



Tucson-Tortolita Mountains Wildlife Linkage Study Avra Valley Wildlife Corridor Monitoring Project

**Annual Report
January 31, 2024**



**Kit fox documented in the Cascada study area northeast of Interstate 10 by CSDP
Desert Monitor volunteer Raynor VanDeven.**

Acknowledgements

This work as made possible thanks to the time, effort, and skill of the following volunteers:
Carl Boswell, Joanne Devereaux, Charles “Chuck” Graf, Don Broomall, Jane “Middy” Henke, Lois Richardson, Marcy Tigerman, Raynor VanDeven, Jane Hunt, Peggy Ollerhead, Andrea “Dre” Hoerr, David DeGroot, Bruce Gungle, and members of the University of Arizona Environmental Law Society.

We want to especially highlight the dedicated volunteer efforts of Virgil Swadley, Keith Kleber, and Josh Skattum in making this project possible.

We also want to thank Pima County Office of Sustainability and Conservation, Pima County Natural Resources Parks & Recreation, Pima County Floodplan Control, the Town of Marana Parks & Recreation, and the Tortolita Alliance for their support.

Background

In February 2021, the Coalition for Sonoran Desert Protection (CSDP) began a new study of wildlife movement and species presence between the Tortolita and Tucson Mountains including the Avra Valley Wildlife Corridor, expanding from CSDP's first monitoring efforts in the Scenic Drive and Los Morteros study areas initiated in 2017. With this expanded study, monitoring is conducted using remote wildlife cameras now located both east and west of Interstate-10. We have stratified cameras within the Tucson-Tortolita Mountains Wildlife Linkage into six study areas for comparison (Figure 1), with 4 cameras sites assigned to each area, and placed a minimum of 200 meters apart:

1. Scenic Drive, on private property just south of Twin Peaks Rd and west of Scenic Drive in the Tucson Mountains;
2. Los Morteros, Pima County property located at the northeastern slope of the Tucson Mountains;
3. El Rio Preserve managed by the Town of Marana;
4. The Santa Cruz River corridor between Avra Valley Rd and Twin Peaks Rd managed by Pima County;
5. The Cascada development owned by Pima County east of Interstate 10; and
6. Tortolita Preserve north of Tangerine Road, managed by the Town of Marana and monitored with the help of adjacent private property owners.

