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Activity in Greater Oak Flat Watershed: 2011-2019
Results of wildlife surveys and monitoring with the use of remote camera traps.

Draft Report

Roger Featherstone, Director, Arizona Mining Reform Coalition; and Richard (Ian) Alexander

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DRAFT of REPORT

Abstract

In September of 2011 the Arizona Mining Reform Coalition implemented a wildlife camera project at Oak Flat (near Superior, AZ) to document wildlife and human activity. Our survey area covers a total of 6,475 Hectares. The area surveyed is primarily a mixing zone of upper Sonoran Desert and interior chaparral, with influences from the Madrean vegetation community. Elevations range from 1150 to 1450 m. Ten cameras were deployed in early October of 2011 and information gathered and analyzed from that date to August 2019. The study is ongoing. We located cameras primarily in riparian and xero-riparian drainages. Locations were chosen as logical wildlife corridors to obtain a sampling of wildlife while allowing relatively easy access to cameras for data collection. To date, we have identified 25 mammalian species, including bobcat (Lynx rufus), ringtail (Bassariscus astutus), and coati (Nasua narica), 30 bird species; and several insect, and reptile species.

Background

Context

In September of 2011 the Arizona Mining Reform Coalition implemented a wildlife camera project at Oak Flat to document wildlife and human activity. At the time the survey began, there had been little to no survey of land mammal species in the study area. The goal of the project aimed to assist land managers and decision makers in understanding movement, behavior patterns, and distributions of species that use the watershed and to understand the use and movement of human recreational activities within the watershed. A secondary interest was the collection of data to provide a record of the survey area. Such a baseline could prove valuable to future research on the habitat, use, and migration impacts of development.

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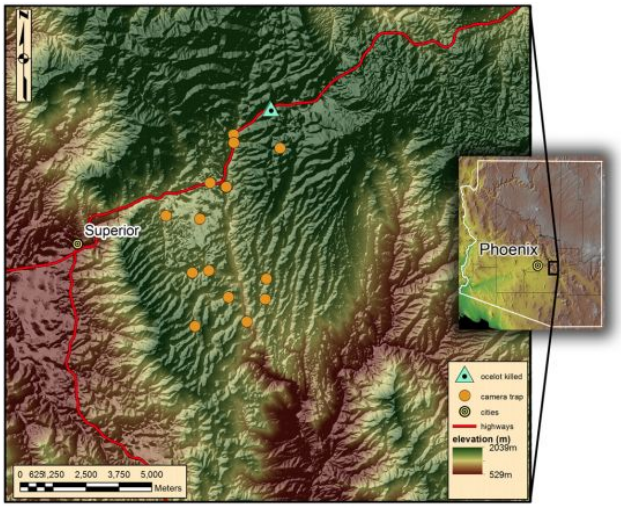


Survey Area

The study focuses on the Greater Oak Flat Watershed east of Superior, Arizona. The survey area is bounded on the west by "Apache Leap", no more than 1 km north of Highway 60 on the north, 1 km east of Gaan Canyon (known as Devil's Canyon on most maps) on the east, and an arbitrary southern limit. The survey area is primarily public land within the Tonto National Forest, managed by the US Forest Service. The primary human uses of the Greater Oak Flat Watershed include recreation, mining, and cattle grazing (Spangle 2008).

Geology

The study area is contained within the watershed drained by Gaan Canyon (Devil's Canyon), which has perennial flows through most of the survey area. The area surveyed is primarily a mixing zone of upper Sonoran Desert and interior chaparral, with some influence of Madrean evergreen woodland. Pyroclastic welded tuft, specifically "Apache Leap tuff", is the most common substrate throughout (USDA Forest Service 2010). These formations create a rugged and steep topography with deep canyons and jagged spires and ridges. The elevation ranges from approximately 1150 to 1450 m.

Biome

Previous flora and fauna surveys have shown that Gaan Canyon is botanically diverse and supports a high diversity of bird species (Jacobs 2009). Eleven special status bird species exist within 5 miles of the project area according to review tools provided by the Arizona Game and Fish Department.

