FINAL

Summary Report
Inventory of Small Mammals and Herpetofauna Within the Chocolate Mountains Aerial Gunnery Range, Riverside and Imperial Counties, California

February 2022

NAVFAC

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SUMMARY REPORT
INVENTORY OF SMALL MAMMALS AND HERPETOFAUNA WITHIN THE CHOCOLATE MOUNTAINS AERIAL GUNNERY RANGE, RIVERSIDE AND IMPERIAL COUNTIES, CALIFORNIA

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Prepared for

NAVFAC Southwest Environmental
1200 Pacific Highway
San Diego, California 92132

Prepared by

Gulf South Research Corporation
8081 Innovation Park Drive
Baton Rouge, Louisiana 70820

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EXECUTIVE SUMMARY

This report provides a summary of small mammal and herpetofauna survey activities that were conducted at the Chocolate Mountain Aerial Gunnery Range (CMAGR), under the jurisdiction of Marine Corps Air Station (MCAS) Yuma, located in Riverside and Imperial Counties, California. The CMAGR encompasses 460,349 acres situated within the Chuckwalla and Chocolate Mountains Zone of the Lower Colorado River Valley Subdivision of the Sonoran Desert. Surveys were conducted in May and September from 2019 to 2021 (six survey events) and included trapping and visual encounter surveys. The objective of the multi-year study was to obtain an inventory of small mammal and herpetofauna species that inhabit natural areas within the installation.

Small mammal diversity and abundance were assessed primarily by deploying Sherman live traps to capture, identify, and measure species on the installation. Mesocarnivore mammal species were identified through visual observation and trail cameras. Herpetofauna were captured and identified using a combination of visual encounter surveys, drift arrays with funnel traps and pitfall traps, trail cameras, and Adapted Hunt Drift Fence Technique (AHDriFT) camera trap arrays.

A total of 11 species of small mammals, 7 species of mesocarnivore, and 25 species of herpetofauna were detected on the installation during the survey. Table ES-1 presents a list of these species. Further results and discussions regarding the findings of these surveys are presented within this report.

Table ES-1. Small Mammal and Herpetofauna Species Observed

Common Name	Scientific Name	Common Name	Scientific Name
Small Mammals		**Lizards**	
White-tailed antelope squirrel	*Ammospermophilus leucurus*	Great Basin whiptail	*Aspidoscelis tigris tigris*
Long-tailed pocket mouse	*Chaetodipus formosus*	Western zebra-tailed lizard	*Callisaurus draconoides rhodostictus*
Desert pocket mouse	*Chaetodipus penicillatus*	Western banded gecko	*Coleonyx variegatus*
Spiny pocket mouse	*Chaetodipus spinatus*	Mojave collared lizard	*Crotaphytus bicinctores*
Merriam's kangaroo rat	*Dipodomys merriami*	Desert iguana	*Dipsosaurus dorsalis*
Black-tailed jackrabbit	*Lepus californicus*	Long-nosed leopard lizard	*Gambelia wislizenii*
White-throated woodrat	*Neotoma albigula*	Desert horned lizard	*Phrynosoma platyrhinos*
Desert woodrat	*Neotoma lepida*	Common chuckwalla	*Sauromalus ater*
Little pocket mouse	*Perognathus longimembris*	Desert spiny lizard	*Sceloporus magister*
Cactus mouse	*Peromyscus eremicus*	Long-tailed brush lizard	*Urosuarus graciosus*
Desert cottontail	*Sylvilagus audubonii*	Common side-blotch lizard	*Uta stansburiana*

Common Name	Scientific Name	Common Name	Scientific Name
Mesocarnivores		Desert night lizard	*Xantusia vigilis*
Coyote	*Canis latrans*	**Snakes**	
Bobcat	*Lynx rufus*	Coachwhip (red racer)	*Coluber flagellum piceus*
Raccoon	*Procyon lotor*	Western diamondback rattlesnake	*Crotalus atrox*
Western spotted skunk	*Spilogale gracilis*	Sidewinder	*Crotalus cerastes*
American badger	*Taxidea taxus*	Speckled rattlesnake	*Crotalus mitchellii pyrrhus*
Gray fox	*Urocyon cinereoargenteus*	California kingsnake	*Lampropeltis californiae*
Kit fox	*Vulpes macrotis*	Three-lined boa	*Lichanura orcutti*
Frogs/Toads		Sonoran gophersnake	*Pituophis catenifer affinis*
Red-spotted toad	*Anaxyrus punctatus*	Long-nosed snake	*Rhinocheilus lecontei*
Rio Grande leopard frog	*Lithobates berlandieri*	Western patch-nosed snake	*Salvadora hexalepis hexalepis*
Testudinae		Desert nightsnake	*Hypsiglena chlorophaea*
Mojave desert tortoise	*Gopherus agassizii*	-	

1.0 INTRODUCTION

Naval Facilities Engineering Command Southwest (NAVFAC SW) contracted Gulf South Research Corporation (GSRC), with funding provided by the Natural Resources Department at Marine Corps Air Station (MCAS) Yuma, to conduct an inventory of small mammals and herpetofauna (reptiles and amphibians), within the Chocolate Mountain Aerial Gunnery Range (CMAGR), in Riverside and Imperial Counties, California. CMAGR is situated in the southeastern corner of California, east of the Salton Sea, with the western boundary of CMAGR being located approximately three miles east of the town of Niland (Figure 1). The purpose of the small mammal and herpetofauna inventory is to establish a baseline for the biodiversity of these taxa that occur within CMAGR. This study will attempt to quantify the relative abundance and distribution of small mammals and herpetofauna across various macro-topographical areas and the associated ecosystems that occur within the CMAGR. This study will be used to satisfy requirements set forth in the *2017 Integrated Natural Resources Management Plan (INRMP) for the CMAGR.*

The study at CMAGR had three objectives: 1) to establish a repeatable baseline survey protocol that will capture the diversity found in small mammals and herpetofauna on the CMAGR; 2) develop potential distribution maps for small mammals and herpetofauna captured on the CMAGR; and 3) provide recommendations for monitoring efforts and natural resource stewardship to assist the military mission on CMAGR. In order to accomplish these objectives, GSRC conducted two survey efforts each year for a three-year period (2019 to 2021). These survey efforts occurred in the spring and fall of each year to coincide with expected periods of peak activity for small mammals and herpetofauna. MCAS Yuma biologist Bobby Law provided assistance for all field logistics, and NAVFAC SW project manager Cece Dahlstrom provided administrative support. This is the first survey effort for small mammals and herpetofauna conducted by the Navy on CMAGR. This summary report discusses the background, materials and methods, and results of these survey efforts.

2.0 LOCATION

CMAGR encompasses approximately 460,349 acres (MCAS Yuma Range Management Department and NAVFAC SW 2017) situated within the Chuckwalla and Chocolate Mountains Zone of the Lower Colorado River Valley Subdivision of the Sonoran Desert (Menke et al. 2016). The CMAGR largely coincides with the southern boundary of this zone. The climate within the CMAGR can be generally described as desert, with low humidity, high summer temperatures, and moderate winter temperatures (MCAS Yuma Range Management Department and NAVFAC SW 2017).

The Chocolate Mountains (and therefore, CMAGR) lie on a southeast-northwest axis and are bounded to the west by the Salton Sea and to the east by the Chuckwalla and Palo Verde Mountains within northern-central Imperial County and southern-central Riverside County (Figure 2). Representative vegetation alliances include: 1) Teddy bear cholla (*Opuntia bigelovii*) cacti scrub alliance; 2) Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; 3) Creosote bush – ocotillo (*Fouquieria splendens*) upper bajada and rock outcrop desert scrub alliance; 4) White bursage desert dwarf scrub alliance; 5) Brittlebush (*Encelia farinosa*) desert scrub alliance; 6) Desert holly (*Atriplex hymenelytra*) scrub alliance; and 7) Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance (Malusa and Sanders 2018).

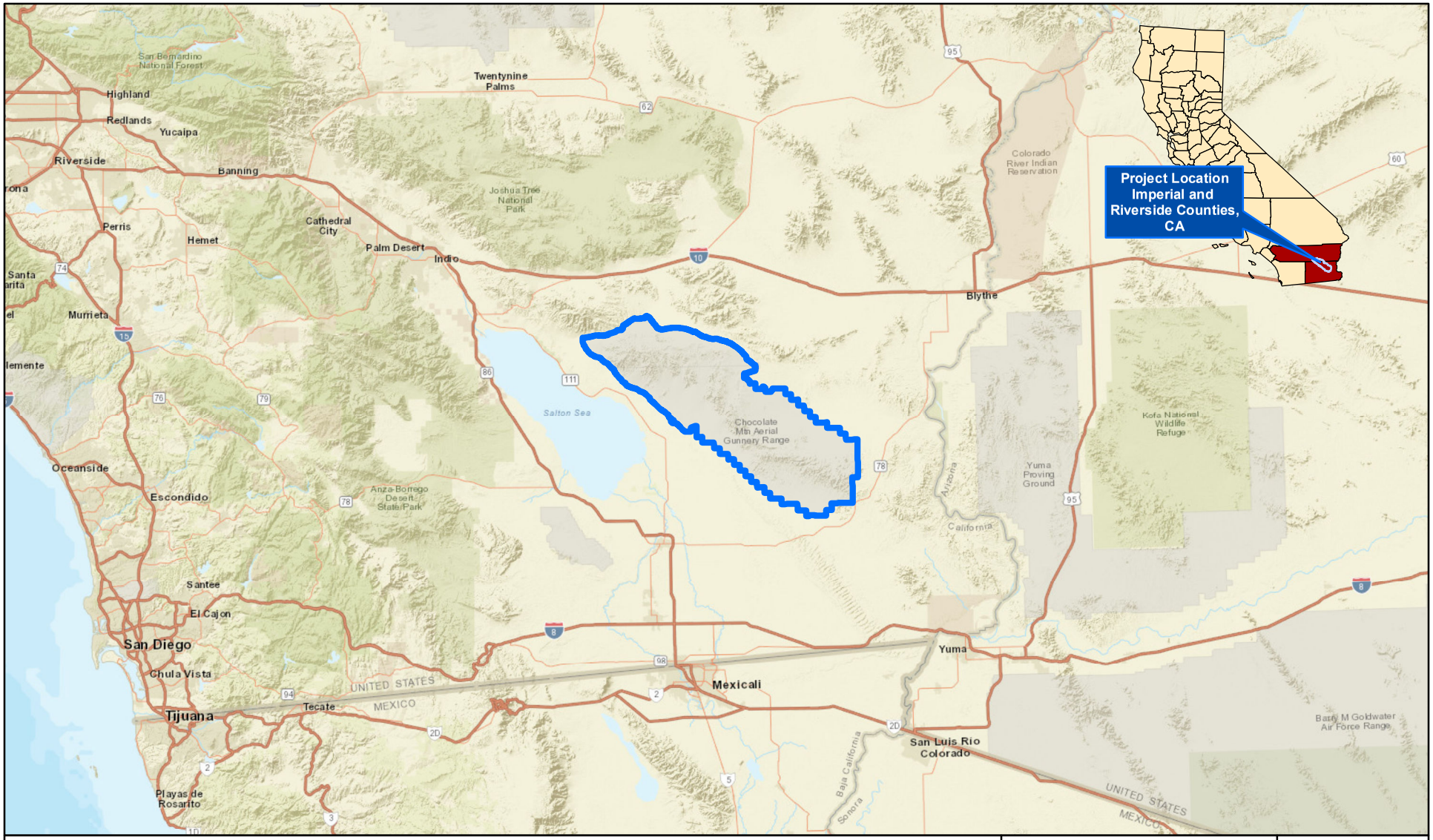

Figure 1. Project Vicinity

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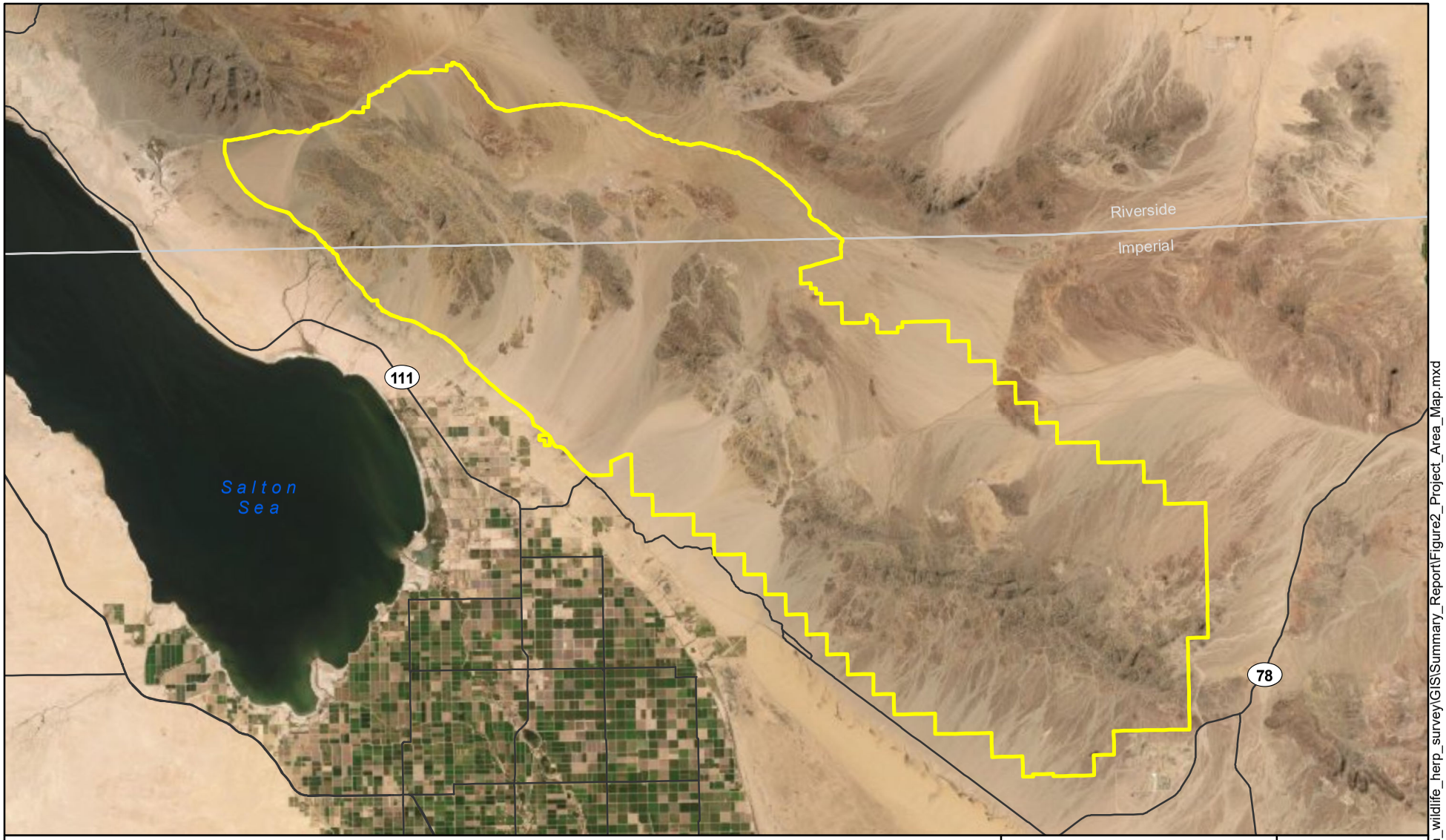


Figure 2. Project Area

3.0 MATERIALS AND METHODS

The three-year study implemented seasonal field survey efforts with six total survey events occurring over the course of the study (Table 1). Each survey event was 8 to 13 days in length. Spring surveys targeted a seasonal period of the Colorado Desert when herpetofauna are generally expected to exhibit increased activity while exiting a state of torpor and beginning to breed. Fall surveys also hoped to capture increased levels of activity in herpetofauna due to relatively mild weather and increased feeding behavior prior to periods of winter inactivity.

Table 1. Herpetofauna and Small Mammal Survey Events at CMAGR (2019 to 2021)

Survey Event		Survey Period	GSRC Personnel
1	Spring 2019	May 15 to 22, 2019	Beau Rapier, Logan Mccardle, Ross Hackbarth, Sean Maguire
2	Fall 2019	September 1 to 13, 2019	Beau Rapier, Gabrielle Barsotti, Logan Mccardle, Ross Hackbarth
3	Spring 2020	May 27 to June 3, 2020	Katrina Rehrer, Logan Mccardle, Ross Hackbarth, Sean Maguire
4	Fall 2020	September 9 to 18, 2020	Beau Rapier, Katrina Rehrer, Madison Vining, Ross Hackbarth
5	Spring 2021	May 17 to 24, 2021	Beau Rapier, Jonathan Woods, Ross Hackbarth, Sean Maguire
6	Fall 2021	September 7 to 13, 2021	Jonathan Woods, Madison Vining, Ross Hackbarth, Sean Maguire

The following sections describe survey and data collection protocols implemented during surveys. Over the course of the study, protocols were modified numerous times. Eighteen drift arrays were set-up initially in March 2019 prior to the commencement of formal surveys. After the first survey (Spring 2019), fewer drift arrays were used in order to limit the number of animal mortalities due to high ambient air temperatures and extensive distances and driving times between drift arrays (Table 2). Additionally, certain areas (e.g., Box Canyons 1 and 2, Salvation Pass 3 and 4) received restricted entry status for portions of 2020 and 2021 due to changes in training operations in these areas, and trap deployments had to be planned around these changes. Adapted-Hunt Drift Fence Technique (AHDriFT) arrays (Martin et al. 2017) were deployed during the September 2020 surveys to provide the opportunity of observing new species passively while avoiding some of the aforementioned difficulties (Table 3). Further, trail cameras (Moultrie A-40 Pro or M-880) were set-up in various locations across the installation to capture occurrences of larger species of small mammals and mesocarnivores. After the first survey trip, GSRC biologists allocated increased time to performing pedestrian and road-cruising surveys.

