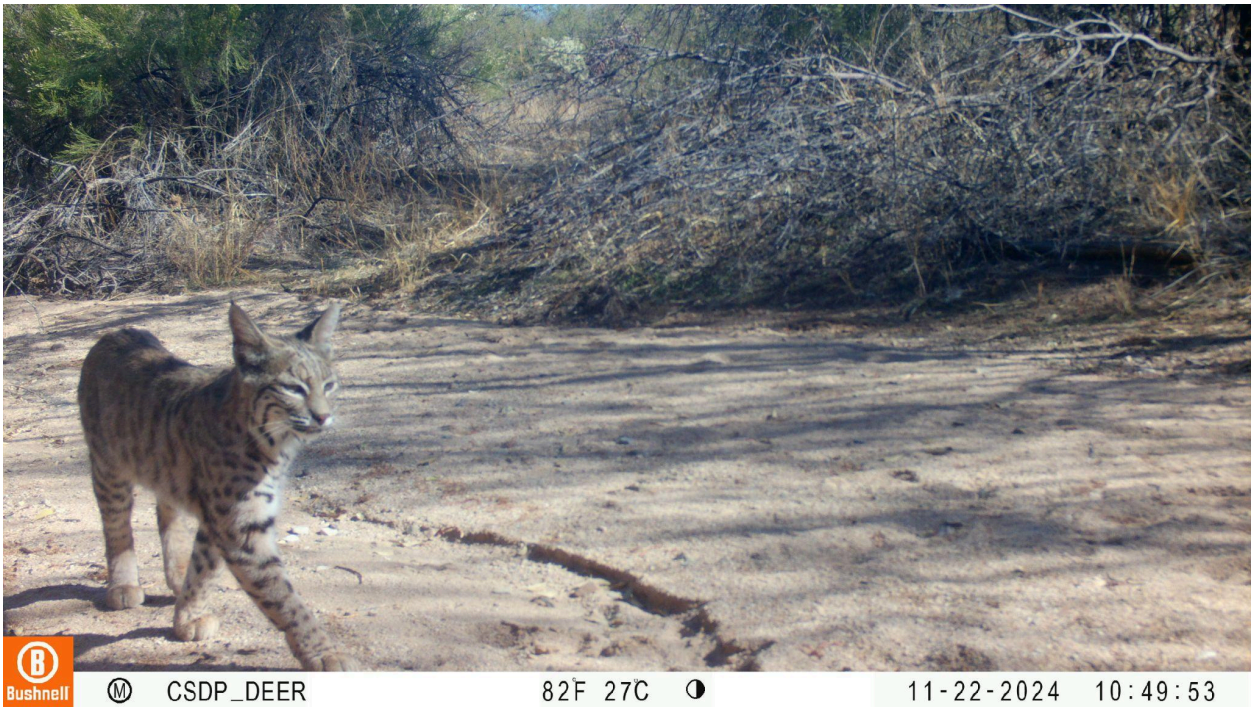
PROGRESS REPORT

Coalition for Sonoran Desert Protection

Santa Cruz Valley Natural Heritage Area Grant:
Further Enhancement of a Critical Wildlife Corridor in the Santa Cruz Watershed

Wildlife Camera Monitoring Progress Report

September 2024 - August 2025



Project goal

Our goal was to **organize** CSDP's Oro Valley wildlife camera monitoring data and **analyze** results in order to compare wildlife species diversity, and animal movement and activity patterns 1) before and after construction of the Oracle Road wildlife crossings, and 2) before and after CSDP's habitat improvements on the crossing structures, to measure project success.

During the grant period, we made progress on organizing our database of more than **483,800 photos** from the **50 wildlife camera locations** we monitored between 2012-2025, which documented more than **65 species** of wildlife including mule deer, coyote, bobcat, javelina, Gila monster, and mountain lion in our study area.

This project was made possible with funding from the Santa Cruz Valley National Heritage Area, and with the help of our Desert Wildlife Interns, Aster Shaefer and Mireya Ballestros, and our 2024-2025 camera program volunteers: Andres Martinez, Cheyenne Garcia, Christine DeMatteo, Christopher Dobrzenski, Genevieve Bock, Jean Lewis, Tania Morris, Terry Minks, John and Cherry Sand, Izetta Feeny, Margie O'Hare, Harold Woods, Vicki Ettleman, Kristi Lewis, Pat and Henry Miller, Gary and Lenora Brown, Diana Holmes, Jane Hunter, and volunteers of the Reid Park Zoo.