Interior chaparral vegetation includes manzanita (Arctostaphylos pungens), catclaw acacia (Acacia greggii), desert broom (Baccharis centennial), and scrub oak (Quercus turbinella) (Spangle 2008). Other common upland species include hop bush (Dodonaea viscosa), birchleaf

mountain mahogany (Cercocarpus betuloides), jojoba (Simmondsia chinensis), wait- a-minute bush (Mimosa biuncifera), cholla (Opuntia sp.), and agave (Agave sp.) (Jacobs 2009). Vegetation composition throughout the uplands is significantly influenced by Arizona Uplands division Sonoran Desert elements as evidenced by the presence of saguaros (Carnegiea gigantea), which are fairly common on rocky east- and south-facing slopes.

Prior Findings

Ten cameras were deployed in early October of 2011 and information gathered and analyzed from that date to August 2019. We located cameras primarily in riparian and xero-riparian drainages. Locations were chosen as logical wildlife corridors to obtain a sampling of wildlife while allowing relatively easy access to cameras for data collection. As wildlife trails and human trails often coincide, most camera locations are also appropriate for the recording of human activities. To date, we have identified 25 mammalian species, including bobcat (Lynx rufus), ringtail (Bassariscus astutus), and coati (Nasua narica), 30 bird species; and several insect, and reptile species.

Methodology

Site Selection

We adopted a standardized remote camera protocol to validate presence/absence of mammal species in a given area (Chavez and Ceballos 2006). The selection of camera sites was chosen carefully to maximize probability for photographing land mammals. We established basic criteria to select camera locations using regional topographic maps, satellite imagery, and GIS surveying for the following variables: topography, geographic connection of mountain ranges, elevation, vegetation type, presence of temporary or permanent water source, and size of corridors (arroyos).

Camera Placement

10 Cuddeback cameras within lockable bear proof camera safes (Cuddeback 2012)[1] are located within the 6,500 hectare study area. We did not use any type of attractants, lure or bait near our cameras, to avoid species bias or modification of behavior. Cameras are placed with minimal disturbance to the surrounding vegetation. Several cameras have been moved during the course of the survey to date. Potential for damage/theft based on proximity to human activity prompted us to reposition several cameras. More than one camera was moved due to a lack of mammal activity at the site. Over the 8 years of the project so far, 2 cameras were stolen, 3 or 4 were destroyed by flooding, and 1 was burned in a forest fire. 7 camera locations have been stationary over the course of the study so far. Of note to the camera

[1] Cameras and safes were supplied at a discount by Cuddeback and we are grateful for their support.

manufacturer, several of the cameras are original and have been in the Oak Flat environment taking photos around the clock for 8 years.

We originally used Cuddeback Attack IR cameras. When Cuddeback discontinued the manufacture of those cameras, we replaced them with newer Silver series long range IR cameras.

After deployment in select areas, cameras were revisited every 4 to 8 weeks, based on battery life and disk space.

Over the past 8 years of data collection, we obtained a total of 15,779 data points after culling all false positives.

Total Observations with Timeframe and Frequency

Camera	Observations	Per Week	Days in Operation	Timeframe
Camera 1	2,907	7.09	2,871	10/11 to 8/19
Camera 7b	2,429	14.10	1,206	1/12 to 5/15
Camera 8b	2,377	6.11	2,725	2/12 to 7/19
Camera 7c	1,602	7.16	1,566	5/15 to 8/19
Camera 5	1,148	2.80	2,874	10/11 to 8/19
Camera 2a	1,065	3.90	1,913	1/12 to 4/17
Camera 9a	1,064	2.70	2,761	1/12 to 8/19
Camera 6	926	2.26	2,874	10/11 to 8/19
Camera 3	616	1.60	2,697	10/11 to 3/19
Camera 4a	604	1.49	2,836	11/11 to 8/19
Camera 2c	308	0.77	2,783	11/11 to 6/19
Camera 10	266	0.65	2,865	10/11 to 8/19
Camera 2b	154	2.87	376	7/15 to 7/16
Camera 11	116	33.83	24	10/11 to 11/11
Camera 4	96	7.72	87	10/11 to 1/12
Camera 7a	87	7.00	87	10/11 to 1/12
Camera 9	9	0.06	1,087	1/12 to 1/15
Camera 8a	5	0.56	63	10/11 to 12/11
Grand Total	**15,779**			

Data Collection

When activated, the cameras collected still photographs with timestamps, followed by video (30 seconds during the day and 10 seconds at night). In order to manage the numerous photographs in an organized manner we developed a system for labeling remote cameras, their location, and corresponding memory cards.