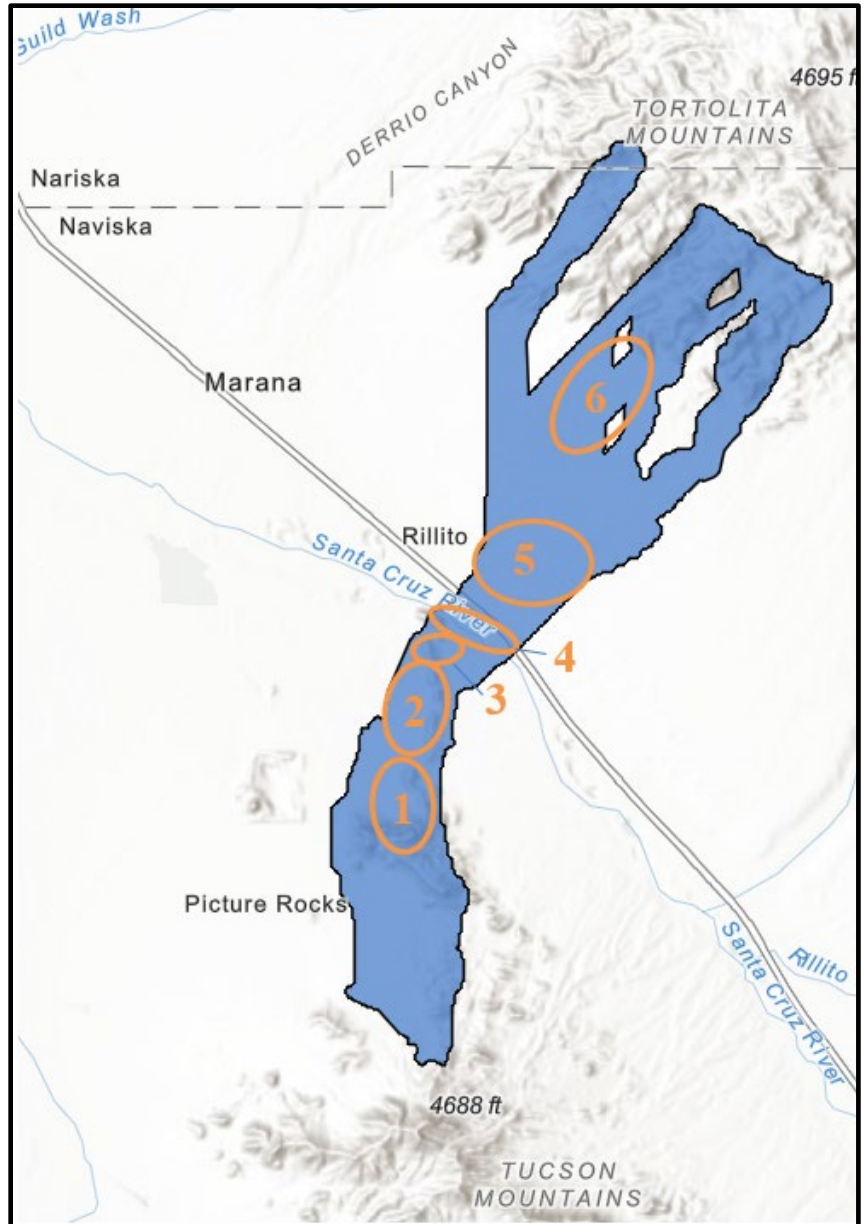


Figure 1. Location of study areas stratified within the Tucson-Tortolita Mountains Wildlife Linkage.

In addition to providing standalone data and images for each of these areas, data is comparable across study areas monitoring wildlife movement within the Tucson-Tortolita Mountains Wildlife Linkage. This data will also help supplement the University of Arizona's monitoring of the Santa Cruz River wildlife corridor under the direction of Dr. Michael Bogan.



Aerial view of a portion of the study area, facing northeast, showing Interstate-10 (upper left corner), the Santa Cruz River, El Rio Preserve, Los Morteros Conservation Area (right), and the northernmost point of the Tucson Mountains (bottom). Photo by Frank Staub with the support of LightHawk.

Supplementary data collection

This effort will also include wildlife camera monitoring at the abandoned railroad underpass located south of Avra Valley Rd managed by ADOT. An additional 2-4 cameras will be placed in the railroad underpass on I-10 near Avra Valley Road in spring of 2024 to gather wildlife passage rate data, before construction begins on the wildlife ramp planned by Pima County west of the underpass location.

In 2023, CSDP began augmenting these studies with walking roadkill surveys in a one mile stretch along Twin Peaks Road at Rattlesnake Pass and driving roadkill surveys on I-10 and the Frontage Road between Cortaro Farms Rd (Exit 246) and Tangerine Rd (Exit 240). The results of these surveys suggest that I-10 and the Frontage Road segment act as an almost total barrier to wildlife movement, with a sample size of only 1 documented case of wildlife (a coyote mortality) during 7 consecutive survey days.

Protocol

In total 22 wildlife cameras are currently maintained by CSDP staff and trained volunteers for this project. Site visits take approximately half an hour per camera and are accessed by foot, approximately once per month. Cameras use “low glow” infrared light for night images to avoid animal or human disturbance. We use Bushnell Core DS 4K camera models protected by a security box, with a 10 second delay. Equipment is attached to trees, secured with a padlock, and clearly labeled. Baits or lures are not permitted as a part of this project. For safety, staff and volunteers do not visit camera sites during upstream rain events or flash flood conditions. Volunteers follow local rules and regulations, are respectful of property, tread lightly, and ensure they do not leave debris. At the conclusion of the project, all equipment will be removed from the site.

Results

Sixteen remote cameras were deployed in 2021 and 2022, added to the four existing cameras in the Scenic Drive study area included in this analysis. We also added two more locations in/around Tortolita Preserve with the help of some local residents, to extend our study north of Tangerine Road.

With 22 cameras in the field, thus far we have gathered a total of 41,592 wildlife photos and documented over 43 species, totaling 20,703 trap days.

Javelina, coyote, and desert cottontail have been the most abundant species overall, with notable detections of mountain lion, badger, hognose skunk, western spotted skunk, and kit fox (Figure 2). We also documented a pheasant, presumably introduced or escaped, along the Santa Cruz River.