3.1 Small Mammal Inventory

Small mammal diversity and abundance were assessed primarily by deploying lines of 20 Sherman live traps in proximity to drift arrays (no more than 100 meters from the associated drift array). The Sherman live traps were marked using orange flagging tape on nearby vegetation, and traps were baited using a combination of birdseed, peanut butter, and dry oatmeal. Traps were placed in positions where trapped animals would not be exposed to excessive sunlight and heat (Photograph 1). Traps were checked each morning or early afternoon, re-baited, and left open until the next day. For captured small mammals, the species, sex, length, weight, and reproductive condition were determined and recorded, and each small mammal was temporarily marked by applying a permanent marker to the inside of one ear. If a marked individual was

Table 2. Trap Array Locations for Drift Fence and Sherman Trapping

Trap Array Name	Code	Latitude (°N)	Longitude (°W)	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021[1]
Salvation Pass 1	1	33.22915583	-115.3590131	♦	-	-	-	♦	-
Salvation Pass 2	2	33.23292806	-115.3329905	♦	-	-	-	-	-
Salvation Pass 4	4	33.26423512	-115.2734625	♦	-	♦	-	♦	-
Salvation Pass 3	3	33.25944831	-115.2886434	♦	♦	♦	-	♦	-
Camp Burt 5	BURT	33.28400583	-115.0625787	♦	-	-	-	-	-
Bull Farp Ravine	BULL	33.08132414	-115.0447733	♦	-	-	♦	-	-
Bradshaw Trail 11	11	33.52407777	-115.4499406	♦	♦	♦	♦	-	-
Bradshaw Trail 10	10	33.51259358	-115.416891	♦	-	-	-	-	-
Bradshaw Trail 9	9	33.49909552	-115.3810062	♦	♦	♦	♦	-	-
Bradshaw Trail 8	8	33.42324448	-115.2429966	♦	-	-	-	-	-
Bradshaw Trail 7	7	33.41666611	-115.2491977	♦	-	-	-	-	-
Bradshaw Trail 6	6	33.41143954	-115.2658634	♦	-	-	-	-	-
Swat 5 Wash	S5W	33.55230405	-115.5802064	♦	-	-	-	-	-
Swat 12	12	33.54478474	-115.6226639	♦	-	-	-	-	-
Swat 13	13	33.51735511	-115.6722973	♦	♦	♦	♦	-	-
Box Canyon 2	BC2	33.50054507	-115.6590681	♦	♦	♦	♦	♦	-
Swat 14	14	33.47673441	-115.712673	♦	-	-	-	♦	-
Box Canyon 1	BC1	33.51604522	-115.6313495	♦		♦	♦	-	-
9-Mile 1	9M1	33.08851068	-114.9586742	-	-	-	♦	-	-
9-Mile 2	9M2	33.12358914	-114.9569662	-	-	-	♦	♦	-

[1] Took down drift arrays and opportunistically trapped at new locations (see Table 4 for further information).

Table 3. Locations and Deployment Periods of Camera Equipment

Survey Area	Equipment Type	Latitude (°N)	Longitude (°W)	Deployment Period
04	AhDrift Camera Station	33.26370100	-115.2753270	Spring 2021 to Fall 2021
09	AhDrift Camera Station	33.49799000	-115.3776510	Fall 2020 to Spring 2021
	AhDrift Camera Station (changed location)	33.49903922	-115.3810318	Spring 2021 to Fall 2021 (Lost)[1]
11	Trail Camera	33.52433628	-115.4504256	Fall 2020 to Spring 2021
13	Trail Camera	33.51593065	-115.6714929	Fall 2020 to Spring 2021
9-Mile 1	AhDrift Camera Station	33.08799194	-114.9581534	February 2021 to Fall 2021
	Trail Camera	33.08855031	-114.9587467	Spring 2020 to Fall 2020
	Trail Camera	33.08655200	-114.9573030	Spring 2021 to Fall 2021
9-Mile 2	AhDrift Camera Station	33.12466991	-114.9580061	Fall 2020 to February 2021
	AhDrift Camera Station (changed location)	33.12527318	-114.9564453	February 2021 to Fall 2021
	Trail Camera	33.12390167	-114.9575554	Spring 2020 to Fall 2021
Box Canyon 1	AhDrift Camera Station	33.51604522	-115.6313495	Fall 2020 to Fall 2021
	Trail Camera	33.50876100	-115.6238620	Spring 2021 to Fall 2021
Box Canyon 2	Trail Camera	33.49912962	-115.6570338	Spring 2020 to Fall 2020
	Trail Camera	33.49978039	-115.6584357	Fall 2020 to Spring 2021
	Trail Camera	33.49558800	-115.6497500	Spring 2021 to Fall 2021
Camp Bull	AhDrift Camera Station	33.08111953	-115.0441158	February 2021 to Fall 2021
	Trail Camera	33.08379535	-115.0431294	Spring 2020 to Fall 2020
	Trail Camera	33.08068172	-115.0448019	Fall 2020 to Fall 2021
Camp Burt	AhDrift Camera Station	33.28656800	-115.0803090	Spring 2021 to Fall 2021 (Lost)[1]

[1] AHDriFT Camera Array was washed away by monsoon rains and could not be located.

Figure 3. Trap Array Locations

captured, the re-capture was noted, and the animal was released without taking further measurements. Visual sightings of small mammals typically occurred for larger species such as desert cottontail (*Sylvilagus audobonii*) and black-tailed jackrabbit (*Lepus californicus*).

Photograph 1. Sherman live trap placed in cover with flagging tape.

3.2 Herpetofaunal Inventory

A herpetofaunal inventory was performed utilizing drift fence and funnel trap arrays, AHDriFT camera trap arrays, and visual encounter transects. Drift fence and funnel trap arrays consisted of either one contiguous 100-foot segment or two perpendicular 50-foot segments of geotextile filter fabric with box-shaped funnel traps placed at the ends of the drift fence segments (Photograph 2). Two 3-foot sections of drift fence were installed as corrals on each side of the box traps to encourage animal movement into the traps. Burlap cloth was placed over the funnel traps as shade protection for any trapped animals. In addition to funnel traps, two pitfall traps (1-gallon buckets) were installed along each drift fence array. Pitfall traps were placed directly adjacent to the drift fence and were buried to ground level. Funnel traps were also placed along canyon or earthen walls. The locations of drift arrays and the associated funnel and pitfall traps used during the study are shown above in Figure 3. Traps were checked each morning and left open until the following day. Captured herpetofauna were marked with a unique heat brand. Each animal captured was sexed when possible and measured for length (snout-vent length [SVL], total length) and weight. If a marked individual was captured, the re-capture was noted and the animal released without taking further measurements.

Photograph 2. Drift array set-up with funnel traps and pitfall traps.

In addition to the traditional drift fences, additional drift fences were installed using the AHDriFT method as described by Martin et al. (2017). This technique combines commercially available game cameras and traditional drift fences to survey for reptiles, amphibians, and small mammals with high detectability while minimizing observer time. Wooden, oriented strand boards were used for the drift fences, and the joined boards were held upright between two 1-meter wooden gardening stakes hammered at a 60° angle toward the fence and secured with cable ties (Martin et. al 2017). A plastic bucket was placed at each end of the fence, with a Bushnell game camera secured to the underside of the top of the bucket to capture images of any small mammals, reptiles, or amphibians that passed through the area (Photographs 3 and 4). This technique was designed to increase the detections of elusive herpetofauna and small mammals that are rarely captured in traditional drift fence and pit fall arrays. See Table 3 and Figure 3 for the location of each AHDriFT array set-up.

Photograph 3. AHDriFT camera trap array at Box Canyon 1 (September 17, 2020).

Photograph 4. AHDriFT camera bucket (September 17, 2020).

GSRC biologists conducted visual encounter surveys for herpetofauna by nighttime road-cruising, pedestrian meandering transects, and opportunistic lizard noosing. Pedestrian transects were typically walked in the late afternoon, evening, or soon after nightfall (1600 to 2400 hours). Pedestrian transects were conducted near drift fence arrays (within 1 mile) as well as in the vicinity of animals found while road-cruising. Data recorded during pedestrian transects included species, habitat type, and environmental conditions. Road-cruising was conducted along the perimeter roads of the installation, typically after nightfall between 2000 and 2400 hours. GPS track lines were recorded for each road-cruising survey. If herpetofauna were observed and could be captured during road-cruising or pedestrian surveys, additional data including sex, length, and weight measurements were taken, and the animal was marked by microbrand (see Ekner et al. 2011). Transect lines and the locations of animals observed along the lines were mapped using a Trimble GeoXT™ GPS unit. Resources for species identification included the California Herps website (Nafis 2021) and Stebbins' *Field Guide to Amphibians and Reptiles of California: Revised Edition* (Stebbins 2012).

3.3 Vegetation Community Assessment

In order to assess potential relationships between habitat types and observed species, vegetation communities were identified based on determination of dominant species and other environmental characteristics. Plant species present at each trapping array site were recorded by assessing a circular area with a 50-meter radius around the center of each array. Within this area, every plant species observed was recorded and the absolute percent cover of the species were estimated. Percent bare ground was also estimated and notes on the terrain and soils were recorded. Photo points were taken at each trap array displaying the surrounding habitat in each cardinal direction. Vegetation communities were identified by Jim Malusa with the aid of vegetation cover maps currently being developed as part of a separate project (see Malusa and Sanders 2018 for first part of this project). Vegetation was identified to the level of "vegetation alliance" as defined by the National Vegetation Classification System (NVCS) (U.S. National Vegetation Classification [USNVC] 2021).

Potential associations between vegetation communities and small mammal species were assessed using the chi-square statistic in R Studio using R version 4.1.2 (R Core Team 2021).

4.0 RESULTS

Table 4 provides a summary of all trap locations and the number of trap nights for each location. One trap night is considered to be a full 24 hours from the time the trap was set-up or checked to approximately the same time the following day. During the entire inventory, there were a total of 2,498 Sherman trap nights, 898 funnel trap nights, and 294 pitfall trap nights. Photographs of each trap array and surrounding habitat can be found in Appendix A. Additional photographs of species observed, survey equipment, and associated survey activities can be found in Appendix B.

In addition to trapping, GSRC biologists conducted approximately 120 hours of pedestrian visual encounter surveys and approximately 100 hours of road-cruising. Visual encounter surveys were conducted both during the day and at night. Roads were driven at night typically between 1900 hours and 2400 hours; roads driven were typically those found around the perimeter of the installation. There are no paved roads on the installation; all roads surveyed were dirt or gravel two-track roads in varying degrees of condition (Photograph 5). Because of installation security restrictions, all roads surveyed were those along routes between the pre-established trap array locations, with the exception of Gasline Road which was open for surveys during the September 2021 trip. Survey tracks, which include areas surveyed on foot and while driving, are shown in Figure 4.

Photograph 5. The "road" (tracks running through wash) that leads to the 9-Mile Wash 2 Trap Array (February 24, 2020).

Table 4. Drift Array Trap Nights

Trap Array Name	Code	Latitude (°N)	Longitude (°W)	Spring 2019			Fall 2019			Spring 2020			Fall 2020			Spring 2021			Fall 2021		
				Trap Nights	Sherman	Funnel/Pitfall	Trap Nights	Sherman	Funnel/Pitfall	Trap Nights	Sherman	Funnel/Pitfall	Trap Nights	Sherman	Funnel/Pitfall	Trap Nights	Sherman	Funnel/Pitfall	Trap Nights	Sherman	Funnel/Pitfall
Salvation Pass 1	1	33.22915583	-115.3590131	6	10	4/2	-	-	-	-	-	-	-	-	-	2	20	-	-	-	-
Salvation Pass 2	2	33.23292806	-115.3329905	6	10	4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salvation Pass 3	3	33.25944831	-115.2886434	6	10	4/2	5	10	4/2	5	10	2/2	-	-	-	1	-	7[1]	-	-	-
Salvation Pass 4	4	33.26423512	-115.2734625	6	10	4/2	-	-	-	5	10	2/2	-	-	-	1	25	10[1]	-	-	-
Camp Burt 5	BURT	33.28400583	-115.0625787	5	10	4[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bull Farp Ravine	BULL	33.08132414	-115.0447733	5	10	4[1]	-	-	-	-	-	-	5	10	4[1]	-	-	-	-	-	-
Bradshaw Trail 6	6	33.41143954	-115.2658634	5	10	4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bradshaw Trail 7	7	33.41666611	-115.2491977	5	10	4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bradshaw Trail 8	8	33.42324448	-115.2429966	5	10	4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bradshaw Trail 9	9	33.49909552	-115.3810062	4	10	8/2	5	10	4/2	7	10	2/2	7	10	2/2	-	-	-	-	-	-
Bradshaw Trail 10	10	33.51259358	-115.416891	5	10	4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bradshaw Trail 11	11	33.52407777	-115.4499406	5	10	4/2	5	10	4/2	7	10	2/2	7	10	2/2	-	-	-	1	20	-
Swat 5 Wash	S5W	33.55230405	-115.5802064	6	10	4[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Swat 12	12	33.54478474	-115.6226639	5	10	4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Swat 13	13	33.51735511	-115.6722973	6	10	4/2	5	10	4/2	7	10	2/2	7	10	2/2	-	-	-	-	-	-
Box Canyon 1	BC1	33.51604522	-115.6313495	2	10	4[1]	-	-	-	5	10	4[1]	6	10	2[1]	-	-	-	-	-	-
Box Canyon 2	BC2	33.50054507	-115.6590681	6	10	4[1]	5	10	4[1]	6	10	4[1]	7	10	2[1]	4	15	8[1]	-	-	-
Swat 14	14	33.47673441	-115.712673	6	10	4/2	-	-	-	-	-	-	-	-	-	2	20	-	-	-	-
9-Mile 1	9M1	33.08851068	-114.9586742	-	-	-	-	-	-	-	-	-	5	10	4[1]	-	-	-	-	-	-
9-Mile 2	9M2	33.12358914	-114.9569662	-	-	-	-	-	-	-	-	-	5	10	4[1]	5	15	9[1]	-	-	-
North of BC-2	n/a	33.512068	-115.691378	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	38	-
Near Siphon 8	n/a	33.266953	-115.460771	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	40	-
Salvation Pass Road	n/a	33.226705	-115.370921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	20	-
Gasline Road	n/a	33.456814	-115.474537	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	20	-
Near Billy Machen	n/a	33.300355	-115.492538	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	20	-

[1] No pitfall traps

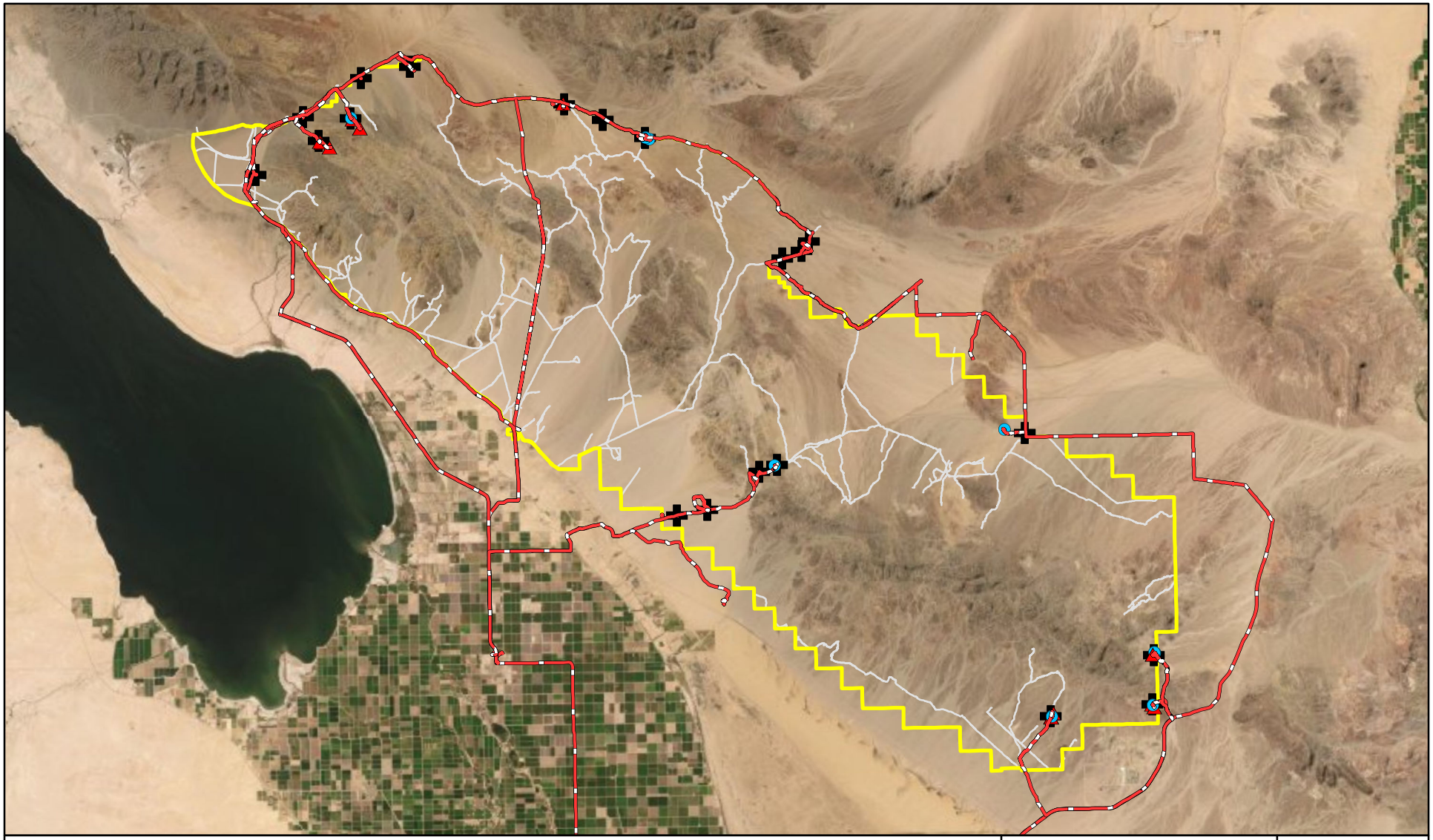


Figure 4. Survey Tracks

4.1 Environmental Conditions

The weather during all six survey efforts was dry with average to seasonally warm temperatures (Table 5). No precipitation was observed while GSRC biologists were on the installation, although evidence of rainfall was noted at times (e.g., pooled water, cracked mud). Further, rain events were captured by trail cameras and an AHDriFT camera in 2021 (Photographs 6 and 7). It is likely that rainfall varies greatly across the installation in any given year due to spotty rain events, and that rainfall received at each trap array is not the same as the numbers provided in Table 5, which are derived from an El Centro weather station (National Oceanic and Atmospheric Administration [NOAA] 2021).