Background

In the Sonoran Desert northwest of Tucson, Arizona, State Route 77 (Oracle Road) divides a regionally important wildlife movement area that connects the Santa Catalina and Tortolita Mountains. In 2012, the Coalition for Sonoran Desert Protection (CSDP) began a community science wildlife monitoring project using remote wildlife camera traps to document the presence and movement of animals in this linkage, to support planning and advocacy efforts for necessary wildlife crossing structures.

Success: The first wildlife bridge in the Sonoran Desert and its sister wildlife underpass were successfully built with voter-approved funds through the Regional Transportation Authority of Pima County and included as part of the expansion of Oracle Road into a six-lane divided state highway in 2016. The structures were covered in back-fill dirt left over from construction and seeded with a hydro-mix of native plant seeds, but otherwise left to nature. Some of these seeds grew, and others did not, while invasive buffelgrass began to take over. In 2023, with funding from the Santa Cruz Valley Natural Heritage Area, CSDP launched its **Habitat Restoration Days** project to remove the invasive plants, re-seed and establish native plants to provide food and cover for wildlife, control erosion, and otherwise care for the crossing

structures. The wildlife camera monitoring project officially ended in May 2025, after 13 years of data collection, providing a look at wildlife before and after construction of the crossings and the habitat re-establishment work.

Where are the wildlife cameras?

Located within the far northern portion of the Santa Cruz Valley Natural Heritage Area in Southern Arizona, wildlife live and move in the open space connecting the Tortolita and the Santa Catalina Mountains in the Town of Oro Valley. Honey Bee Canyon, home to a perennial stream and riparian area, winds through the western end, and Big Wash provides open riparian habitat running parallel with the Oracle Road highway to the west. East of the highway, Sutherland Wash and Canada del Oro Wash stitch together Catalina State Park and Coronado National Forest lands. The landscape undulates with rolling hills and desert arroyos, filled with green paloverde trees, prickly pear, and the occasional saguaro.

The Ann Day Memorial Wildlife Bridge, and an underpass located one mile south, bridge the divide created by the six-lane divided highway.

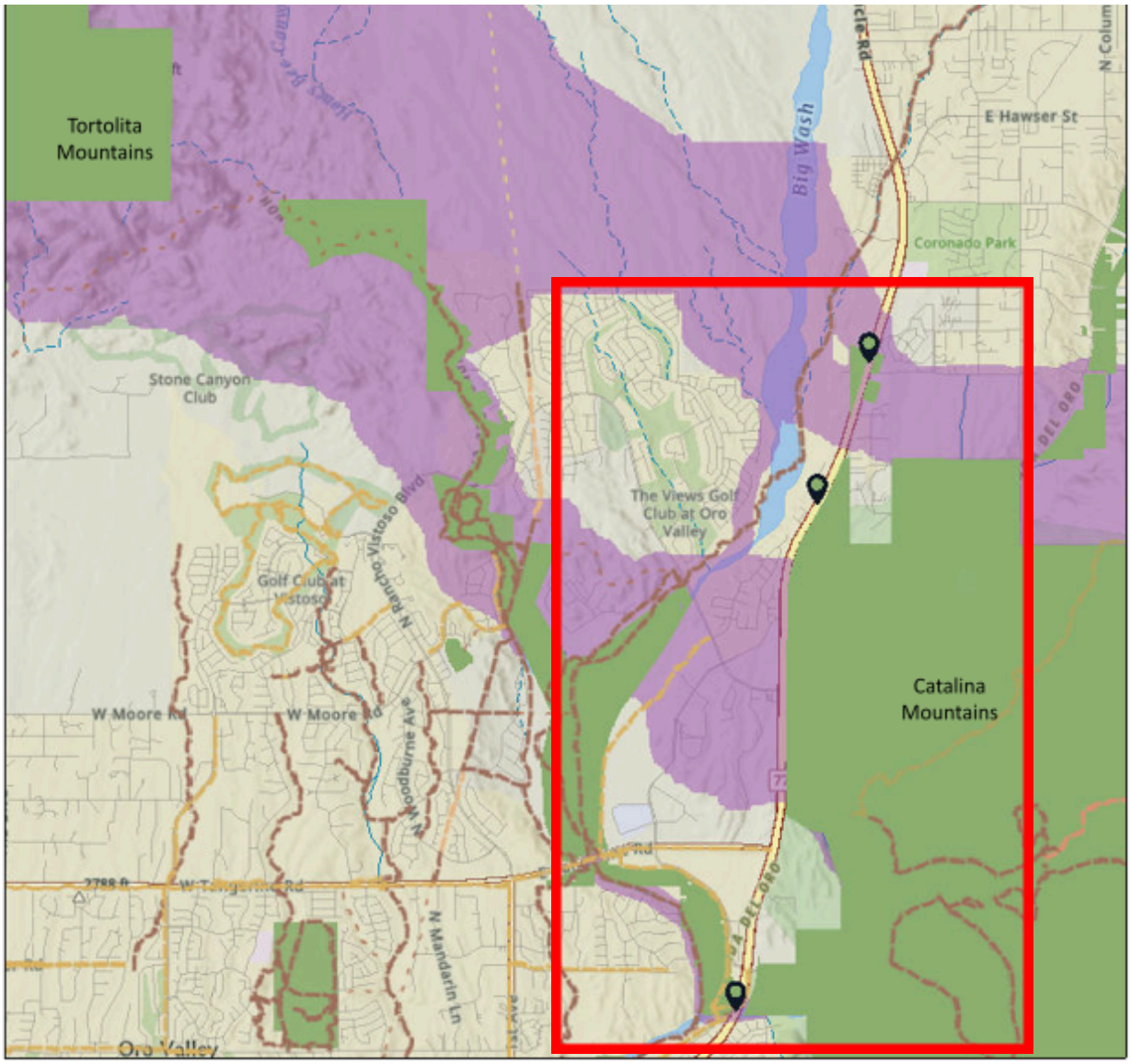
Remote wildlife cameras, triggered to photograph a passing animal using heat and motion sensing technology and specifically designed to capture medium to large mammals, were placed in natural open space within 2km (1.2 miles) of the highway and were organized into two equal groups of camera sites:

1) West of Oracle Road

2) East of Oracle Road

Cameras were added over time as the project grew, or moved to different locations, but by 2024, we had a total of **24 cameras** deployed across the entire study area, with **12 east** of the highway and **12 west** of the highway. This included 3 camera sites grouped near each crossing structure's east and west approaches.

Study Area: Oro Valley Wildlife Crossings



8/22/2024

1:65,763

0 0.47 0.95 1.9 mi

0 0.75 1.5 3 km

N

Tortolita – Santa Catalina Mountains Wildlife Linkage (Beier, 2006)

Study Area

Wildlife Crossing structure

Organize: working behind the screen

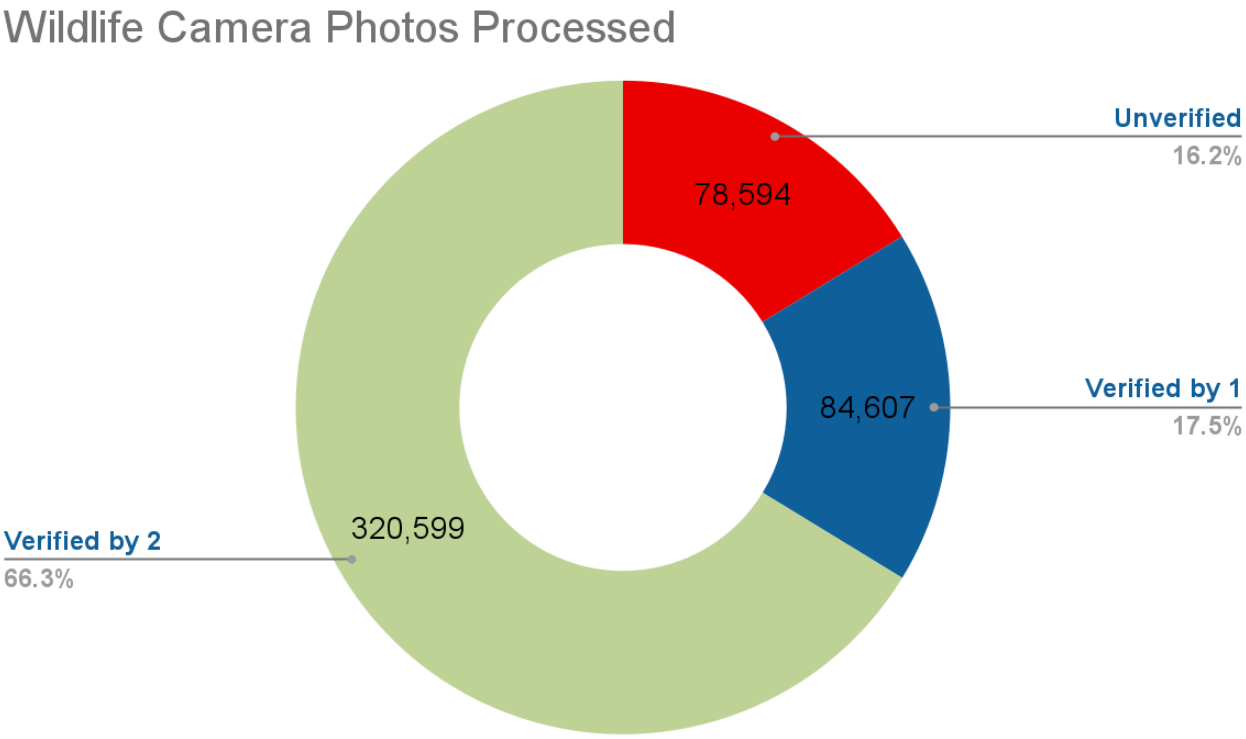
Teams of Desert Monitor volunteers checked their assigned cameras once per month to collect photos and replace batteries. These photos were then uploaded to CSDP using Google Drive, and imported into our database to be processed and identified. Our data and photos are stored and organized in Microsoft Access using the Colorado Parks and Wildlife Photo Warehouse Database. Every image is reviewed separately by two different Desert Identifier volunteers to identify the animals that were photographed in them, or to tag photos “blank” if the image is just grass blowing in the wind. When both results are the same, the database confirms them as a verified record. Disagreements are flagged for staff experts to verify, and then blanks are deleted from the database.