ALL SITES

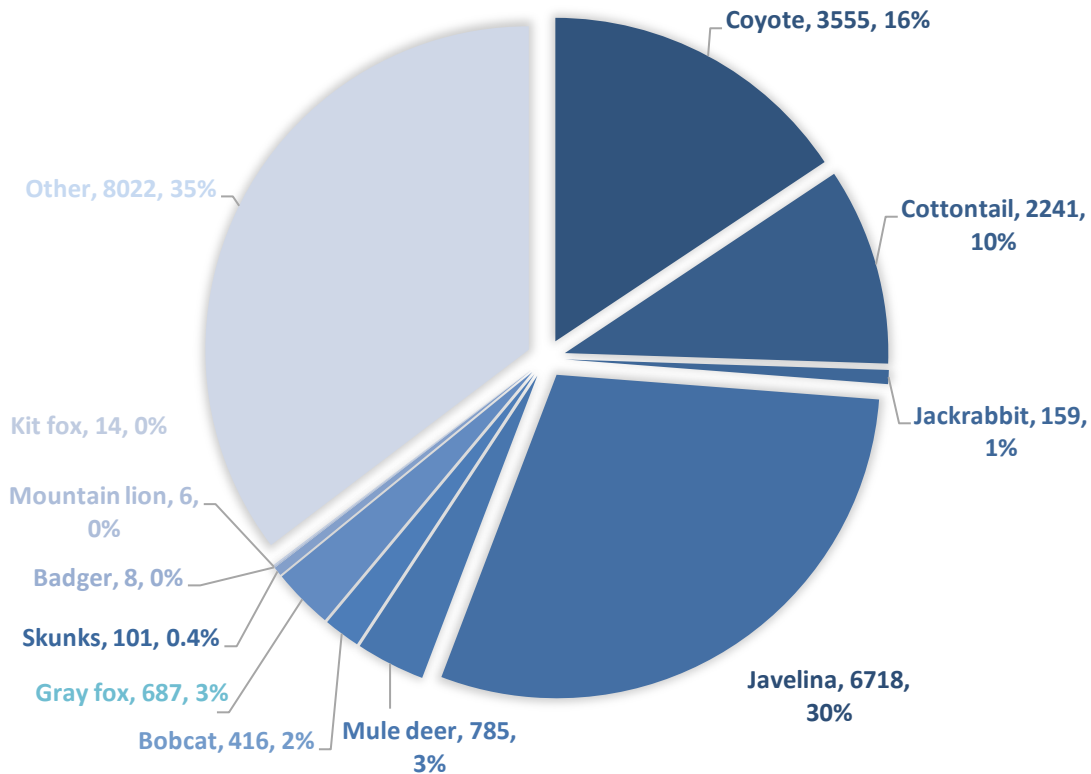


Figure 2. Species ranked by number of independent pictures (1 minute interval) and percent of total, across all study sites combined. Humans were excluded. “Other” species includes birds and rodents.