After each field visit, we collected information on all wildlife species, time and date of each photo-event and observations.

Photographs were used to tally species numbers. If good judgment indicated that >1 individuals were present, all were counted, even if all were not in the frame at the same time (e.g. an individual runs across the frame at the beginning of the video and a second individual runs in the same direction later).

The data obtained from the project is presented here in raw form. The only manipulation of data at this stage was to categorize as noted below. The complete draft reports in an appendix to these comments and a final report (or report) will be published at a later date.

Data Analysis Methods

For this report, we did not differentiate certain species. Although both White-tailed and Mule deer are present, they were "lumped" as deer species. The same for chipmunk and squirrel species. When we couldn't identify individual species (skunk, birds, and others) they were identified in more general categories. The "hiker" category may (and do) include bird watchers, seekers of spiritual solitude, search and rescue trainees, and the occasional surveyor. Climbers were identified by climbing gear hanging from packs so it's possible that hikers may have been climbers. Riders were on horses and hunters had guns. Vehicles were all off-road capable.

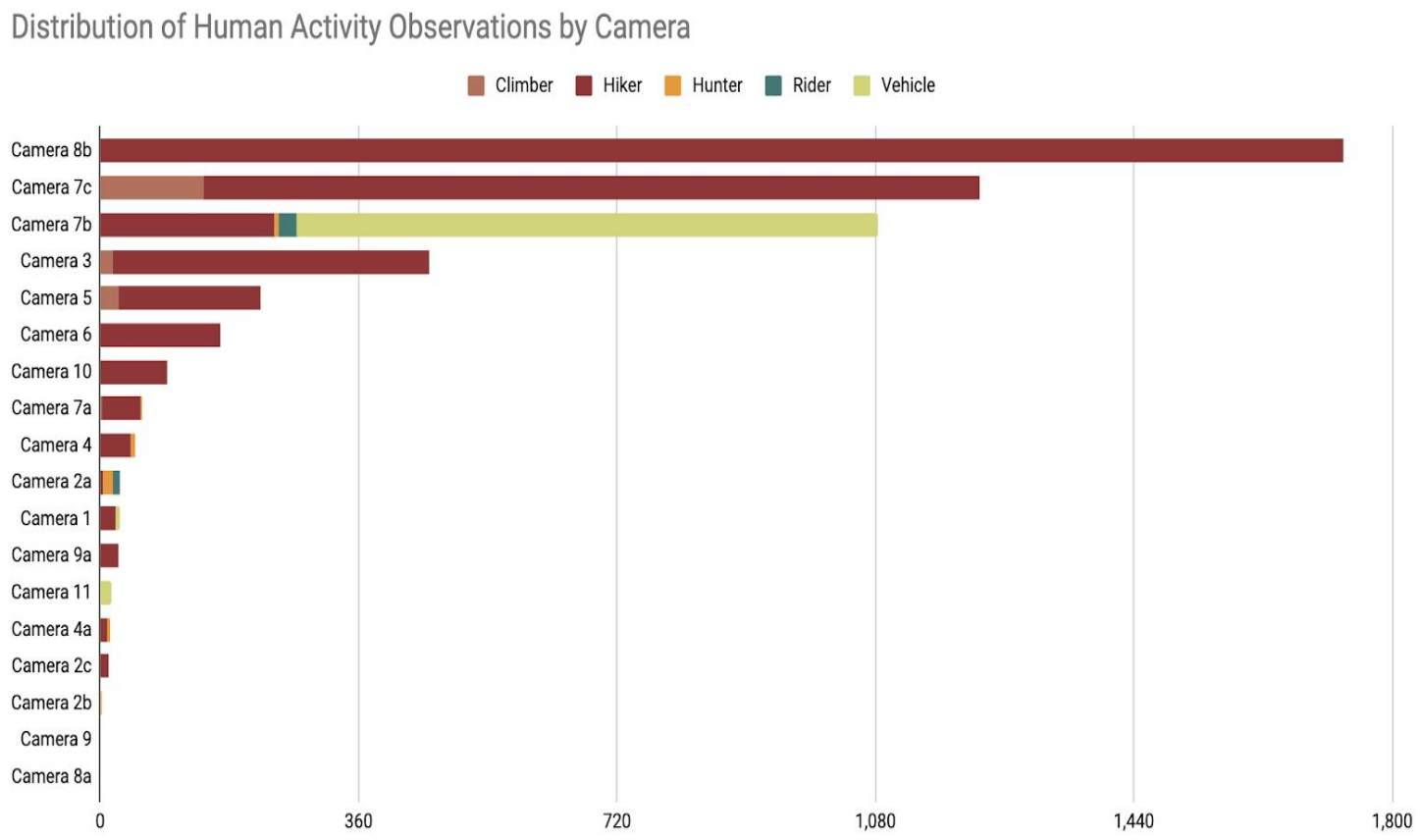
Each data point equates to one species regardless of how many species were in the photo (coatis tended to travel in troops with more than one individual in the photo and hikers also tended to travel in groups). Conversely, individuals (especially cows) sometimes congregated around cameras and were captures several times. Vehicles were counted as an individual no matter how many occupants.