Photograph 6. Rain event at 9-Mile Wash 2 (July 25, 2021).

Photograph 7. Rain event at 9-Mile Wash 1 (August 30, 2021).

4.2 Small Mammal Survey Results

Eleven species of small mammals and 7 species of mesocarnivore were observed at CMAGR during the study (Table 6). Small mammal species were typically detected by capture in Sherman live traps while mesocarnivores were most often encountered during visual encounter surveys.

The following pages provide a short summary of each small mammal and mesocarnivore species detected. All photographs within this report were taken during survey activities at CMAGR unless otherwise referenced. The number of captures reported for each species is defined as the number of animals for which data were taken (i.e., size measurements, sex) and excludes recaptures of the same individual. Measurements provided are the averages (mean) for each species.

Table 5. Temperature and Precipitation at CMAGR (2019 to 2021)

Mean Maximum Temperature (°F)													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2019	54.1	62.4	78.2	89.4	87.7	103.0	108.3	110.1	100.2	89.2	79.4	65.5	85.6
2020	71.7	70.9	73.6	87.4	98.5	102.3	110.2	111.1	105.8	95.7	79.9	70.3	89.8
2021	70.4	74.9	76.7	90.6	95.7	107.4	108.2	107.2	102.5	87.1	84.1	72.5	89.8
Average (1991-2020)	70.5	73.7	80.1	86.3	94.3	103.5	107.8	107.7	102.2	90.4	78.3	68.7	88.6
Mean Average Temperature (°F)													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2019	53.4	50.9	64.6	74.5	74.2	87.1	93.4	94.9	85.9	72.4	64.9	54.2	72.5
2020	57.0	56.27	62.3	72.6	82.6	86.3	94.0	96.6	89.0	79.1	94.6	55.0	77.1
2021	56.1	59.9	62.0	74.0	78.7	90.6	95.0	93.7	88.7	72.6	68.5	58.9	74.9
Average (1991-2020)	56.0	59.4	65.3	70.9	78.2	86.8	93.1	93.6	87.2	75.2	63.3	54.9	73.7
Precipitation (inches)													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2019	0.38	0.12	0.10	0.02	0.01	T	T	T	0.44	0.00	0.58	0.15	1.80
2020	T	0.00	0.56	0.00	0.00	0.00	0.00	T	0.00	0.00	T	T	0.56
2021	0.00	T	T	T	0.00	0.00	T	T	0.00	0.02	T	0.00	0.02
Average (1991-2020)	0.41	0.38	0.29	0.08	0.07	0.00	0.11	0.15	0.18	0.19	0.18	0.34	2.38

Source: NOAA 2021; Location: El Centro Area
T = Trace amounts (<0.01 inches)

Table 6. Small Mammal and Mesocarnivore Species Encountered at CMAGR

Common Name	Scientific Name	Group	Observed						Survey Type
			May 2019	Sept. 2019	May 2020	Sept. 2020	May 2021	Sept. 2021	
White-tailed antelope squirrel	*Ammospermophilus leucurus*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap, funnel trap, and visual encounter
Long-tailed pocket mouse	*Chaetodipus formosus*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap
Desert pocket mouse	*Chaetodipus penicillatus*	Small mammal	✔	✔	✔	✔	-	-	Sherman live trap
Spiny pocket mouse	*Chaetodipus spinatus*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap
Merriam's kangaroo rat	*Dipodomys merriami*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap and visual encounter
Black-tailed jackrabbit	*Lepus californicus*	Small mammal	✔	✔	✔	✔	✔	✔	Visual encounter
White-throated woodrat	*Neotoma albigula*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap
Desert woodrat	*Neotoma lepida*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap
Little pocket mouse	*Perognathus longimembris*	Small mammal	✔	-	–	–	-	-	Sherman live trap
Cactus mouse	*Peromyscus eremicus*	Small mammal	✔	✔	✔	✔	✔	-	Sherman live trap
Desert cottontail	*Sylvilagus audubonii*	Small mammal	✔	✔	✔	✔	✔	✔	Sherman live trap, visual encounter
Coyote	*Canis latrans*	Mesocarnivore	✔	✔	✔	✔	✔	✔	Trail camera, visual encounter, sign (tracks)
Bobcat	*Lynx rufus*	Mesocarnivore	-	✔	✔	✔	✔	✔	Trail camera, visual encounter, sign (tracks)
Raccoon	*Procyon lotor*	Mesocarnivore	✔	-	✔	✔	-	✔	Visual encounter, sign (tracks)
Western spotted skunk	*Spilogale gracilis*	Mesocarnivore	-	-	–	✔	-	✔	AHDriFT Trap Array, Trail camera

Common Name	Scientific Name	Group	Observed						Survey Type
			May 2019	Sept. 2019	May 2020	Sept. 2020	May 2021	Sept. 2021	
American badger	*Taxidea taxus*	Mesocarnivore	-	✔	-	✔	✔	✔	Visual encounter
Gray fox	*Urocyon cinereoargenteus*	Mesocarnivore	-	–	-	✔	–	–	Trail camera
Kit fox	*Vulpes macrotis*	Mesocarnivore	✔	✔	✔	✔	✔	✔	Visual encounter

White-tailed antelope squirrel (*Ammospermophilus leucurus*)	
Trap Array(s): 2, 3, 4, 6, 9, 10, 11, 12, 13, 14, 9M-1, 9M-2, BC1, BC2, BULL, BURT, Swat 5 **Captures:** 136 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** AHDriFT, Funnel trap, Sherman trap, Trail camera, VES **Measurements (Length [mm] / Weight [g]):** 200 – 68 – 34 – 6 = 84 (total-tail-hind foot-ear=total weight)	
Notes	Frequently seen in all habitats during the heat of the day – strictly diurnal.

Little pocket mouse (*Perognathus longimembris*)	
Trap Array(s): 13 **Captures:** 1 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance **Survey Type:** Funnel trap **Measurements (Length [mm] / Weight [g]):** 143-78-20-8=10 (total-tail-hind foot-ear=total weight)	
Notes	A single specimen was observed. This species is extremely seasonal.

Desert pocket mouse (*Chaetodipus penicillatus*)	
Trap Array(s):	
1, 2, 3, 4, 6, 7, 9, 11, 12, 13, 14, BC2, Swat 5	
Captures:	
49	
Habitat(s):	
Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance	
Survey Type:	
Funnel trap, Sherman trap, Pitfall trap	
Measurements (Length [mm] / Weight [g]):	
172 – 100 – 22 – 8 = 20 (total-tail-hind foot-ear=total weight)	
Notes	

Long-tailed pocket mouse (*Chaetodipus formosus*)	
Trap Array(s):	
1, 2, 3, 4, 6, 7, 9, 11, 12, 13, 14, BC1, BC2, Bull, Gasline Road, Siphon 8, Salvation Pass Road, Salvation Pass Installation Boundary	
Captures:	
63	
Habitat(s):	
Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance	
Survey Type:	
AHDriFT, Funnel trap, Sherman trap	
Measurements (Length [mm] / Weight [g]):	
186 – 109 – 22 – 9 = 20 (total-tail-hind foot-ear=total weight)	
Notes	

Spiny pocket mouse (*Chaetodipus spinatus*)	
Trap Array(s): 3, 4, 7, 8, 9, 11, 12, 13, 9-mile wash 1, 9-mile wash 2, BC1, BC2, Bull, Gasline Road **Captures:** 105 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance **Survey Type:** AHDriFT, Funnel trap, Sherman trap **Measurements (Length [mm] / Weight [g]):** 172 – 99 – 21 – 7 = 16 (total-tail-hind foot-ear=total weight)	
Notes	

Merriam's kangaroo rat (*Dipodomys merriami*)	
Trap Array(s): 7, 8, 9, 11, 12, 13, 14 Burt, Gaseline Road, Siphon 8, Salvation Pass Installation Boundary, Salvation Pass Road, Swat 5 **Captures:** 26 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance; Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance **Survey Type:** AHDriFT, Sherman trap, Funnel trap, VES **Measurements (Length [mm] / Weight [g]):** 233 – 139 – 29 – 16 = 38 (total-tail-hind foot-ear=total weight)	
Notes	

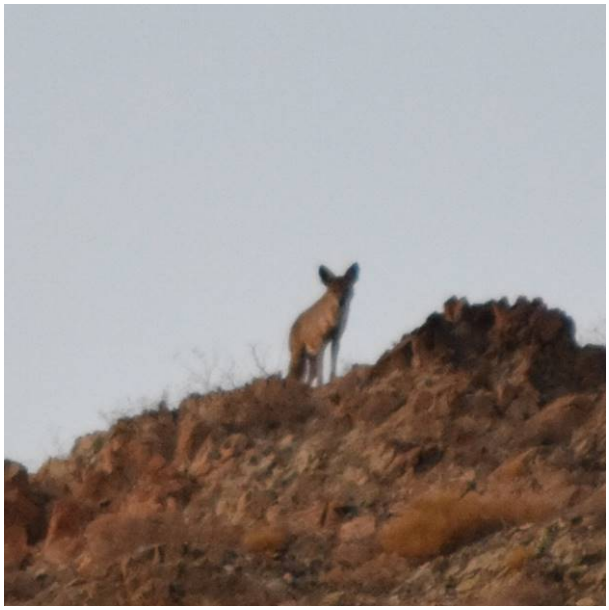
Black-tailed jackrabbit (*Lepus californicus*)	
Trap Array(s):	
None – Visual encounters only	
Captures:	
None	
Habitat(s):	
Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance; Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance	
Survey Type:	
Trail camera, VES	
Measurements (Length [mm] / Weight [g]):	
N/A	
Notes	

White-throated woodrat (*Neotoma albigula*)	
Trap Array(s):	
1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, BC1, BC2, Bull, 9-mile wash 1, 9-mile wash 2, Swat 5	
Captures:	
83	
Habitat(s):	
Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance	
Survey Type:	
Sherman trap, Funnel trap, VES	
Measurements (Length [mm] / Weight [g]):	
256 – 115 – 28 – 25 = 107 (total-tail-hind foot-ear=total weight)	
Notes	

Desert woodrat (*Neotoma lepida*)	
Trap Array(s): 3, 4, 6, 8, 9, 10, 11, 13, BC1, BC2, 9-mile wash 1, 9-mile wash 2, Bull, Burt, Swat 5 **Captures:** 70 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** Sherman trap, VES **Measurements (Length [mm] / Weight [g]):** 253 – 115 – 28 – 24 = 105 (total-tail-hind foot-ear=total weight)	
Notes	

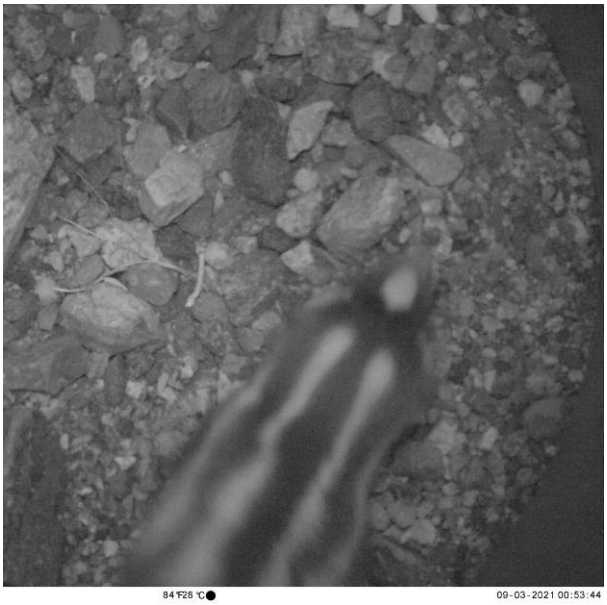
Cactus mouse (*Peromyscus eremicus*)	
Trap Array(s): 2, 3, 4, 8, 9, 10, 11, 13, BC1, BC2, 9-mile wash 1, 9-mile wash 2, Bull, Burt, Swat 5 **Captures:** 54 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** AHDriFT, Sherman trap **Measurements (Length [mm] / Weight [g]):** 167 – 90 – 18 – 16 = 18 (total-tail-hind foot-ear=total weight)	
Notes	

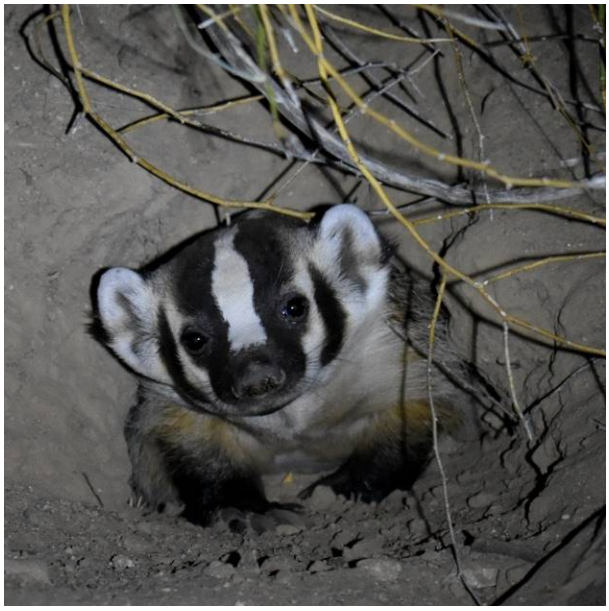
Desert cottontail (*Sylvilagus audubonii*)	
Trap Array(s): 9 **Captures:** 1 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** Sherman trap, Trail camera, VES **Measurements (Length [mm] / Weight [g]):** 320 – 30 – 76 – 70 = 275 * (total-tail-hind foot-ear=total weight)	
Notes	

Coyote (*Canis latrans*)	
Trap Array(s): None – Visual encounters only **Captures:** None **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** AHDriFT, Trail camera, VES **Measurements (Length [mm] / Weight [g]):** N/A	
Notes	Generalist species typically identified by scat, tracks, or vocalizations. Occasionally seen at twilight throughout the installation and captured often on trail cameras.

Bobcat (*Lynx rufus*)	
Trap Array(s): Bull, 9-mile wash 2 **Captures:** None **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Trail camera, VES (sign) **Measurements (Length [mm] / Weight [g]):** N/A	
Notes	Exclusively observed in rocky washes.

Raccoon (*Procyon lotor*)	
Trap Array(s): None – Evidence only (signs) **Captures:** None **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance **Survey Type:** VES (signs) **Measurements (Length [mm] / Weight [g]):** N/A	- No Photograph -
Notes	Identified by tracks and scat. Visual observation of species approximately 0.2 mile outside of installation boundary. No photographs were captured of this species at the installation.