TABLE 2. Species richness and survey effort by camera site and study area (listed left to right from southwest to northeast).	Scenic Drive Properties (Private)				Twin Peaks Road	Los Morteros Ridgeline (Pima County)				El Rio Preserve (Town of Marana)				Santa Cruz River (Pima County)				Interstate 10	Cascada Property (Pima County)				Tangerine Road	Tortolita Preserve (Town of Marana/Private)	
	Scenic Drive 1: BANDIT	Scenic Drive 2: FRISKY	Scenic Drive 3: LUCY	Scenic Drive 4: CAMPBELL		Morteros 1: VERDIN	Morteros 2: KESTREL	Morteros 3: WARBLER	Morteros 4: NIGHTHAWK	El Rio 1: TERN	El Rio 2: KINGFISHER	El Rio 3: CARACARA	El Rio 4: SANDPIPER	River 1: DRAGONFLY	River 2: MUDDTURTLE	River 3: TOPMINNOW	River 4: FROG		Cascada 1: UTA	Cascada 2: HORNY TOAD	Cascada 3: GILA MONSTER	Cascada 4: WHIPTAIL		Tortolita 1: SKATTUM	Tortolita 2: BASIL
Amphibian		X												X											
Antelope jackrabbit														X											
Badger												X							X		X				
Barn owl									X						X										
Black-tailed jackrabbit		X	X	X														X	X		X	X			
Bobcat	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X		X	X	X			
Cooper's hawk									X						X										
Cottontail rabbit	X	X	X	X		X				X	X	X	X	X		X			X	X		X			
Coyote	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X			
Desert Iguana														X											
Desert spiny lizard						X																			
Desert tortoise		X	X											X	X										
Domestic cat	X																								
Domestic cow														X	X	X	X	X	X	X	X	X	X		
Domestic dog		X		X			X	X		X	X	X	X	X	X	X	X	X	X		X		X		
Gambel's Quail	X		X	X						X	X			X	X	X		X	X						
Gila monster			X																						
Gray Fox	X	X	X	X		X	X	X	X	X		X				X		X	X		X	X			
Great blue heron														X	X										
Great horned owl		X		X											X										
Ground squirrel	X	X	X	X		X	X		X										X						
Hognose skunk		X																							
Hooded skunk	X	X					X				X		X	X	X	X	X								
Hummingbird															X										
Javelina	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X			
Kangaroo rat	X																								
Kit fox																		X	X	X		X			
Mexican free-tailed bat		X									X	X													
Mountain lion		X	X					X																	
Mule deer	X	X	X	X		X		X	X	X				X	X			X	X	X	X	X	X		
Pheasant																X									
Other rodents	X			X																					
Other reptiles	X		X	X		X	X			X		X	X	X	X	X									
Other songbirds	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Other waterfowl												X		X											
Pond slider										X				X	X										
Raccoon	X	X	X	X		X	X			X	X	X	X	X	X	X	X		X						
Ringtail	X			X		X																			
Roadrunner	X	X	X	X		X	X	X	X	X		X	X	X	X	X		X		X	X				
Rock squirrel	X	X	X	X			X							X		X			X						
Western spotted skunk	X	X																							
White-throated woodrat	X	X	X	X		X		X	X					X	X										
White-wing dove	X					X				X		X		X	X	X			X	X					

Number of species	21	22	18	19	15	12	9	9	14	13	9	14	19	22	16	7	12	13	8	9	13	6
Number of photos	6643	4493	3764	5867	400	288	1131	287	738	2,004	1191	4904	1119	1,623	4276	426	404	317	358	319	888	152
Number of trap days	1,505	1,604	1,979	1,612	673	945	937	522	1073	1067	1072	1076	1053	1038	911	861	620	552	553	553	194	303
Total number of species	30				19				21				28				18				12	
Total number of photos	20767				2106				8837				7444				1398				1040	
Total number of trap days	6,700				3,077				4,288				3,863				2,278				497	

