD, NPS, ADOT, FHWA, county/city planners and engineers, tribes, conservation groups, AGFD Wildlife Managers and regional biologists, APS, SRP, any other agency/organization/individual who plays a role in addressing wildlife connectivity

Phase One:

- Stakeholder Workshop #1:
 1. Send “save the date” e-mail two months prior to workshop, invitation letter one month prior, phone calls to invitees as needed/appropriate
 2. Develop materials:
 - Break county/region up into smaller geographic areas for different workshop stations
 - Provide maps for each area displaying datasets that will help inform the stakeholder input process
 - Datasheets will be used to record information on each crucial habitat block and wildlife corridor drawn on the map
 3. Hold Workshop #1 (full day):
 - AM: presentations from partners on the importance of connectivity and the history of the connectivity effort in Arizona
 - PM: identify species important in the county (even those for which we don’t have a model built or sufficient data on); break-out sessions where crucial habitat blocks are further divided if necessary, corridors are hand-drawn, datasheets are completed, and species relevant for habitat suitability models are identified
 4. Analysis of data collected at meeting
 - Digitize input from meeting into GIS shapefiles and review results; compare and merge with AWLA and Sonoran Desert Conservation Plan or other HCPs where appropriate
 - Enter datasheet information into database
 - Draft mid-level report (include information such as overview map showing all corridors in the county, wildlife species occurring in the area, ownership entities, threats, etc.)
 5. Stakeholder Outreach – send workshop #1 meeting notes to entire invitee list and the RTA
- Stakeholder Workshop #2:
 1. Send “save the date” e-mail two months prior to workshop, invitation letter one month prior, phone calls to invitees as needed/appropriate
 2. Develop materials:
 - Use same maps as at previous workshop

- Maps will display:
 - Potential Linkage Zones from AWLA, the County SDCP, and other HCPs
 - Newly identified corridors
- Datasheets will be used to record information on any additional wildlife corridors added to the map
- 3. Hold Workshop #2 (1/2 day):
 - Recap process
 - Verify GIS corridors and add additional corridors that may have been missed at the previous workshop, or revise corridors that may have been modified
 - Collect information on each corridor from stakeholders, which partners will use to decide which linkages to model
- 4. Analysis of data collected at meeting
 - Digitize any additional input from meeting into GIS shapefiles and review results
 - Enter datasheet information into database
 - Send workshop #2 meeting notes to entire invitee list, including partner organizations
 - Finalize mid-level Pima County Wildlife Corridor Assessment report and GIS data
 - Distribute Pima County Wildlife Corridor Assessment report and GIS data to partners and make available to all stakeholders via a web page

Phase Two:

- Work with partner agencies to choose five areas to be modeled
- Contact species experts to develop habitat suitability models for any species for which we don't already have a model
- For each of the five corridors chosen to be modeled, use GIS tools developed by the Corridor Design team and available at www.corridordesign.org to model a corridor for the relevant focal species
- Refine models through ground-truthing, expert opinion, GIS evaluation tools, etc.
- Compare computer models to animal movement data and roadkill data, where available
- Draft Pima County Detailed Wildlife Corridor Design reports (similar to the Arizona Missing Linkage Reports—include detailed information about the corridor and surrounding landscape; identify barriers, species, and important organizations or agencies operating in the area)
- Send draft reports and GIS data to select stakeholders for review
- Finalize Pima County Detailed Wildlife Corridor Design reports and GIS data
- Distribute fine-scale Pima County Detailed Wildlife Corridor Design reports and GIS data to partners and make available to all stakeholders via a web page

6. FINAL DELIVERABLES

- **Pima County Wildlife Corridor Assessment** – This will be a map of all of the identified wildlife corridors in Pima County, GIS dataset of these corridors, and a written summary report. The overview map will be at a county scale, showing crucial habitat areas and the general locations of connectivity between them. The report will include information such as introduction, purpose, methodology, recommendations, county-specific details, and future steps, as well as summarized information for each corridor, such as a wildlife species list, current threats and opportunities, and other relevant data.
- **Five (5) Detailed Wildlife Corridor Designs** – These will be developed for a subset of corridors from the Pima County Wildlife Corridor Assessment. A comprehensive report will include fine-scale corridor maps, GIS datasets of these corridors, photographs, biological information for modeled species and their habitats, and specific management recommendations.

7. PROJECT COMPLETION SCHEDULE AND DELIVERABLES

We propose to accomplish the first phase of this project within one year, with the majority of the time committed to conducting the digitizing the identified potential wildlife linkage zones and assembling the compiled data. The second phase will be completed within 18 months. The table below details the projected timeframes associated with the accomplishment of each project objective and procedure. The specific deliverables associated with this proposed project and the timeframe for their completion or submission include:

Timeframe	Activity
Month 1-3	Plan stakeholder workshop #1
Month 3	Hold stakeholder workshop #1
Month 3-Month 7	Analysis of data from workshop; Preliminary “Pima County Wildlife Corridor Assessment” report development
Month 7	Stakeholder workshop #2
Month 7-Month 10	Analysis of data from workshop; Finalize “Pima County Wildlife Corridor Assessment” report; PHASE ONE COMPLETE
Month 10-Month 16	Preliminary “Pima County Detailed Wildlife Corridor Design” reports development; GIS modeling of high-priority corridor areas; Verification/ground-truthing of corridors
Month 16-Month 18	Finalize “Pima County Detailed Wildlife Corridor Design” reports; PHASE TWO COMPLETE

8. PROJECT BUDGET

Project Expenses	RTA Request	Non-RTA funding
Prepare and convene workshops	1,500 (mapping supplies)	2,000 (meeting room, refreshments, etc; Pima County/local partnership in kind)
AGFD staff member (salary and benefits) to analyze data and prepare maps / GIS datasets / reports, 12 month duration	55,000	0
Produce CDs containing final reports, maps, and GIS datasets	5,000	0
Administration (contracts administration, funding oversight and follow-up, review of preliminary findings and draft research report, use of GIS facilities) Local technical support and product evaluation by project partners	0	20,000 (AGFD in kind) 5,000 (Local partner inkind)
TOTAL	\$61,500	\$27,000

9. PRINCIPAL INVESTIGATORS/ORGANIZATIONAL EXPERIENCE

Dr. Ray Schweinsburg, AGFD, Research Branch, Program Manager
 Julie Mikolajczyk, AGFD, Habitat Branch, GIS Specialist
 Siobhan Nordhaugen, ADOT, Office of Environmental Services, GIS/Special Projects Consultant/Wildlife Connectivity

10. LIST OF COOPERATORS

The project is located in Pima County. Many agencies and non-profit organizations have been involved with the initial formulation and discussion of this project. All interested and affected jurisdictions, agencies and parties will be kept well informed as this important project progresses.

Local Partners:

- Pima County
- Town of Marana
- Town of Oro Valley
- Town of Sahuarita
- City of Tucson
- Coalition for Sonoran Desert Protection
- Desert Watch
- Sonoran Institute

Arizona Wildlife Linkages Workgroup (AWLW):

- Arizona Department of Transportation
- Arizona Game and Fish Department

AZTEC Engineering
Bureau of Land Management
Defenders of Wildlife
Federal Highway Administration
Northern Arizona University
Sky Island Alliance
USDA Forest Service
US Fish and Wildlife Service
Wildlands Network