Western spotted skunk (*Spilogale gracilis*)	
Trap Array(s): Camp Bull (AHDriFT) **Captures:** None **Habitat(s):** Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT **Measurements (Length [mm] / Weight [g]):** None	
Notes	Observed once by AHDriFT camera array at Camp Bull (September 2021).

American badger (*Taxidea taxus*)	
Trap Array(s): None **Captures:** None **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** VES, Trail camera **Measurements (Length [mm] / Weight [g]):** N/A	
Notes	Observations of this species were typically at night or early morning while road cruising in sandy habitats, including large washes. Observed near #2, 9-Mile Wash 1, and 9-Mile Wash 2. Badger digs were observed in numerous locations.

Gray fox (*Urocyon cinereoargenteus*)	
Trap Array(s): Box Canyon 2, Camp Bull, 9-Mile Wash 2 **Captures:** None **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Trail camera **Measurements (Length [mm] / Weight [g]):** N/A	
Notes	Observed on trail cameras both during the day (dawn and dusk) and at night.

Kit fox (*Vulpes macrotis*)	
Trap Array(s): None – Visual encounters only **Captures:** None **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** Trail camera, VES **Measurements (Length [mm] / Weight [g]):** N/A	
Notes	Strictly nocturnal and rather abundant. This species was regularly found while road cruising the installation at night.

4.3 Herpetofauna Survey Results

Twenty-five different herpetofaunal species were detected during the study (Table 7). The following number of species of each herpetofaunal group were detected: 12 lizard species, 10 snake species, 2 amphibian species, and 1 tortoise species. The type of trap or survey method that was successful for detection varied by species. Certain common species such as the western zebra-tailed lizard (*Callisaurus draconoides rhodostictus*) were never or rarely captured in funnel traps but were often observed while conducting trapping activities or pedestrian surveys. Other fossorial or nocturnal species, such as the desert nightsnake (*Hypsiglena chlorophaea deserticola*) and three-lined boa (*Lichanura orcutti*) were only detected during nighttime road-cruising or pedestrian surveys. The only herpetofauna species captured in pitfall traps were the common side-blotch lizard (*Uta stansburiana*) and the western banded gecko (*Coleonyx variegatus*). One species, the desert night lizard (*Xantusia vigilis*), was only detected while searching underneath old vegetative detritus on the ground.

The following pages give a brief summary of each herpetofaunal species encountered during the study.

Table 7. Herpetofaunal Species Encountered at CMAGR

Common Name	Scientific Name	Group	Observed						Survey Type
			May 2019	Sept. 2019	May 2020	Sept. 2020	May 2021	Sept. 2021	
Red-spotted toad	*Anaxyrus punctatus*	Amphibian	✔	-	✔	-	✔	✔	Visual encounter
Rio Grande leopard frog	*Lithobates berlandieri*	Amphibian	-	-	✔	-	✔	-	Visual encounter
Mojave desert tortoise	*Gopherus agassizii*	Tortoise	✔	✔	✔	✔	✔	✔	AHDriFT camera array, visual encounter
Great Basin whiptail	*Aspidoscelis tigris tigris*	Lizard	✔	✔	✔	✔	✔	✔	Funnel trap, Sherman trap, and visual encounter
Western zebra-tailed lizard	*Callisaurus draconoides rhodostictus*	Lizard	✔	✔	✔	-	✔	✔	Lizard snare and visual encounter
Western banded gecko	*Coleonyx variegatus*	Lizard	✔	✔	✔	-	✔	✔	Pitfall trap, visual encounter
Mojave collared lizard	*Crotaphytus bicinctores*	Lizard	✔	✔	✔	-	–	–	Lizard snare and visual encounter
Desert iguana	*Dipsosaurus dorsalis*	Lizard	✔	✔	✔	✔	✔	✔	Funnel trap
Long-nosed leopard lizard	*Gambelia wislizenii*	Lizard	-	-	✔	-	-	-	Visual encounter
Desert horned lizard	*Phrynosoma platyrhinos*	Lizard	✔	✔	✔	-	✔	-	Visual encounter
Common chuckwalla	*Sauromalus ater*	Lizard	✔	✔	✔	✔	✔	✔	Visual encounter
Desert spiny lizard	*Sceloporus magister*	Lizard	✔	✔	✔	✔	✔	✔	Funnel trap, Sherman trap, and visual encounter
Long-tailed brush lizard	*Urosuarus graciosus*	Lizard	✔	-	-	✔	✔	✔	Visual encounter, lizard snare, and funnel trap
Common side-blotch lizard	*Uta stansburiana*	Lizard	✔	✔	✔	✔	✔	✔	Funnel trap, pitfall trap, and visual encounter
Desert night lizard	*Xantusia vigilis*	Lizard	✔	✔	✔	✔	-	-	Visual encounter
Coachwhip (red racer)	*Coluber flagellum piceus*	Snake	✔	✔	✔	✔	✔	✔	Funnel trap and visual encounter
Western diamondback rattlesnake	*Crotalus atrox*	Snake	-	✔	✔	✔	-	-	AHDriFT camera array, visual encounter

Common Name	Scientific Name	Group	Observed						Survey Type
			May 2019	Sept. 2019	May 2020	Sept. 2020	May 2021	Sept. 2021	
Sidewinder	*Crotalus cerastes*	Snake	✔	✔	✔	✔	✔	✔	AHDriFT camera array, visual encounter
Speckled rattlesnake	*Crotalus mitchellii pyrrhus*	Snake	✔	✔	✔	✔	✔	✔	AHDriFT camera array, visual encounter
Desert nightsnake	*Hypsiglena chlorophaea*	Snake	✔	-	✔	–	-	-	Visual encounter
California kingsnake	*Lampropeltis californiae*	Snake	-	-	✔	-	-	-	Visual encounter (incidental, driving)
Three-lined boa	*Lichanura orcutti*	Snake	✔	✔	✔	-	✔	-	Visual encounter
Sonoran gophersnake	*Pituophis catenifer affinis*	Snake	✔	-	✔	-	-	-	Funnel trap, visual encounter
Long-nosed snake	*Rhinocheilus lecontei*	Snake	✔	-	-	-	-	-	Visual encounter (road-cruising)
Western patch-nosed snake	*Salvadora hexalepis hexalepis*	Snake	✔	-	✔	-	-	-	Funnel trap, visual encounter

Red-spotted toad (*Anaxyrus punctatus*)	
Trap Array(s): 3, BC1, 9-mile wash 1, 9-mile wash 2 **Captures:** 4 **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, VES **Measurements (Length [mm] / Weight [g])** 49 – 49 = 20 (total-SVL=total weight)	
Notes	Observed chiefly at night in rocky washes.

Rio Grande leopard frog (*Lithobates berlandieri*)	
Trap Array(s): None – Visual encounter only **Captures:** 2 **Habitat(s):** In wildlife drinker at Siphon 10 **Survey Type:** VES **Measurements (Length [mm] / Weight [g])** N/A (total-SVL=total weight)	
Notes	Introduced species from other regions of North America. Cannot survive on the installation without a permanent source of water, but found at multiple drinkers along the canal bordering the installation boundary.

Mojave desert tortoise (*Gopherus agassizii*)	
Trap Array(s): None – Visual encounter only **Captures:** None were captured. **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, VES **Measurements (Length [mm] / Weight [g])** N/A	
Notes	A regular occurrence in the northern and eastern portions of the installation. Well-documented in other reports produced for CMAGR.

Great Basin whiptail (*Aspidoscelis tigris tigris*)	
Trap Array(s): 1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 9-mile wash 1, BC1, Bull **Captures:** 31 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** AHDriFT, Funnel trap, Lizard snare, Trail camera, VES **Measurements (Length [mm] / Weight [g])** 273 – 75 = 16 (total-SVL=total weight)	
Notes	An active species commonly seen foraging throughout the day.

Western zebra-tailed lizard (*Callisaurus draconoides rhodostictus*)	
Trap Array(s): 6, 9-mile wash 1, Burt **Captures:** 5 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** Lizard snare, VES **Measurements (Length [mm] / Weight [g])** 157 – 65 = 7 (total-SVL=total weight)	
Notes	Frequently seen but rarely captured. The number of captures suggests they were infrequent on the landscape, yet were seen often.

Western banded gecko (*Coleonyx variegatus*)	
Trap Array(s): 13, 9-mile wash 1, 9-mile wash 2, Ted Kipf Road **Captures:** 4 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, Pitfall trap, Funnel trap, VES **Measurements (Length [mm] / Weight [g])** 145 – 88.5 = 5 (total-SVL=total weight)	
Notes	A nocturnal species that was locally common.

Mojave black-collared lizard (*Crotaphytus bicintores*)	
Trap Array(s): Bull, 9-mile wash 2 **Captures:** 1 **Habitat(s):** Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Lizard snare, VES **Measurements (Length [mm] / Weight [g])** 85 mm SVL = 5 g (total-SVL=total weight)	
Notes	Only two individuals observed (one captured). Appears to be associated with steep and rocky hillsides.

Desert iguana (*Dipsosaurus dorsalis*)	
Trap Array(s): 4, 11, 12, 13, 9-mile wash 1, Burt **Captures:** 11 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, Funnel trap, Lizard snare, Trail camera, VES **Measurements (Length [mm] / Weight [g])** 385 – 142 = 80 (total-SVL=total weight)	
Notes	Observed during the hottest part of the day. Often flushed off of Bradshaw Trail while driving between trap arrays.

Long-nosed leopard lizard (*Gambelia wislizenii*)	
Trap Array(s): 13 **Captures:** 1 **Habitat(s):** Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Lizard snare, VES **Measurements (Length [mm] / Weight [g])** 235 – 110 = 48 (total-SVL=total weight)	
Notes	Potentially rare on the installation (observed only twice).

Desert horned lizard (*Phrynosoma platyrhinos*)	
Trap Array(s): Bull **Captures:** 3 **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** AHDriFT, Lizard snare, VES **Measurements (Length [mm] / Weight [g])** 124 – 78 = 28 (total-SVL=total weight)	
Notes	Observed more often on the northern side of the installation along Bradshaw Trail and various washes.

Common chuckwalla (*Sauromalus ater*)	
Trap Array(s): None – Visual encounter only **Captures:** 2 **Habitat(s):** Rocky slopes and outcroppings; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Lizard snare, Trail Camera, VES **Measurements (Length [mm] / Weight [g])** 175 – 133 = 141 (total-SVL=total weight)	
Notes	While only two individuals were captured, numerous others were observed sunning on boulders in Salvation Pass and areas along Bradshaw Trail.

Desert spiny lizard (*Sceloporus magister*)	
Trap Array(s): 3, 4, 6, 7, 9, 11, BC1, BC2 **Captures:** 9 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; \Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, Lizard snare, VES, Funnel trap, Sherman trap **Measurements (Length [mm] / Weight [g])** 233 – 94 = 44 (total-SVL=total weight)	
Notes	

Long-tailed brush lizard (*Urosaurus graciosus*)	
Trap Array(s): 4, 9 **Captures:** 4 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Funnel trap, Lizard snare, VES **Measurements (Length [mm] / Weight [g])** 156 – 45 = 4 (total-SVL=total weight)	
Notes	Also observed near Trap Array #3 and along Bradshaw Trail north of Box Canyon 1. Although known to bask on creosote bush, individuals at CMAGR were most easily observed on desert ironwood.

Common side-blotch lizard (*Uta stansburiana*)	
Trap Array(s): 3, 9, 10, 11, 13, 14, 9-mile wash, BC1, Burt **Captures:** 29 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance; Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance **Survey Type:** AHDriFT, Funnel trap, Pitfall Trap, Lizard snare, VES **Measurements (Length [mm] / Weight [g])** 99 – 63 = 3 (total-SVL=total weight)	
Notes	The most frequently observed reptile on the installation. Diurnal, often observed foraging or basking at all times of the day.

Desert night lizard (*Xantusia vigilis*)	
Trap Array(s): None – Visual encounter only **Captures:** 5 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance **Survey Type:** VES (under cover) **Measurements (Length [mm] / Weight [g])** 68 – 37 = 3 (total-SVL=total weight)	
Notes	Typically found under dead yucca biomass and captured by hand. Found along Bradshaw Trail on the north side of the installation.

Coachwhip (red racer) (*Coluber flagellum piceus*)	
Trap Array(s): 13, BC1, BC2, 9-mile wash **Captures:** 5 **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, Funnel trap, VES **Measurements (Length [mm] / Weight [g])** 973 – 671 = 127 (total-SVL=total weight)	
Notes	One of the more common snake species in the area; most often observed in rockier areas or areas with more variable topography.

Western diamondback rattlesnake (*Crotalus atrox*)	
Trap Array(s): Bull **Captures:** 4 **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** AHDriFT, VES **Measurements (Length [mm] / Weight [g])** 961 – 877 = 310 (total-SVL=total weight)	
Notes	Easily the largest *Crotalus* species on the installation. All individuals were observed at night. Found commonly in large washes where it can hunker down in the sand.

Sidewinder (*Crotalus cerastes*)	
Trap Array(s): None – Visual encounter only **Captures:** 7 **Habitat(s):** Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, VES **Measurements (Length [mm] / Weight [g])** 570 – 519 = 162 (total-SVL=total weight)	
Notes	Common in flatter, lower elevation areas (creosote flats and bajadas).

Speckled rattlesnake (*Crotalus mitchellii pyrrhus*)	
Trap Array(s): None – Visual encounter only **Captures:** 7 **Habitat(s):** Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** AHDriFT, VES **Measurements (Length [mm] / Weight [g])** 728 – 629 = 274 (total-SVL=total weight)	
Notes	Usually observed during the day, typically in the late mornings or early afternoons. Associated with box canyons where they wait for prey along the rock wall edges.

Desert nightsnake (*Hypsiglena chlorophaea*)	
Trap Array(s): None – Visual encounter only **Captures:** 2 **Habitat(s):** Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** VES **Measurements (Length [mm] / Weight [g])** 331 – 278 = 15 (total-SVL=total weight)	
Notes	Always found at night near rocky hillsides, including near Box Canyon 2.

California kingsnake (*Lampropeltis californiae*)	
Trap Array(s): None – Visual encounter only **Captures:** 1 **Habitat(s):** Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** VES **Measurements (Length [mm] / Weight [g])** 1,350 – 1,070 = 192 (total-SVL=total weight)	
Notes	Only one individual encountered in the early morning while driving into Salvation Pass from the south.

Rosy boa (*Lichanura orcutti*)	
Trap Array(s): None – Visual encounter only **Captures:** 4 **Habitat(s):** Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** VES **Measurements (Length [mm] / Weight [g])** 639 – 554 = 174 (total-SVL=total weight)	
Notes	Always found at night near rocky hillsides or along canyon edges.

Sonoran gopher snake (*Pituophis catenifer affinis*)	
Trap Array(s): 3, 11 **Captures:** 3 **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance **Survey Type:** Funnel trap, VES **Measurements (Length [mm] / Weight [g])** 1,323 – 1,157 = 320 (total-SVL=total weight)	
Notes	A male and female gopher snake were observed in the same funnel trap at Trap Array #11.

Long-nosed snake (*Rhinocheilus lecontei*)	
Trap Array(s): None – Visual encounter only **Captures:** 1 **Habitat(s):** Upper Bajada Desert Scrub Alliance **Survey Type:** VES (Road-cruising) **Measurements (Length [mm] / Weight [g])** 1323 – 1157 = 320 (total-SVL=total weight)	
Notes	Only one individual observed while road-cruising at night along Bradshaw Trail.

Desert patch-nosed snake (*Salvadora hexalepis hexalepis*)	
Trap Array(s): 11 **Captures:** 2 **Habitat(s):** Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance; Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance **Survey Type:** Funnel trap, VES **Measurements (Length [mm] / Weight [g])** 915 – 707 = 115 (total-SVL=total weight)	
Notes	One individual observed while driving, half-way out of a burrow along a dirt wall north of Box Canyon 2.

4.3.1 AHDriFT Camera Trap Array Results

AHDriFT camera trap arrays were first deployed in September 2020 (fourth survey trip) in an effort to obtain evidence of cryptic species that may have short periods of activity each year. Table 8 provides information on the deployment of AHDriFT cameras. Two cameras installed in May 2021 (#9, Camp Burt) were lost after monsoons washed away the trap arrays.

Table 8. Summary of Results from Deployment of AHDriFT Camera Trap Arrays

Trap	Deployment Period	Trap Nights	Total Species or Genera Observed	New Species Observed
3/4 (Salvation Pass)	5/23/2021 – 9/11/2021	112	7	0
9[1]	3/2/2021 – 5/18/2021	156[2]	5	0
11[3]	9/15/2020 – 2/25/2021	72	9	0
9-Mile 1	2/26/2021 – 9/11/2021	198	7	0
9-Mile 2[4]	9/17/2020 – 1/20/2021 3/01/2021 – 9/11/2021	321	9	0
BC-1	9/17/2020 – 9/09/2021	358	11	0
Camp Bull	2/26/2021 – 9/08/2021	195	10	1
Camp Burt	5/21/2021 – Lost	-	-	-

[1] One camera re-installed on 5/21/2021, but lost.

[2] Two cameras set-up simultaneously at array.