Last updated 1/31/2024

Cumulative Detections of Mule Deer

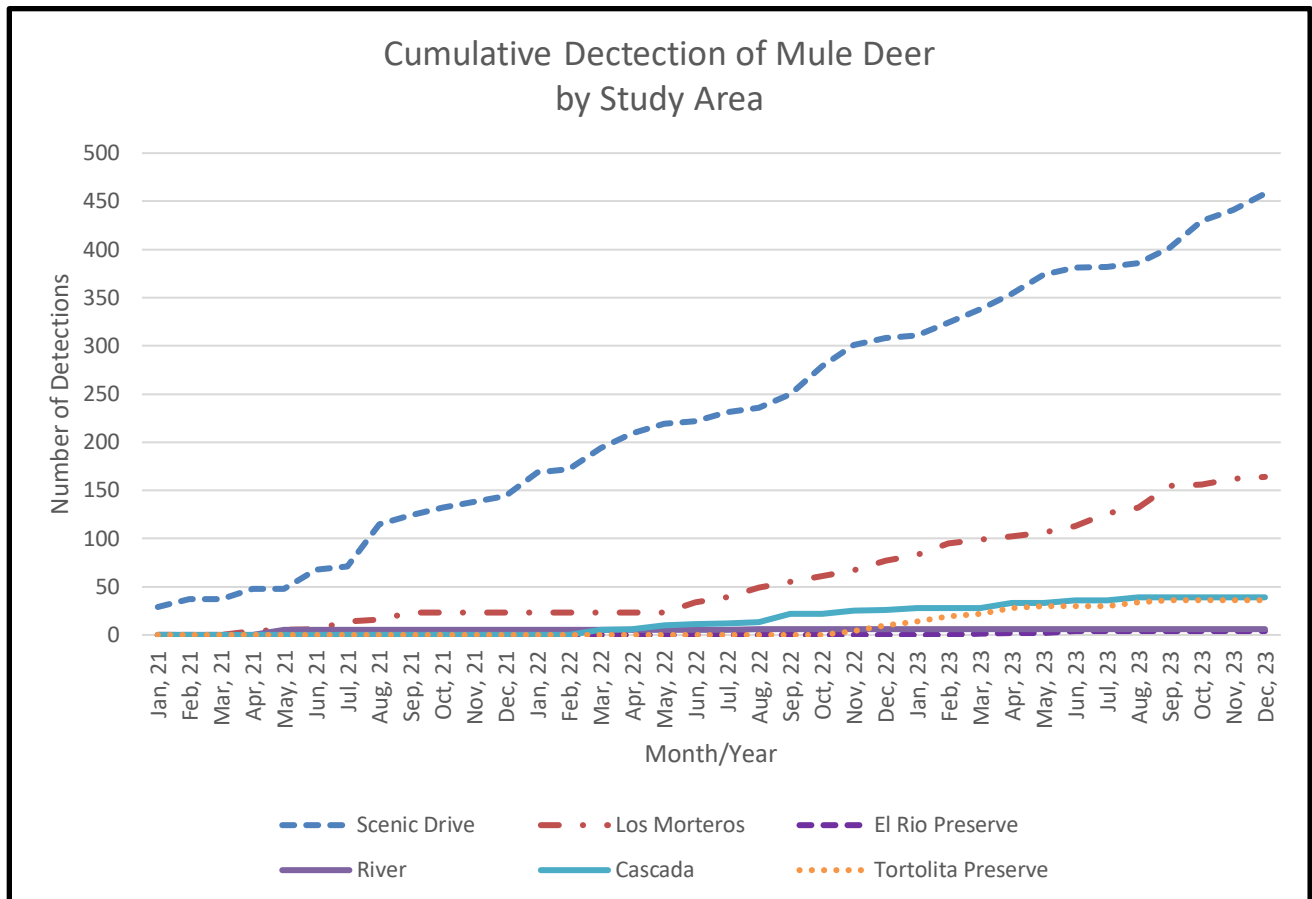


Figure 3. Cumulative detection of Mule Deer across all six study sites from Jan 2021 – Dec 2023.

Field Notes:

- Mule deer comprised only 3% of independent pictures but were documented in 16 of the 22 camera locations, or 72% occupancy of the camera sites, and showed 100% occupancy in all six study areas. They were most abundant in the Scenic Drive and Los Morteros study areas, with 4 detections made in the El Rio Preserve study area and 6 in the Santa Cruz River study area (Figure 3). This could suggest that the river's levy and/or N. Silverbell Road act as a barrier to Mule Deer movement despite the attraction of available water.
- Only at sites west of Interstate-10 have we documented ringtails and hooded skunks, and western spotted skunks have only been detected south of Twin Peaks Road.
- Only at sites east of Interstate-10 have we documented kit foxes - including the discovery of a den site.
- All sites east of El Rio Preserve have documented cows, including along the Santa Cruz River, and occurring at all sites east of Interstate-10.
- We did not detect striped skunks, but captured photos of hognose, hooded and western spotted skunks in low numbers. Only hognose skunks occurred at sites northeast of Twin Peaks Road.

- We have 6 photos of mountain lions at 3 different sites. The same subadult (Puma 1) was photographed at two adjacent sites in June 2021. At this location a subadult puma, either the same individual or a second individual (Puma 2), was photographed in January 2022. A year later an adult (Puma 3) was photographed at this site in February 2023. These all occurred south of Twin Peaks Road in the Tucson Mountains. An adult female, the only image where we were able to determine sex (Puma 4) was photographed in September 2023 north of Twin Peaks Road in the Tucson Mountains. Given the locations and the approximately annual time span between these detections, it is very possible that these records document the same resident female growing over time from a subadult (1.5 – 2.5 years old) to adult (over 2.5 years old), but this is difficult to confirm.



Mountain lion detections of 1-4 individuals in the Tucson Mountains from June 2021 to September 2023.

Principal CSDP Staff Contact:

Jessica A. Moreno
Conservation Science Director
Coalition for Sonoran Desert Protection

Email: jessica.moreno@sonorandesert.org
Mail: 738 N. 5th Ave. Suite 205, Tucson, AZ 85705
Web: www.sonorandesert.org
Office: 520-388-9925



From top left to bottom right: Mule deer with fawn, kit fox, great blue heron, coyote, pheasant. You can view and download photo highlights from this study here: <https://bit.ly/TucMtnProjectPhotos>. Original photos without watermarks as well as the raw data are available upon request.