Results of Analysis - Human Activity

Human activity was categorized as hiker, climber, hunter, rider, and vehicle. Together, these categories account for 5,217 (33%) of recorded observations.

Human Activity	Sightings	% Total
Hiker	4,130	79.2%
Vehicle	831	15.9%
Climber	188	3.6%
Rider	36	0.7%
Hunter	32	0.6%
Grand Total	**5,217**	**100.0%**

Recorded activity was tightly grouped by location. Six cameras captured 95% of human activity observations:



Results of Analysis - Wildlife Activity

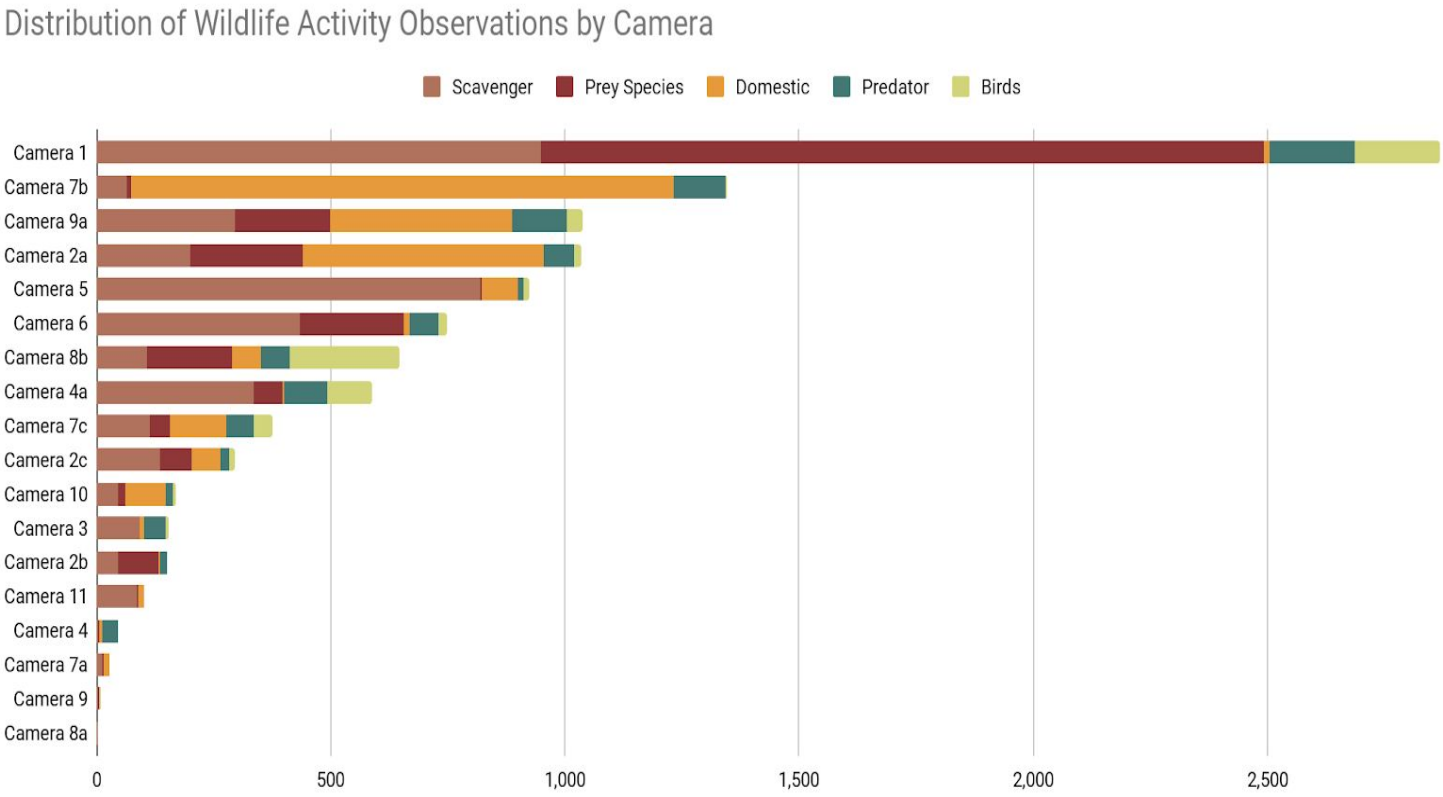
Wildlife activity accounted for the remaining two-thirds of our observations. We categorized wildlife species into scavengers, prey, predators, domestic, birds, and miscellaneous.