[3] Camera 1 disturbed: 10/26/2020; Camera 2 disturbed: 10/06/2020 (both knocked over by coyote).

[4] One camera re-installed on 5/21/2021, but lost.

Species commonly captured by AHDriFT cameras were those known from areas across the entire base such as the tiger whiptail (*Aspidoscelis tigris tigris*) and common side-blotch lizard. One new species, the western spotted skunk (*Spilogale gracilis*), was captured by the AHDriFT array at the Camp Bull survey area. Appendix C provides a table of species observed at each array and photographs of each species.

4.4 Vegetation Community Assessments

Five different vegetation alliances were identified across 25 trapping array locations (Table 9). These alliances are labeled by the NVCS as follows (USNVC 2021):

- 2 – Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance (6 trap arrays)
- 7 – Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance (3 trap arrays)
- 9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance (14 trap arrays)
- 10 – Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance (1 trap array)
- 11 – Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance (1 trap array)

Formal assessment and classification of vegetation alliances occurred after trap array sites had already been chosen, which accounts for the disparity in number of trap arrays across different alliances. Vegetation alliances were identified by Jim Malusa; identifications were based upon dominant species as recorded in the plant species survey results provided in Appendix D.

Table 9. Vegetation Alliances Identified at Each Trap Array

Trap Array	Vegetation Association
1	2 – Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance
2	2 - Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance
3	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
4	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
BURT	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
BULL	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
6	7 - Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance
7	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
8	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
9	2 – Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance
10	2 – Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance
11	7 – Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance

Trap Array	Vegetation Association
S5W	10 – Desert willow (*Chilopsis linearis*) – smoketree (*Psorothamnus spinosus*) woodland alliance
12	2 – Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance
13	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
BC1	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
BC2	7 – Catclaw acacia (*Acacia greggii*) – desert lavender (*Hyptis emoryi*) – chuparosa (*Justicia californica*) desert wash scrub alliance
14	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
9M1	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
9M2	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
North of BC-2	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
Near Siphon 8	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance
Salvation Pass Road	2 – Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance
Gasline Road	11 – Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance
Near Billy Machen	9 – Palo verde (*Parkinsonia florida*) – ironwood (*Olneya tesota*) woodland alliance

Due to the large number of small mammals captured during the study, an analysis of potential correlation between vegetation alliances and small mammal species could be performed and is provided below. Reptile species were not captured at high enough rates to warrant analysis, but observational evidence of habitat types where reptile species were observed is provided in Section 4.3. Table 10 lists the number of small mammal species captured within each vegetation alliance, excluding recaptures.

Table 10. Small Mammal Species by Vegetation Alliance[1]

Species	Vegetation Alliance Code[2]					
	2	7	9	10	11	Total
White-tailed antelope squirrel	13	27	93	2	0	135
Long-tailed pocket mouse	22	13	25	0	3	63
Desert pocket mouse	16	10	19	4	0	49
Spiny pocket mouse	9	34	60	0	1	104
Merriam's kangaroo rat	6	5	13	1	1	26
White-throated woodrat	17	18	45	1	0	81
Desert woodrat	16	12	36	4	0	68
Cactus mouse	4	20	28	2	0	54
Desert cottontail	1	0	0	0	0	1
Total	104	139	319	14	5	581

[1] Excludes recaptured animals.

[2] See previous table for vegetation alliances associated with each code.

The results of a chi-square test performed on these data is provided in Table 11. A chi-square test compares two categorical variables (animal species, habitat type) to determine if they are related. The formula to determine the chi-square statistic is:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Subscript "c" is degrees of freedom, "O" is observed value, and "E" is expected value (Pearson 1900).

A P-value (as shown in Table 11) equal to or close to zero indicates that there is a statistically significant association or dependence between small mammal species and vegetation alliances at CMAGR (Pearson 1900). Another way of stating this is to say that small mammal species are not randomly placed throughout the environment at CMAGR, but rather certain species have a preference or need for certain habitat types.

Positive Pearson Residuals indicate a positive association between the species and vegetation alliance, while negative Pearson Residuals imply a negative association (Pearson 1900). Figure 5 displays the Pearson Residuals in graphic form. In Figure 5, darker blue circles indicate a more positive association between small mammal species and vegetation alliance, while darker red circles indicate a more negative association. The size of the circles is an additional graphic display of the size of the value of each Pearson Residual.

Table 11. Chi-square Test and Pearson Residuals

Chi-square	df[1]	P-value
84.943	28	1.198^{-7}

Pearson Residuals					
Species	**Vegetation Alliance**				
	2	**7**	**9**	**10**	**11**
White-tailed antelope squirrel	-2.241	-0.941	2.176	-0.697	-1.079
Long-tailed pocket mouse	3.232	-0.54	-1.639	-1.233	3.334
Desert pocket mouse	2.474	-0.509	-1.531	2.59	-0.65
Spiny pocket mouse	-2.203	1.818	0.37	-1.584	0.109
Merriam's kangaroo rat	0.644	-0.493	-0.344	0.47	1.639
White-throated woodrate	0.69	-0.32	0.067	-0.683	-0.836
Desert woodrat	1.129	-1.064	-0.229	1.841	-0.766
Cactus mouse	-1.805	1.962	-0.312	0.61	-0.682

[1] df = degrees of freedom (for use in chi-square distribution table).

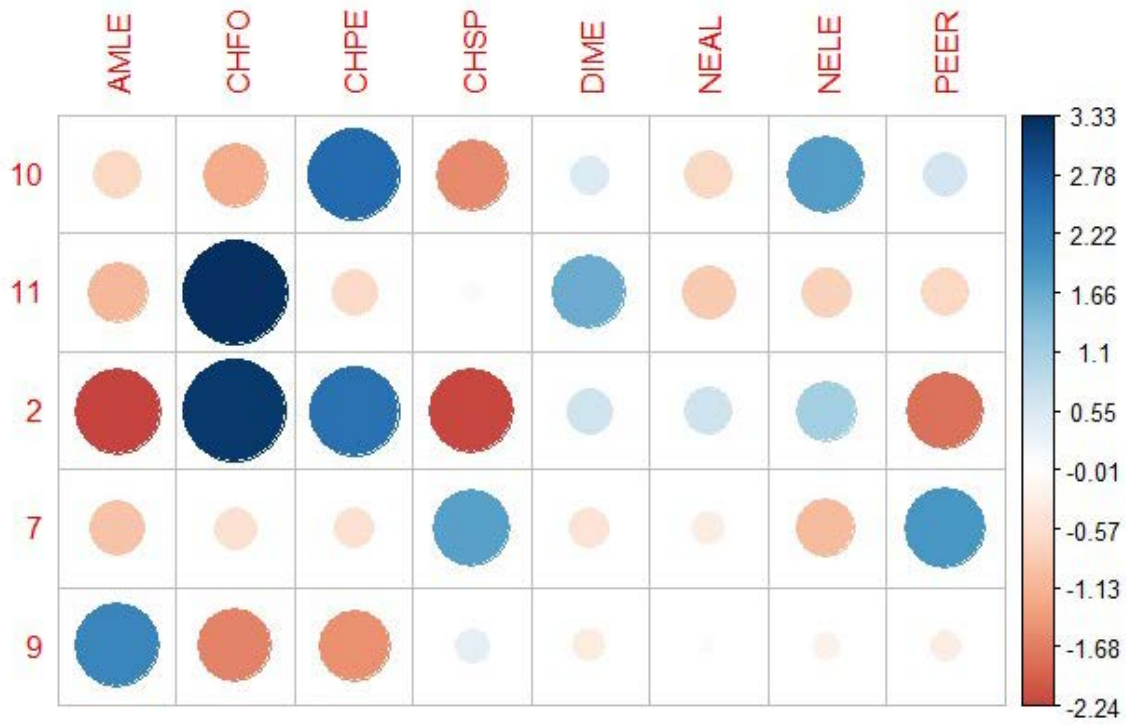


Figure 5. Pearson Residuals

The strongest positive associations are between the long-tailed pocket mouse (*Chaetodipus formosus*) and two alliances: 1) Creosote bush (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) bajada and valley desert scrub alliance (2); and 2) Cheesebush (*Ambrosia salsola*) – Chuckwalla's delight (*Bebbia juncea*) shrubland alliance (11). Strong negative associations include white-tailed antelope squirrel (*Ammospermophilus leucurus*), spiny pocket mouse (*Chaetodipus spinatus*), and cactus mouse (*Peromyscus eremicus*) with creosote bush – white bursage desert scrub.

Another alternative when considering the importance of each association between species and vegetation alliance is to calculate the contribution to chi-square from each combination of species and alliance (Table 12 and Figure 6). The highest 10 contributions to chi-square are highlighted in Table 12.

Table 12. Contribution to Chi-Square Value

Species	Vegetation Alliance Code				
	2	7	9	10	11
White-tailed antelope squirrel	5.914	1.043	5.574	0.572	1.370
Long-tailed pocket mouse	12.301	0.343	3.164	1.790	13.085
Desert pocked mouse	7.206	0.305	2.761	7.900	0.497
Spiny pocket mouse	5.715	0	0.161	2.955	0.014
Merriam's kangaroo rat	0.488	0.286	0.139	0.260	3.162
White-throated woodrat	0.560	0.121	0.005	0.549	0.822
Desert woodrat	1.501	1.334	0.062	3.990	0.690
Cactus mouse	3.836	4.532	0.115	0.438	0.548

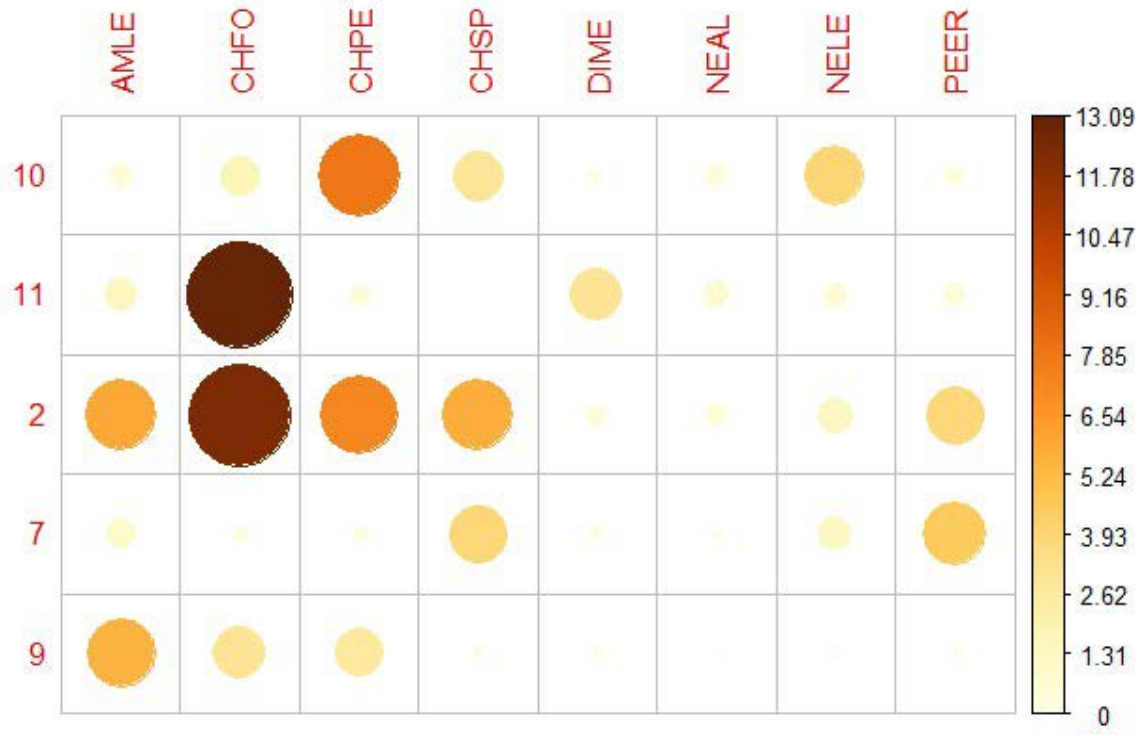


Figure 6. Graphic Representation of Contribution to Chi-Square Value

5.0 DISCUSSION

Survey and trapping efforts during the three-year inventory were successful in detecting the majority of species thought to be present within CMAGR. Despite this, implementing improvements to survey methodology, an expansion of habitats surveyed, and increased time spent on the installation would likely result in the observation of additional species. Species known from the area based on past records but not detected during the inventory are discussed here.

5.1 Small Mammal Results and Potential Additional Species

Small mammal species were consistently caught in Sherman trap lines at relatively high rates. A total of 763 small mammals were captured during 2,498 trap nights. This equates to an average of 3.1 animal captures each time a line of 10 Sherman traps was checked. Small mammals were caught at every trap array that was set up and evidence of small mammals was observed in every habitat type with the exception of barren rock pavement.

Observed small mammal activity patterns and habitat associations were consistent with what is reported in the literature. Based on chi-square results, white-tailed antelope squirrel are associated with palo verde-ironwood communities, which includes the trap arrays located in major washes and box canyons (e.g., 9-Mile Wash 1/2, Box Canyon 1). Although not trapped in frequently, the desert willow-smoke tree woodland alliance was another common location of antelope squirrel observations while driving between trap arrays (such as the large wash system along the northern tip of the installation boundary). Long-tailed pocked mice and desert pocket mice were positively associated with creosote bush-white bursage bajada and valley desert scrub habitats, where terrain is flatter but soil is still rocky and provides suitable camoflauge for

the species' size and color (Jameson and Peeters 2004). In contrast, spiny pocket mice were associated more with vegetation alliances found in box canyons and other rocky, sloped areas. Merriam's kangaroo rats were found in all habitat types; they were usually observed foraging between shrubs in flat areas rather than up in rocky areas. Woodrats were observed in most habitats and nests were found in rocky outcroppings, under shrubs on wash edges, and in large cholla (*Cylindropuntia* spp.) clumps. Creosote bush-white bursage alliances typically included cholla or other succulents (e.g., *Yucca* spp.) that woodrats are known to prefer (Jameson and Peeters 2004). Desert cottontails and black-tailed jackrabbits were observed commonly during the day in shady spots along large wash systems.

Species of small mammals or mesocarnivores that were not observed during this study but are likely to occur on the installation include:

- **Botta's pocket gopher (*Thomomys bottae*):** A large gopher of the southwest most often observed by recognition of mounds of dirt marking its presence (Jameson and Peeters 2004). This species has been noted on the installation during previous biological resources surveys (MCAS Yuma and NAVFAC SW 2017).
- **Round-tailed ground squirrel (*Xerospermophilus tereticaudus*):** A slightly larger ground squirrel with less drastic markings as compared to the white-tailed antelope squirrel (Jameson and Peeters 2004). It prefers sandy habitats for burrowing and has been recorded on the installation previously (MCAS Yuma and NAVFAC SW 2017). A few round-tailed ground squirrels were observed during this study approximately 0.75 mile south of the installation boundary along Ted Kipf Road. The species likely occurs along the installation's southwest boundary.

Small mammal and mesocarnivore species not captured or observed but with the potential to occur on the installation include the following:

- **Canyon mouse (*Peromyscus crinitus*):** A soft-furred deer mouse similar to the cactus mouse (*Peromyscus eremicus*), but having a more strongly furred, bi-colored tail with a tuft of hairs 4-10 mm in length at the tip. It's found in deserts of eastern California in sandy habitats with rocky outcrops (Jameson and Peeters 2004).
- **Desert kangaroo rat (*Dipodomys deserti*):** A much larger species of kangaroo rat compared to Merriam's kangaroo rat, the desert kangaroo rat has a white tip on its tail (Jameson and Peeters 2004). It prefers habitats with loose, dry sand and is more likely to occur on the Algodones Dunes than on CMAGR. Despite this, it may range onto lower elevation areas of the installation.
- **House mouse (*Mus musculus*):** A common mouse of developed areas that has been introduced across the Americas from the Old World (Jameson and Peeters). This species could be found around Camp Billy Machem or the canal on the southwestern boundary.

5.2 Herpetofauna Results and Potential Additional Species

Herpetofauna were captured sporadically using drift arrays, and the chance to catch certain fossorial species (e.g., spotted leaf-nosed snake [*Phyllorhynchus decurtatus*]) makes the use of drift arrays advantageous during future surveys. Small nocturnal snake species can be difficult to detect even during nighttime pedestrian and road-cruising surveys. It should be noted that despite the benefits, there were issues with drift fence arrays at CMAGR. Constructed of geotextile plastic fabric, drift fences ripped and broke down quickly and didn't last from spring

set-up into the autumn survey period during the first year. The distance between drift arrays, risk of animal mortality, and the need for excessive repairs or replacement limited the use of drift arrays during surveys based on time and resource constraints. Snake species were detected more consistently during nighttime road-cruising and pedestrian survey events. Walking wide, open washes and canyons at night was an effective method for snake capture.