For the 2024-2025 grant year, one of our goals was to better organize and catch up on processing the thousands of photos and data that we had collected over the last decade, and continued to collect in this last year. Photos arrive as image files organized by camera location, each with a date and time stamp. Volunteers were asked to start removing blank photos before submitting them.

The processing path of each photo goes like this:

- ☐ Collected from the field
- ☐ Blank images removed

- ☐ Uploaded to Google Drive by Desert Monitors
- ☐ Imported into Access database
- ☐ Photo files sent to Desert Identifiers
- ☐ Two different volunteers ID each photo
- ☐ CSDP resolves any disagreements with ID
- ☐ Data is checked for errors & irregularities
- ☐ Any remaining blank images are removed
- ☐ Data is backed up and ready for analysis



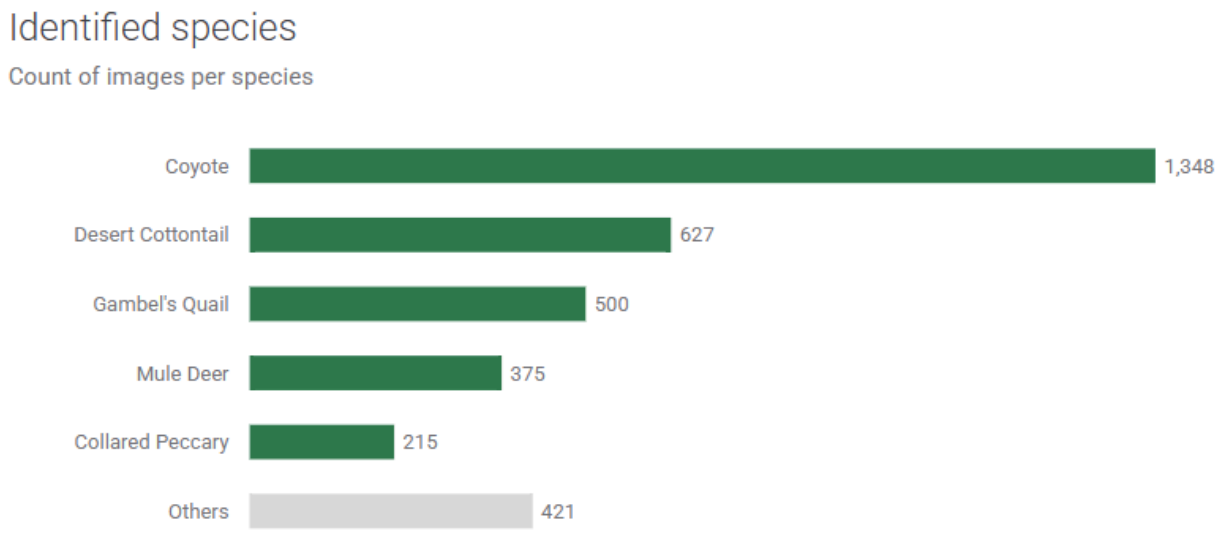
The above pie chart displays the number and percentage of photos that were processed by the end of the grant period in the whole 2012-2025 wildlife camera monitoring database, after blanks had been removed.

Organizing this data has been an ongoing process! When we started, our camera database was years behind in processing and identifying photos. We used this grant year to catch up on prior years, and make improvements in our workflow and Desert Identifier volunteer recruitment and training. And, several years of older photos that were archived under a different system were finally incorporated into this newer database, to pull it all together in one place.