Wildlife Category	Sightings	% Total
Scavenger	3,751	35.5%
Prey Species	2,689	25.5%
Domestic	2,524	23.9%
Predator	901	8.5%
Birds	667	6.3%
Miscellaneous	30	0.3%
Grand Total	**10,562**	**100.0%**

Observed Wildlife by Categorization

Scavengers	**Predators**	**Birds**	
Grey fox	Coyote	Northern flicker	Owl species
White-nosed coati	Mountain lion	White-winged dove	Mourning dove
Striped skunk	Bobcat	Western scrub jay	Mexican jay
Spotted skunk	Black bear	Spotted towhee	Mallard Duck
Ringtail		Unknown	White-crowned sparrow
Skunk species	**Domestic**	Turkey vulture	Hawk species
Javelina	Dog	American robin	Hutton's vireo
Raccoon	Horse	Ruby-crowned kinglet	Gray hawk
Hog-nosed skunk	Cow	Canyon towhee	Flycatcher species
Hooded skunk	Cat (housecat)	Roadrunner	Western screech owl
		Green-tailed towhee	Cardinal
Prey	**Misc.**	Gambel's quail	Duck Species
Eastern cottontail	Reptile	Bird species	Dark-eyed junco
Squirrel species	Butterfly	Hummingbird	Common Black Hawk
Rock squirrel	Not identified	Curve-billed thrasher	Clark's nutcracker
Chipmunk species	Bat	Red-tailed hawk	Black-throated sparrow
Mouse	Arachnid	Raven	Black Phoebe
Deer species			Belted kingfisher

While wildlife observations were more widely distributed across cameras, Camera 1 accounted for 27% of all wildlife observations. Notably, Camera 1 accounted for less than 1% of all human activity observations.



*Miscellaneous count (30 total observations) not included for ease of viewing

Additional Species

In hiking to our cameras several additional species were encountered that were not observed on the cameras. Those species include gila monster, tarantula, and a number of (currently) healthy and happy Arizona Hedgehog Cactus who move too slowly to be “captured” on the wildlife cameras. Not seen, but heard frequently within Ga’an and Hackberry Canyon were canyon wrens.

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