Species of herpetofauna that were not observed but are likely to occur on the installation include:

- **Desert glossy snake (*Arizona elegans eburnata*):** A cream- and brown-colored nocturnal snake that could be confused with other fossorial snakes such as the desert nightsnake (Nafis 2021). This species likely inhabits the low-elevation creosote flats on the southwest side of CMAGR. At least one confirmed observation within a mile of the installation has been reported on iNaturalist during the survey period (iNaturalist 2021a).
- **Western threadsnake (*Rena humilis*):** A tiny, thin, brown or purple nocturnal snake that eats ants and has non-functional eyes which appear as black dots (Nafis 2021). This species likely inhabits multiple habitat types (e.g., creosote flats, rocky areas) on the installation. One confirmed observation near Slab City/Niland reported on iNaturalist during the survey period (iNaturalist 2021b).
- **Spotted leaf-nosed snake (*Phyllorhynchus decurtatus*):** Another spotted, secretive nocturnal snake of cream, brown, or red colorations. Rostral scale over the nose is enlarged, similar to the patch-nosed snake (Nafis 2021). Multiple occurrences on the Global Biodiversity Information Facility (GBIF) website along Highway 78, one or two miles east of the installation boundary; most recent observation from 2016 (iNaturalist 2021c).
- **California lyresnake (*Trimorphodon lyrophanes*):** Another brown- and cream-colored nocturnal snake that is associated with rocky habitats and is known to be a good climber (Nafis 2021). This species is known from records north of the Salton Sea and just south of the installation near Highway 78 (iNaturalist 2021d).

Additional species of herpetofauna that have the potential to occur on the installation include:

- **Couch's spadefoot toad (*Scaphiopus couchi*):** A small toad with distinctive vertical pupils that is known from the Algodones Dunes and areas east of the dunes (Nafis 2021). This species requires temporary ponded water to reproduce and can be inactive for long periods of time until rainfall events. If on the installation, spadefoots would be found in low elevation areas on the southwest side of CMAGR near Ted Kipf Road.
- **Colorado Desert shovel-nosed snake (*Chionactis annulata annulata*):** A small, typically brightly colored snake that prefers sandy areas where it can burrow easily. This species is found in Imperial County in multiple locations including the Algodones Dunes and could range north onto the installation along sandy washes. If not located on the installation, it is because of the lack of this soft sandy soil type.
- **Variable groundsnake (*Sonora semiannulata semiannulata*):** A small snake, typically 8 to 12 inches in length, with highly variable scale colors and patterns (Nafis 2021). Prefers areas with some moisture which includes areas with human disturbance. It is known from areas south of the Salton Sea including around El Centro (GBIF Secretariat 2021). Possibly too dry on CMAGR to support this species.
- **Mediterranean house gecko (*Hemidactylus turcicus*):** An introduced species of gecko that is typically found around buildings or other developed areas. It would not be found in natural areas on the installation but could survive around Camp Billy Machem or

other developed areas with some water source. This species is incidentally transported to different areas on vehicles.

- **Red-eared slider (*Trachemys scripta elegans*):** An average-sized turtle with a characteristic red ear-mark that has been introduced to many areas around North America where it is not native. This species is known from canals in Imperial County and could be present in the canal and wildlife drinkers along the southwest boundary of the installation (U.S. Geological Survey [USGS] 2020).

Other species known to occur in Imperial County but that likely don't reside on the installation include the flat-tailed horned lizard (*Phrynosoma mcallii*) and Colorado Desert fringe-toed lizard (*Uma notata*). Both species prefer sandy habitats and are known from the Algodones Dunes area southwest of the installation (Nafis 2021, iNaturalist 2021e).

5.3 Recommendations

Future surveys for small mammals and herpetofauna should target higher elevations on CMAGR that were not surveyed extensively during this inventory. Potential additional species that could be found at these elevations include the canyon mouse (*Peromyscus crinitus*) and ringtail (*Bassariscus astutus*). Surveys at higher elevations would require timing so that survey activities were not impeded or prevented by military training operations. Further, additional survey time should be allocated to the lowest-elevation areas on the installation, along the southwestern boundary. Species not observed during this inventory but that have been recorded near Niland and Slab City (e.g., western threadsnake, glossy snake) may be more likely to occur at lower elevations. If possible, future survey efforts should occur during and immediately after the monsoon season or rainfall events at CMAGR. Additional amphibian species may be detectable only around these periods of precipitation. Additionally, a small section of man-made canal runs through the installation boundary. This section of canal should be periodically checked for red-eared slider (*Trachemys scripta elegans*), which has been found in canals in Imperial County. For a more extensive study of mesocarnivores, tomahawk traps should be implemented in conjunction with increased numbers of trail cameras. If drift fences are deployed in future survey efforts, it is recommended that wooden strand board or plywood is used as the primary fence material, rather than geotextile plastic. Wood drift fences are better able to resist the damaging effects of strong winds that are common in the region.

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APPENDIX A
TRAP ARRAY PHOTO POINTS

Appendix A – Trap Array and Adjacent Habitat Photographs

Photograph A-1. Trap Array #1 (May 20, 2019).

Photograph A-2. Habitat adjacent to Trap Array #1 (May 20, 2019).

Photograph A-3. Trap Array #2 (May 20, 2019).

Photograph A-4. Habitat adjacent to Trap Array #2 (May 20, 2019).

Photograph A-5. Trap Array #3 (May 20, 2019).

Photograph A-6. Habitat adjacent to Trap Array #3 (May 20, 2019).

Photograph A-7. Trap Array #4 (May 17, 2019).

Photograph A-8. Habitat adjacent to Trap Array #4 (May 23, 2021).

Photograph A-9. Camp Bull Trap Array (no drift fence) (May 20, 2019).

Photograph A-10. Habitat adjacent to Camp Bull Trap Array (May 20, 2019).

Photograph A-11. Camp Burt Trap Array (May 20, 2019).

Photograph A-12. Habitat adjacent to Camp Burt Trap Array (May 20, 2019).

Photograph A-13. Trap Array #6 (May 20, 2019).

Photograph A-14. Habitat adjacent to Trap Array #6 (May 20, 2019).

Photograph A-15. Trap Array #7 (May 20, 2019).

Photograph A-16. Habitat adjacent to Trap Array #7 (May 20, 2019).

Photograph A-17. Trap Array #8 (May 20, 2019).

Photograph A-18. Habitat adjacent to Trap Array #8 (May 20, 2019).

Photograph A-19. Trap Array #9 (May 21, 2019).

Photograph A-20. Habitat adjacent to Trap Array #9 (May 21, 2019).

Photograph A-21. Trap Array #10 (May 21, 2019).

Photograph A-22. Habitat adjacent to Trap Array #10 (May 21, 2019).

Photograph A-23. Trap Array #11 (May 21, 2019).

Photograph A-24. Habitat adjacent to Trap Array #11 (May 21, 2019).

Photograph A-25. Trap Array #12 (May 19, 2019).

Photograph A-26. Habitat adjacent to Trap Array #12 (May 19, 2019).

Photograph A-27. Swat 5 Wash Trap Array (no drift fence) (May 19, 2019).

Photograph A-28. Habitat adjacent to Swat 5 Wash Trap Array (May 19, 2019).

Photograph A-29. Trap Array #13 (May 19, 2019).

Photograph A-30. Habitat adjacent to Trap Array #13 (May 19, 2019).

Photograph A-31. Box Canyon #1 Trap Array (no drift fence) (May 24, 2021).

Photograph A-32. Habitat adjacent to Box Canyon #1 Trap Array (May 24, 2021).

Photograph A-33. Box Canyon #2 Trap Array (May 19, 2019).

Photograph A-34. Habitat adjacent to Box Canyon #2 Trap Array (May 19, 2019).

Photograph A-35. Trap Array #14 (May 19, 2019).

Photograph A-36. Habitat adjacent to Trap Array #14 (May 19, 2019).

Photograph A-37. 9-Mile Wash 1 Trap Array (AHDriFT array pictured) (May 20, 2021).

Photograph A-38. Habitat adjacent to 9-Mile Wash 1 Trap Array (February 21, 2020).

Photograph A-39. 9-Mile Wash 2 Trap Array (no drift fence) (September 11, 2021).

Photograph A-40. Habitat adjacent to 9-Mile Wash 2 Trap Array (September 11, 2021).

APPENDIX B
ADDITIONAL SURVEY PHOTOGRAPHS

Appendix B – Additional Survey Photographs

Additional Small Mammal and Herpetofauna Species Photos

Photograph B-1. A chuckwalla (*Sauromalus ater*) that has retreated into its burrow under a rock (May 17, 2019).

Photograph B-2. Desert horned lizard (*Phrynosoma platyrhinos*) exhibiting slight auto-hemorrhaging (May 17, 2019).

Photograph B-3. Great Basin collared lizard (*Crotaphytus bicinctores*) under cover (May 18, 2019).

Photograph B-4. A sidewinder (*Crotalus cerastes*) nestled into the sand and gravel (May 20, 2019).

Photograph B-5. Mojave desert tortoise (*Gopherus agassizii*) with the remnants of a radio transmitter on its shell (May 21, 2019).

Photograph B-6. Bright coloration on the ventral side of a male desert spiny lizard (*Sceloporus magister*) (May 23, 2019).

Photograph B-7. Western diamondback rattlesnake (*Crotalus atrox*) observed at night while roadcruising (September 1, 2019).

Photograph B-8. A neonate (hatchling) sidewinder (*Crotalus cerastes*) (September 9, 2019).

Photograph B-9. Side-blotch lizard (*Uta stansburiana*) showing bright coloration (September 13, 2019).

Photograph B-10. Additional photograph of western spotted skunk (*Spilogale gracilis*) at Camp Bull Trap Array (date unknown, 2020).

Photograph B-11. Additional photograph of gray fox (*Urocyon cinereoargenteus*) at Camp Bull Trap Array (date unknown, 2020).

Photograph B-12. Western banded gecko (*Coleonyx variegatus*) found in the open while walking at night (May 26, 2020).

Photograph B-13. A large group of Rio Grande leopard frogs (*Lithobates berlandieri*) sitting at the edge of the Siphon 10 drinker near Camp Billy Machem (May 27, 2020).

Photograph B-14. An adult red-spotted toad (*Anaxyrus punctatus*) with tadpoles in the wildlife drinker near 9-Mile Wash 2 (June 2, 2020).

Photograph B-15. A juvenile speckled rattlesnake (*Crotalus mitchellii*) perched up on a dead shrub at night (September 12, 2020).

Photograph B-16. Western diamondback rattlesnake (*Crotalus atrox*) coiled up at night, ready to ambush prey (September 12, 2020).

Photograph B-17. Coyote (*Canis latrans*) at Trap Array #13 (September 18, 2020).

Photograph B-18. A gravid female desert spiny lizard (*Sceloporus magister*) with red coloration on its head (May 14, 2021).

Photograph B-19. Rosy boa (*Lichanurus orcuttii*) in-situ (May 20, 2021).

Photograph B-20. Juvenile chuckwalla (*Sauromalus ater*) showing yellow-and-black tail characteristic of younger individuals of the species (May 22, 2021).

Photograph B-21. A Mojave desert tortoise (*Gopherus agassizii*) sitting on the rocks above its burrow at night (May 25, 2021).

Photograph B-22. Fox carrying its woodrat prey (June 14, 2021).

Incidental Observations

Photograph B-23. Crissal thrasher (*Toxostoma crissale*), a California Bird Species of Special Concern (September 1, 2019).

Photograph B-24. Adult male mule deer (*Odocoileus hemionus*) at Camp Bull Trap Array (Date unknown, 2020).

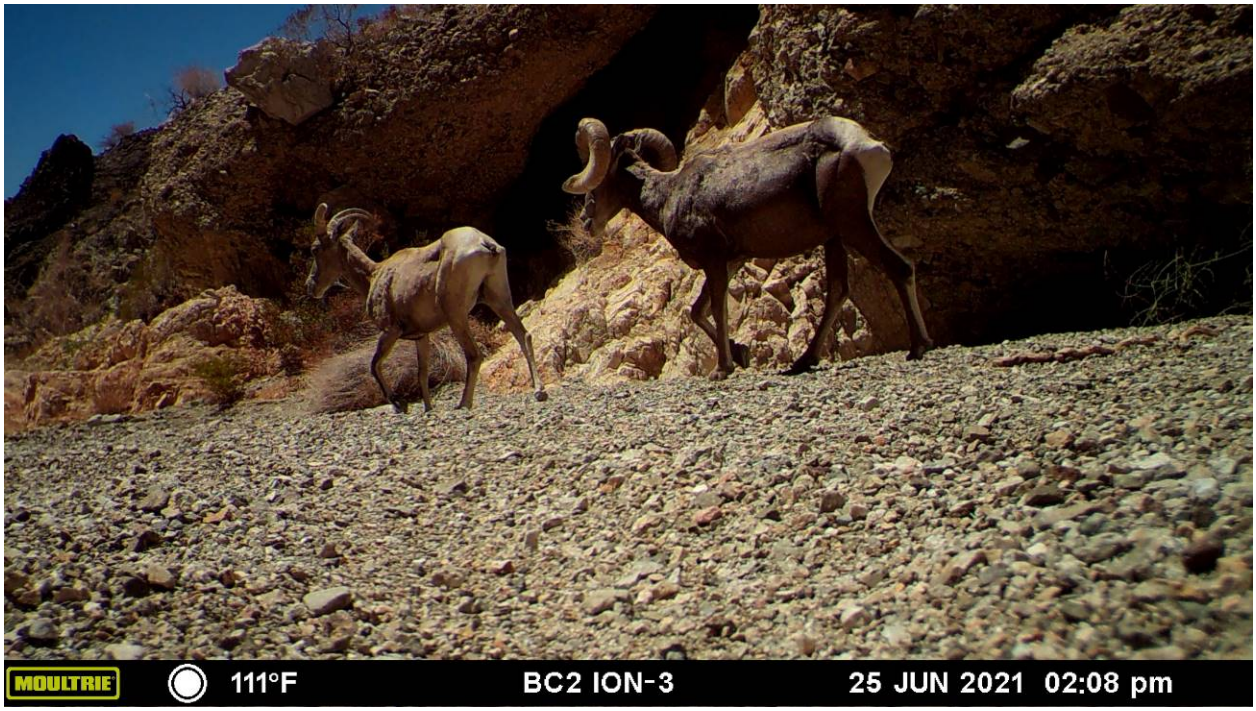
Photograph B-25. A golden eagle (*Aquila chrysaetos*) was observed soaring directly over the installation while at 9-Mile Wash 2 Trap Array (February 25, 2020).

Photograph B-26. Rainfall event at 9-Mile Wash 2 Trap Array (July 15, 2020).

Photograph B-27. Naturally-pooled water north of the Box Canyon 2 Trap Array (February 26, 2021).

Photograph B-28. One of a group of fairy shrimp observed in the pool in previous photograph (potentially *Streptocephalus dorothae* or *S. texanus*) (February 26, 2021).

Photograph B-29. Group of seven wild burros (*Equus astinus*) north of Ted Kipf Road (May 23, 2021).



Photograph B-30. A pair of bighorn sheep (*Ovis canadensis*) higher up in the mountains above the Box Canyon 2 Trap Array (June 25, 2021).

Photograph B-31. Great horned owl (*Bubo virginianus*) perched near the ground (July 28, 2021).

Equipment, Traps, and Set-up

Photograph B-32. Juvenile side-blotch lizard (*Uta stansburiana*) caught in a pitfall trap at Trap Array #14 (May 17, 2019).

Photograph B-33. A coachwhip (*Masticophis flagellum*) captured in a funnel trap (May 19, 2019).

Photograph B-34. GSRC biologist Beau Rapier preparing to tube a western diamondback rattlesnake (*Crotalus atrox*) for measurements (September 12, 2019).

Photograph B-35. A speckled rattlesnake (*Crotalus mitchellii*) in a tube ready for measurement (September 12, 2020).

Photograph B-36. Damage to geotextile drift fence after 3 to 6 months of deployment (May 18, 2021).

Photograph B-37. Typical set-up of trail cameras on the installation (May 18, 2021).

Photograph B-38. Merriam's kangaroo rat (*Dipodomys merriami*) showing marking system for small mammals (2 dots on right ear) (May 21, 2021).

Photograph B-39. The AHDriFT camera trap array set-up near Trap Array #9 that was washed away by monsoon rains (May 21, 2021).

Photograph B-40. Funnel trap set-up along a natural barrier (rock wall) (May 22, 2021).