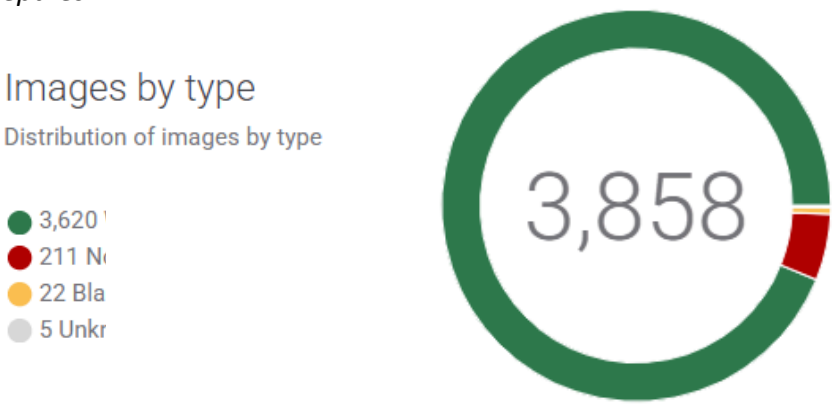
At the end of this grant period, we verified 83% of the 483,800 photos in our Oro Valley project database by at least one trained observer, and all of our data is now housed together as one dataset.

Analyze: what does this mean?

Under this grant period, we continued monitoring our established wildlife cameras from September 2024 through May 2025, and collected and verified **3,858 more wildlife photos** of at least **24 species** from our camera sites. We continue to process the year's data as photos continue to be verified.



The above graphs show a breakdown of the wildlife camera results from September 2024 - May 2025, including number of photos for each most frequently photographed species. "Other" species were less frequently photographed, including mountain lion, black bear, badger, and various birds and reptiles.



By this time, our workflow had improved, and blank images were largely removed before submitting them, so fewer blank photos had to be sorted in the database than in past years. "Non Wildlife" images included photos of people, and of volunteers maintaining the camera.

Although we still have some work to do, we do have some key takeaways:

- In 13 years of data collection, we have documented at least 65 different species in the study area, showing a wide diversity of wildlife.
- We have documented species at every level of the “trophic food pyramid,” from herbivores and omnivores to medium and large carnivores, which is a sign of a healthy and functioning ecosystem. There appears to be a good balance of predator and prey, with an abundance of cottontail rabbits, quail, and woodrats in evidence.
- We continue to see a seasonal increase in mule deer activity around September and November, which coincides with the peak of rut or mating season.
- Preliminary analysis suggests that mule deer activity significantly increased both east and west of the highway after the wildlife crossing structures were completed, although our 2024-2025 data will add to the larger picture.
- Coyote, cottontail rabbit, Gambel’s quail, javelina, bobcat, and mule deer continue to be the most common species recorded from year to year, including 2024-2025.
- Species highlights over the years include Gila monster, bighorn sheep, black bear, mountain lion, badger, spotted skunk, ringtail, desert tortoise, and white-nose coati. In this last grant year, a mountain lion and several black bears were photographed.
- Animal activity is greatest during the crepuscular hours of dawn and dusk, and slowest during the middle part of the day, both on the crossings and in the surrounding area.

Build it and they will come

The first animal to use either of the wildlife crossings was a Sonoran Desert tortoise. **She stopped construction** in October 2015 to go through the half-completed wildlife underpass. Then… nothing. The Arizona Game and Fish Department tracked over 30 individual tortoises in the area with GPS devices for two years, but none of the animals used the crossings, and none have ever appeared on the crossing cameras—until our Habitat Restoration Days.

In fall of 2023, volunteers made an exciting discovery. While our group of Coalition volunteers and staff were hard at work improving native habitat on the wildlife bridge during our 2023-2024 Habitat Restoration Days project, we spotted a female Sonoran Desert tortoise moving near the south wall of the wildlife bridge. Finally, after 9 years, we were seeing firsthand evidence of a tortoise using the crossings!

At this point, our first habitat improvements were well begun, with most of the invasive grass removed and plenty of new desert plants starting to grow on the bridge to provide habitat, cover, shade, and food.

Not long after, also in fall 2023, we confirmed a black bear crossing on the bridge from east to west - another first, despite years of bears regularly appearing on our cameras east (and only east) of the highway. Were these both a coincidence, or are they a sign that the re-establishment of vegetation on the crossings is a success for wildlife?

Seeing wildlife like black bears and tortoises on the landscape are a tangible reminder that this work matters. While we often have to play the long game, our collective persistence pays off.

Time will tell, and the data has more to say. We look forward to sharing more as we find out.