APPENDIX C
AHDRIFT CAMERA PHOTOGRAPHS

Appendix C: AHDriFT Camera Trap Array Photographs

Common Name	Scientific Name	Group	3 // 4	9	11	9-Mile 1	9-Mile 2	BC-1	Camp Bull
White-tailed antelope squirrel	***Ammospermophilus leucurus***	**Small Mammal**	x	-	x	x	x	x	x
Long-tailed pocket mouse	***Chaetodipus formosus***	**Small Mammal**	-	-	-	-	-	x	-
Desert pocket mouse	*Chaetodipus penicillatus*	Small Mammal	-	-	-	-	-	-	-
Spiny pocket mouse	***Chaetodipus spinatus***	**Small Mammal**	x	x	-	x	-	x	x
Pocket mouse	***Chaetodipus sp.***	**Small Mammal**	x	x	x	-	x	x	-
Merriam's kangaroo rat	***Dipodomys merriami***	**Small Mammal**	x	x	x	-	-	-	-
Black-tailed jackrabbit	*Lepus californicus*	Small Mammal	-	-	-	-	-	-	-
Woodrat	***Neotoma sp.***	**Small Mammal**	-	x	x	x	x	x	x
White-throated woodrat	*Neotoma albigula*	Small Mammal	-	-	-	-	-	-	-
Desert woodrat	*Neotoma lepida*	Small Mammal	-	-	-	-	-	-	-
Little pocket mouse	*Perognathus longimembris*	Small Mammal	-	-	-	-	-	-	-
Cactus mouse	*Peromyscus eremicus*	Small Mammal	-	-	-	-	-	-	-
Mouse	***Peromyscus sp.***	**Small Mammal**	-	-	-	x	-	x	-
Desert cottontail	***Sylvilagus audubonii***	**Small Mammal**	-	-	x	-	-	-	-
Coyote	***Canis latrans***	**Mesocarnivore**	-	-	x	-	-	-	-
Bobcat	***Lynx rufus***	**Mesocarnivore**	-	-	-	-	x	-	-
Raccoon	*Procyon lotor*	Mesocarnivore	-	-	-	-	-	-	-
Western spotted skunk	***Spilogale gracilis***	**Mesocarnivore**	-	-	-	-	-	-	x
American badger	*Taxidea taxus*	Mesocarnivore	-	-	-	-	-	-	-
Kit fox	*Vulpes macrotis*	Mesocarnivore	-	-	-	-	-	-	-
Red-spotted toad	***Anaxyrus punctatus***	**Amphibian**	x	-	-	-	-	x	-

Common Name	Scientific Name	Group	3 // 4	9	11	9-Mile 1	9-Mile 2	BC-1	Camp Bull
Rio Grande leopard frog	*Lithobates berlandieri*	Amphibian	-	-	-	-	-	-	-
Great Basin whiptail	***Aspidoscelis tigris tigris***	**Lizard**	x	-	x	x	x	x	x
Western zebra-tailed lizard	*Callisaurus draconoides rhodostictus*	Lizard	-	-	-	-	-	-	-
Western banded gecko	***Coleonyx variegatus***	**Lizard**	-	-	-	-	x	-	-
Desert iguana	***Dipsosaurus dorsalis***	**Lizard**	-	-	-	-	x	-	-
Long-nosed leopard lizard	*Gambelia wislizenii*	Lizard	-	-	-	-	-	-	-
Desert nightsnake	*Hypsiglena chlorophaea*	Lizard	-	-	-	-	-	-	-
Desert horned lizard	***Phrynosoma platyrhinos***	**Lizard**	-	-	-	-	-	-	x
Common chuckwalla	*Sauromalus ater*	Lizard	-	-	-	-	-	-	-
Desert spiny lizard	***Sceloporus magister***	**Lizard**	x	-	-	-	x	x	-
Long-tailed brush lizard	*Urosuarus graciosus*	Lizard	-	-	-	-	-	-	-
Common side-blotched lizard	***Uta stansburiana***	**Lizard**		x	x	x	x	x	x
Desert night lizard	*Xantusia vigilis*	Lizard	-	-	-	-	-	-	-
Coachwhip (red racer)	***Coluber flagellum piceus***	**Snake**	-	-	-	-	-	x	x
Western diamondback rattlesnake	***Crotalus atrox***	**Snake**	-	-	-	-	-	-	x
Sidewinder	***Crotalus cerastes***	**Snake**	-	-	x	-	-	-	-
Speckled rattlesnake	***Crotalus mitchellii pyrrhus***	**Snake**	-	-	-	-	-	-	x
California kingsnake	*Lampropeltis californiae*	Snake	-	-	-	-	-	-	-
Three-lined boa	*Lichanura orcutti*	Snake	-	-	-	-	-	-	-
Sonoran gophersnake	*Pituophis catenifer affinis*	Snake	-	-	-	-	-	-	-
Western patch-nosed snake	*Salvadora hexalepis hexalepis*	Snake	-	-	-	-	-	-	-
Mojave desert tortoise	***Gopherus agassizii***	**Tortoise**	-	-	-	x	-	-	-

Trap Array #3/4 - Salvation Pass

Photograph C-1. White-tailed antelope squirrel (*Ammospermophilus leucurus*) (May 31, 2021).

Photograph C-2. Desert spiny lizard (*Sceloporus magister*) (June 5, 2021).

Photograph C-3. Merriam's kangaroo rat (*Dipodomys merriami*) (July 29, 2021).

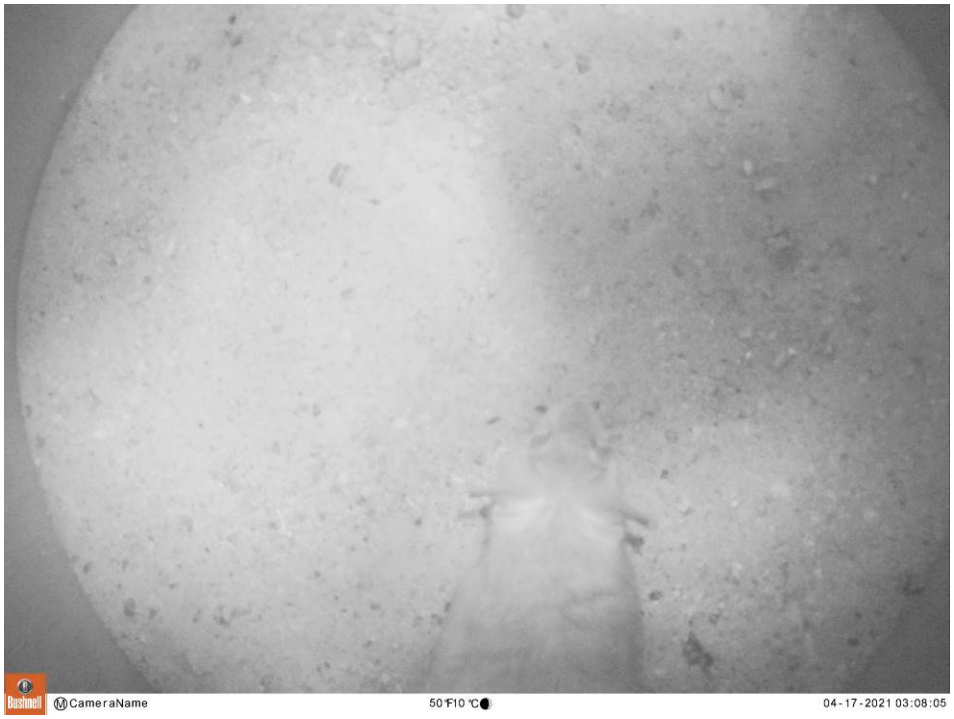
Photograph C-4. Spiny pocket mouse (*Chaetodipus spinatus*) (July 31, 2021).

Photograph C-5. Red-spotted toad (*Anaxyrus punctatus*) (August 6, 2021).

Photograph C-6. Tiger whiptail (*Aspidoscelis tigris tigris*) (August 24, 2021).

Photograph C-7. Unknown pocket mouse (*Chaetodipus* sp.) (September 4, 2021).

Trap Array #9



Photograph C-8. Unknown woodrat (*Neotoma* sp.) (April 17, 2021).

Photograph C-9. Side-blotch lizard (*Uta stansburiana*) (March 2, 2021).

Photograph C-10. Merriam's kangaroo rat (*Dipodomys merriami*) (March 4, 2021).

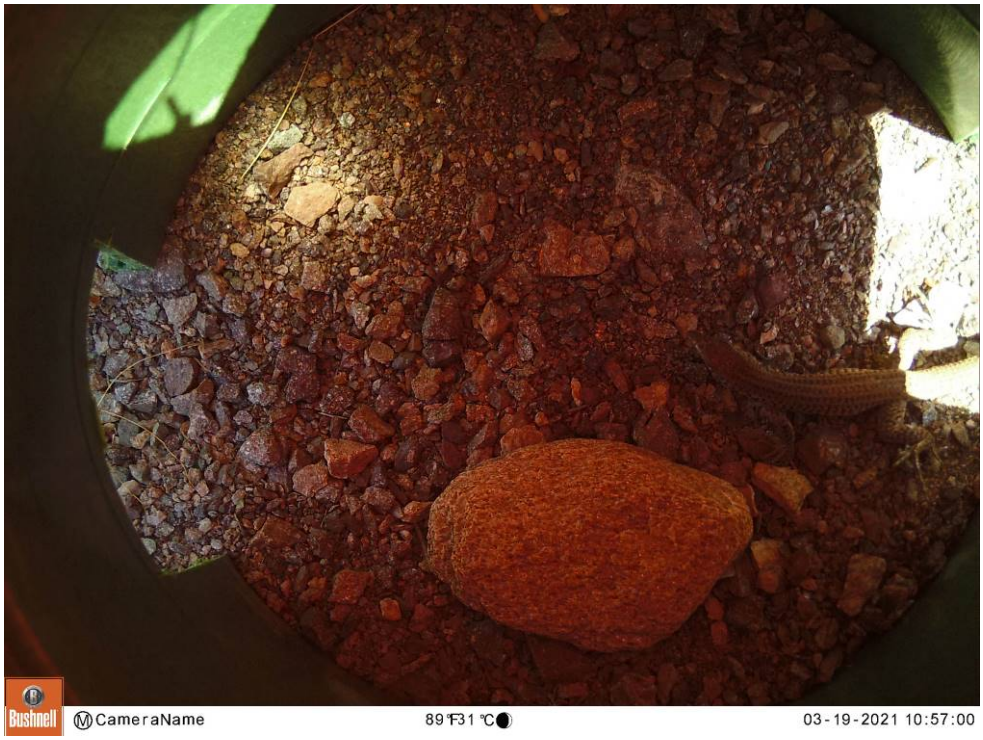
Photograph C-11. Unknown pocket mouse (*Chaetodipus* sp.) (March 8, 2021).

Photograph C-12. Spiny pocket mouse (*Chaetodipus spinatus*) (April 27, 2021).

9-Mile Wash 1

Photograph C-13. Unknown mouse (*Peromyscus* sp.) (March 7, 2021).

Photograph C-14. Side-blotch lizard (*Uta stansburiana*) (March 8, 2021).



Photograph C-15. Tiger whiptail (*Aspidoscelis tigris tigris*) (March 19, 2021).

Photograph C-16. Spiny pocket mouse (*Chaetodipus spinatus*) (March 19, 2021).

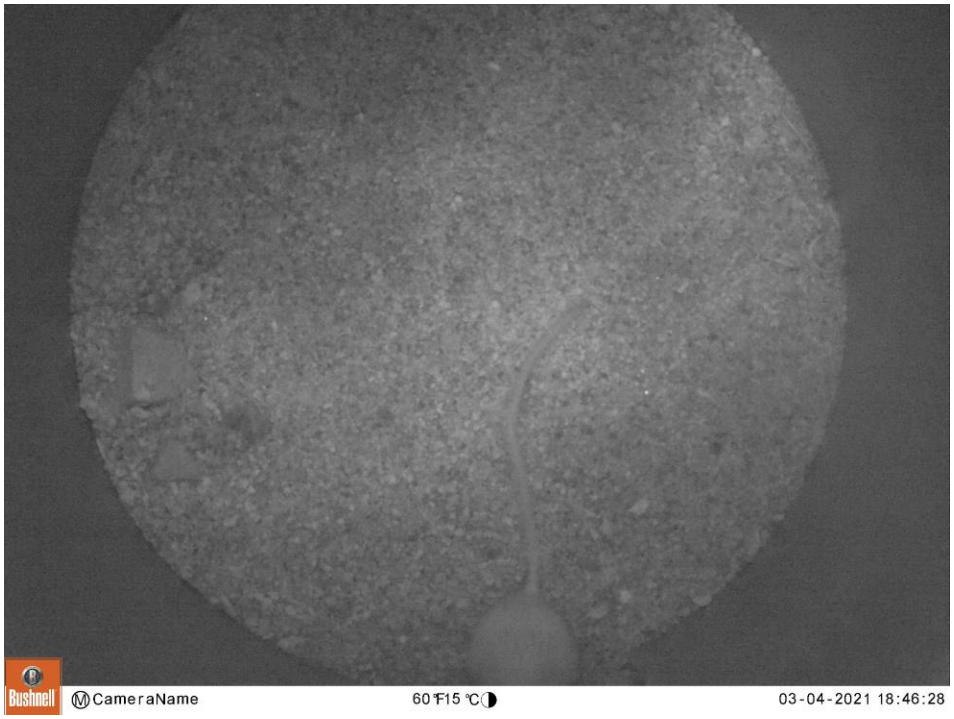
Photograph C-17. Mojave desert tortoise (*Gopherus agassizii*) (April 21, 2021).

Photograph C-18. Unknown woodrat (*Neotoma* sp.) (April 29, 2021).

Photograph C-19. White-tailed antelope squirrel (*Ammospermophilus leucurus*) (June 5, 2021).

9-Mile Wash 2

Photograph C-20. Tiger whiptail (*Aspidoscelis tigris tigris*) (March 4, 2021).



Photograph C-21. Unknown pocket mouse (*Chaetodipus* sp.) (March 4, 2021).

Photograph C-22. White-tailed antelope squirrel (*Ammospermophilus leucurus*) (March 6, 2021).

Photograph C-23. Unknown woodrat (*Neotoma* sp.) with docked tail (March 7, 2021).

Photograph C-24. Side-blotch lizard (*Uta stansburiana*) (March 12, 2021).

Photograph C-25. Desert spiny lizard (*Sceloporus magister*) (March 29, 2021).

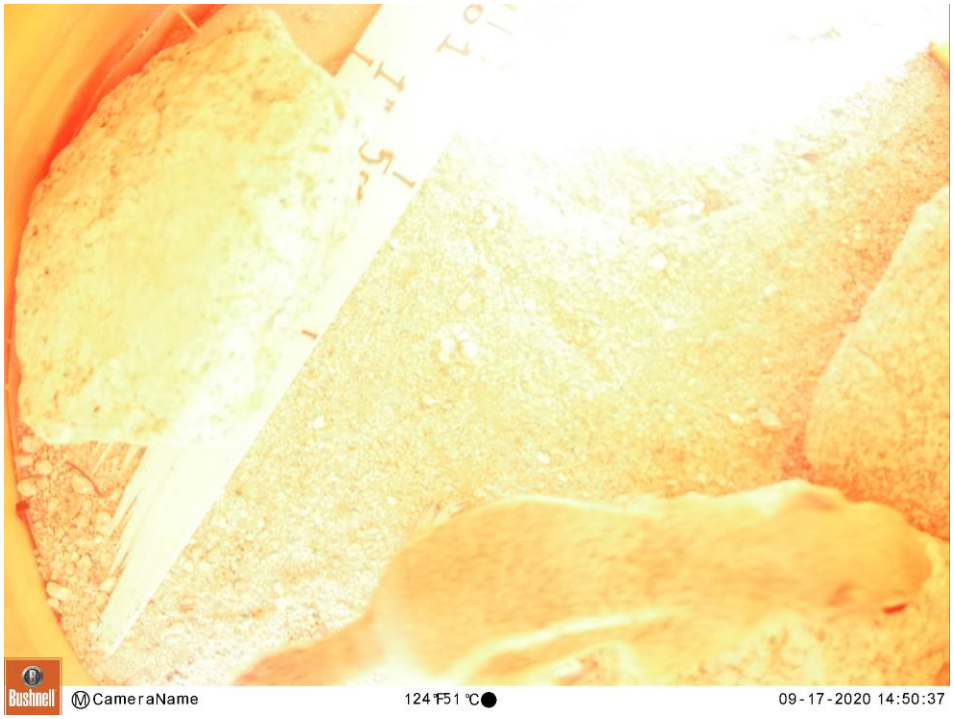
Photograph C-26. Desert iguana (*Dipsosaurus dorsalis*) (May 14, 2021).

Photograph C-27. Western banded gecko (*Coleonyx variegatus*) (July 15, 2021).

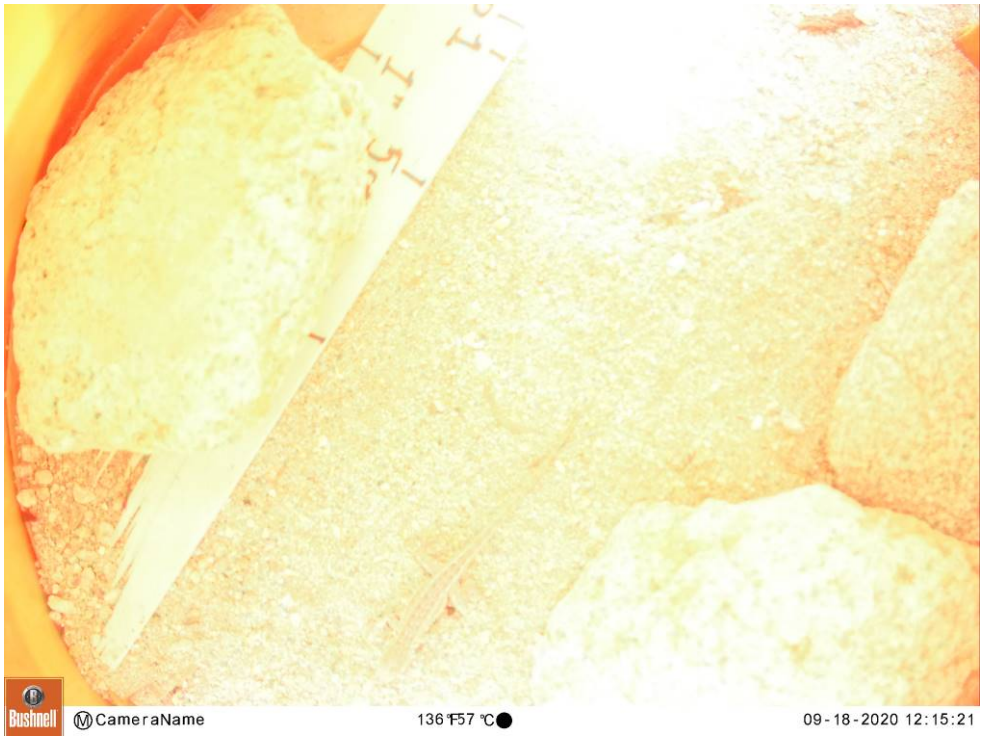
Photograph C-28. Bobcat (*Lynx rufus*) exploring the area (November 3, 2020).

Trap Array #11

Photograph C-29. Unknown pocket mouse (*Chaetodipus* sp.) (September 16, 2021).



Photograph C-30. White-tailed antelope squirrel (*Ammospermophilus leucurus*) (September 17, 2020).



Photograph C-31. Side-blotch lizard (*Uta stansburiana*) (September 18, 2020).

Photograph C-32. Unknown woodrat (*Neotoma* sp.) (September 18, 2020).

Photograph C-33. Desert cottontail (*Sylvilagus audobonii*) (September 21, 2020).

Photograph C-34. Merriam's kangaroo rat (*Dipodomys merriami*) (September 23, 2020).

Photograph C-35. Tiger whiptail (*Aspidoscelis tigris tigris*) (September 29, 2020).

Photograph C-36. Sidewinder (*Crotalus cerastes*) (October 7, 2020).

Photograph C-37. Coyote (*Canis latrans*) after pulling down the bucket and camera (November 1, 2020).

Box Canyon 1

Photograph C-38. Side-blotch lizard (*Uta stansburiana*) (February 3, 2021).

Photograph C-39. Unknown woodrat (*Neotoma* sp.) (February 19, 2021).

Photograph C-40. White-tailed antelope squirrel (*Ammospermophilus leucurus*) (March 24, 2021).

Photograph C-41. Spiny pocket mouse (*Chaetodipus spinatus*) (April 6, 2021).

Photograph C-42. Tiger whiptail (*Aspidoscelis tigris tigris*) (April 8, 2021).

Photograph C-43. Red-spotted toad (*Anaxyrus punctatus*) (September 6, 2021).

Photograph C-44. Long-tailed pocket mouse (*Chaetodipus formosus*) (September 17, 2020).

Photograph C-45. Unknown mouse (*Peromyscus* sp.) (September 20, 2020).

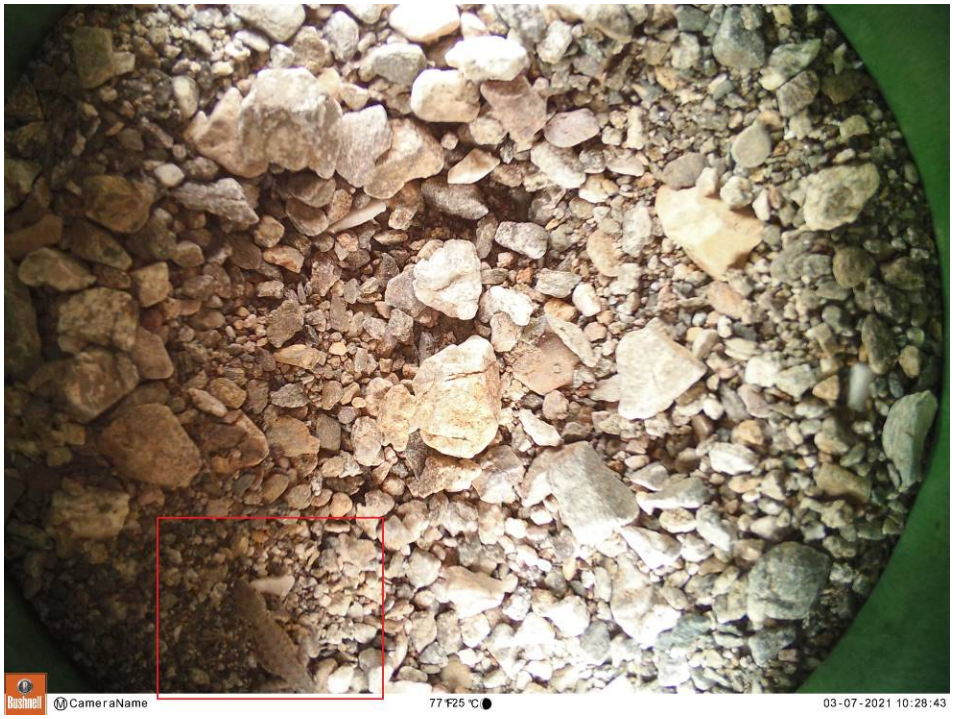
Photograph C-46. Desert spiny lizard (*Sceloporus magister*) (September 22, 2020).

Photograph C-47. Unknown pocket mouse (*Chaetodipus* sp.) (September 27, 2020).

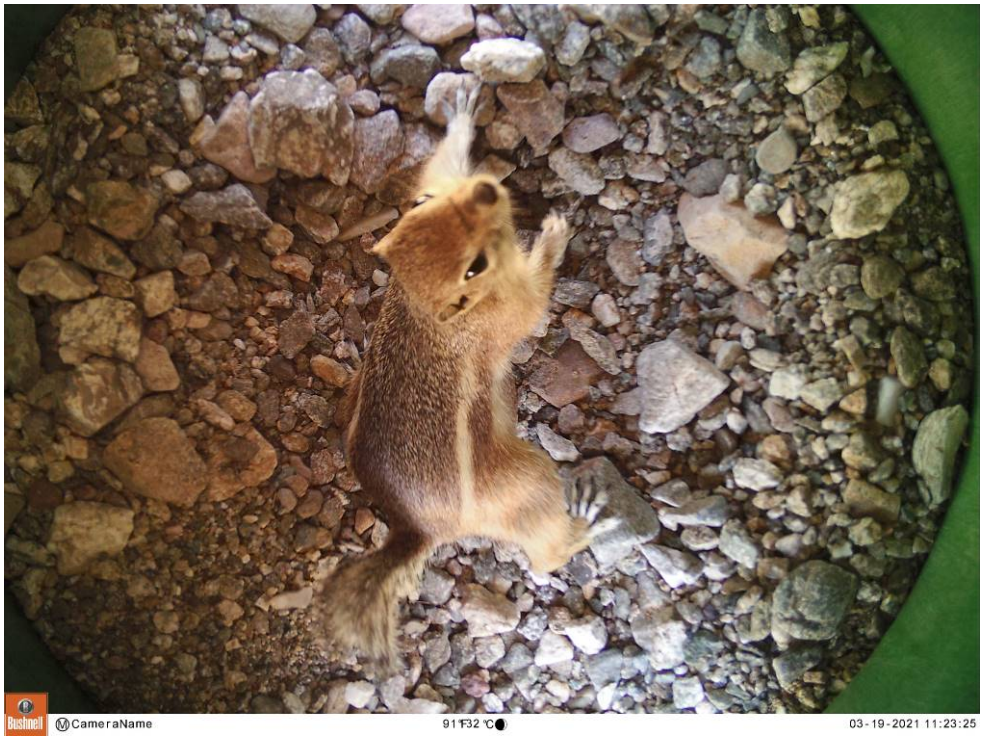
Photograph C-48. Coachwhip (*Coluber flagellum*) (September 4, 2021).

Camp Bull

Photograph C-49. Unknown woodrat (*Neotoma* sp.) (March 4, 2021).



Photograph C-50. Side-blotch lizard (*Uta stansburiana*) (March 7, 2021).

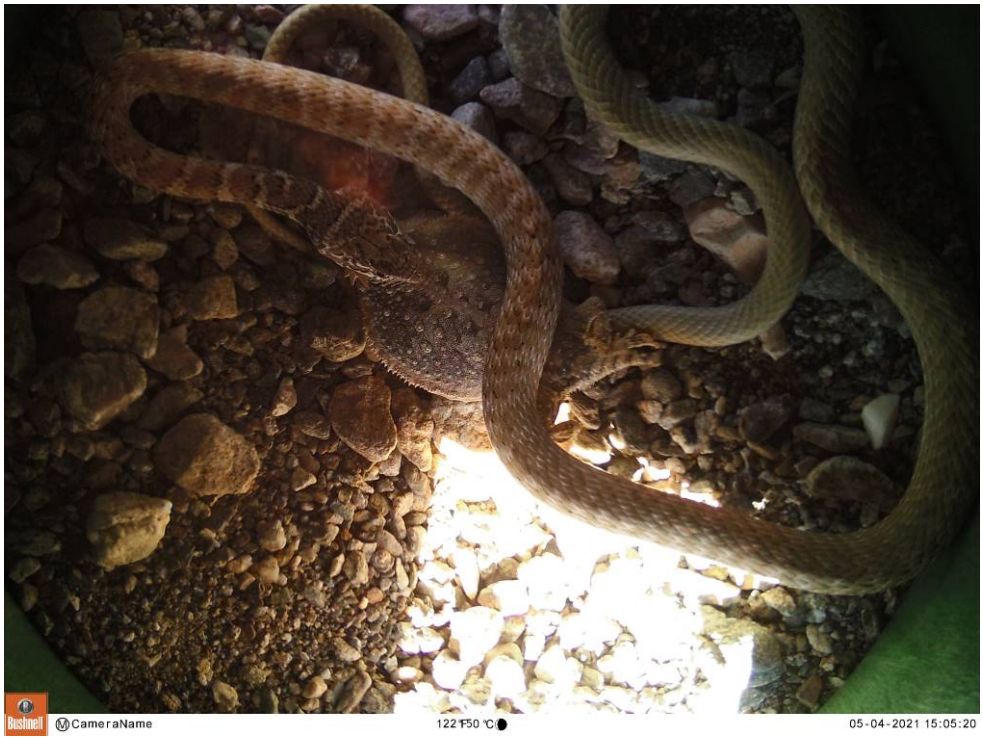


Photograph C-51. White-tailed antelope squirrel (*Ammospermophilus leucurus*) (March 19, 2021).

Photograph C-52. Spiny pocket mouse (*Chaetodipus spinatus*) (April 9, 2021).

Photograph C-53. Tiger whiptail (*Aspidoscelis tigris tigris*) (April 16, 2021).

Photograph C-54. Desert horned lizard (*Phrynosome platyrhinos*) (May 4, 2021).



Photograph C-55. Coachwhip (*Coluber flagellum*) attempting to eat the desert horned lizard (*Phrynosoma platyrhinos*) from the previous photo (May 4, 2021).

Photograph C-56. Western diamondback rattlesnake (*Crotalus atrox*) (August 11, 2021).

Photograph C-57. Neonate/juvenile speckled rattlesnake (*Crotalus mitchelli*) (August 27, 2021).

Photograph C-58. Western spotted skunk (*Spilogale gracilis*) (September 3, 2021).

Photograph C-59. A second image of the same spotted skunk (*Spilogale gracilis*) (September 3, 2021).

APPENDIX D
VEGETATION PLOTS DATA

Appendix D. Plant Species Assessments

#1		#2		#3		#4	
5/23/2021		5/20/2021		5/23/2021		5/23/2021	
Species	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**
Creosote bush (*Larrea tridentata*)	8	Creosote bush (*Larrea tridentata*)	2	Desert ironwood (*Olneya tesota*)	12	Blue palo verde (*Parkinsonia florida*)	10
Branched pencil cholla (*Cylindropuntia ramosissima*)	2	Desert holly (*Atriplex hymenelytra*)	1	Lotebush (*Ziziphus obtusifolius*)	3	Desert ironwood (*Olneya tesota*)	15
Mediterranean grass (*Schismus* sp.)	2	Ocotillo (*Fouquieria splendens*)	1	Blue palo verde (*Parkinsonia florida*)	8	Catclaw acacia (*Senegalia greggii*)	15
Desert plantain (*Plantago ovata*)	2	Desert ironwood (*Olneya tesota*)	1	Creosote bush (*Larrea tridentata*)	5	White bursage (*Ambrosia dumosa*)	3
Notch-leaved phacelia (*Phacelia crenulata*)	1	Branched pencil cholla (*Cylindropuntia ramosissima*)	2	Munz's cholla (*Cylindropuntia munzii*)	3	Cheesebush (*Ambrosia salsola*)	18
White bursage (*Ambrosia dumosa*)	3	Mediterranean grass (*Schismus* sp.)	2	Cheesebush (*Ambrosia salsola*)	15	Desert lavender (*Condea emoryi*)	5
Spanish needle (*Palafoxia arida*)	T	White bursage (*Ambrosia dumosa*)	2	Mediterranean grass (*Schismus* sp.)	2	Brittlebush (*Encelia farinosa*)	2
Desert ironwood (*Olneya tesota*)	3	California barrel cactus (*Ferocactus cylindraceus*)	T	Desert mistletoe (*Phoradendron californicum*)	1	Mediterranean grass (*Schismus* sp.)	3
Bare ground	*80*	Munz's cholla (*Cylindropuntia munzii*)	1	Desert lavender (*Condea emoryi*)	4	Creosote bush (*Larrea tridentata*)	4
		Cheesebush (*Ambrosia salsola*)	2	Saharan mustard (*Brassica tournefortii*)	10	Saharan mustard (*Brassica tournefortii*)	8
		Brittlebush (*Encelia farinosa*)	1	White bursage (*Ambrosia dumosa*)	3	Chuckwalla's delight (*Bebbia juncea*)	4
		Notch-leaved phacelia (*Phacelia crenulata*)	2	Buckwheat (*Eriogonum* sp.)	T	*Bare ground*	*50*
		Desert plantain (*Plantago ovata*)	2	Notch-leaved phacelia (*Phacelia crenulata*)	3		
		Bare ground	*80*	Brittlebush (*Encelia farinosa*)	2		
				Catclaw acacia (*Senegalia greggii*)	2		
				Branched pencil cholla (*Cylindropuntia ramosissima*)	2		
				Bare ground	*55*		
soil rocky, silty-sandy areas are hard and compact; no to slight sand built up around creosotes; many small, interwoven drainages				sandy wash with consistent rocks throughout; surrounding mountains have mixed bedrock (further away from plot than #3)		sandy wash with consistent rocks throughout; surrounding mountains have mixed bedrock	

Camp Bull		Camp Burt		#6		#7	
9/8/2021		9/11/2021		9/10/2021		9/10/2021	
Species	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**
Blue palo verde (*Parkinsonia florida*)	10	Creosote bush (*Larrea tridentata*)	15	Desert tea (*Ephedra californica*)	5	Desert ironwood (*Olneya tesota*)	6
Desert ironwood (*Olneya tesota*)	10	Desert ironwood (*Olneya tesota*)	10	Desert lavender (*Condea emoryi*)	8	Chuckwalla's delight (*Bebbia juncea*)	4
Creosote bush (*Larrea tridentata*)	6	Chinchweed (*Pectis papposa*)	2	Jojoba (*Simmondsia chinensis*)	3	Ocotillo (*Fouquieria splendens*)	2
Brittlebush (*Encelia farinosa*)	8	Smallseed sandmat (*Euphorbia polycarpa*)	2	Tiny-leaved shrub	2	Jojoba (*Simmondsia chinensis*)	3
Catclaw acacia (*Senegalia greggii*)	5	Boxthorn (*Lycium* sp.)	3	Parish's goldeneye (*Bahiopsis parishii*)	3	Creosote bush (*Larrea tridentata*)	7
Mediterranean grass (*Schismus* sp.)	T	Desert mistletoe (*Phoradendron californicum*)	T	Big galleta (*Hilaria rigida*)	2	Chuckwalla's delight (*Bebbia juncea*)	2
White bursage (*Ambrosia dumosa*)	2	Mediterranean grass (*Schismus* sp.)	1	Creosote bush (*Larrea tridentata*)	6	Catclaw acacia (*Senegalia greggii*)	5
Notch-leaved phacelia (*Phacelia crenulata*)	T	Sandmat (*Euphorbia* sp.)	2	*Krameria* sp.	5	Saharan mustard (*Brassica tournefortii*)	5
Bare ground	*60*	Blue palo verde (*Parkinsonia florida*)	6	Boxthorn (*Lycium* sp.)	4	*Krameria* sp.	3
		White bursage (*Ambrosia dumosa*)	4	Catclaw acacia (*Senegalia greggii*)	4	Mediterranean grass (*Schismus* sp.)	4
		Bare ground	*60*	Buckhorn cholla (*Cylindropuntia acanthocarpa*)	1	Mojave yucca (*Yucca schidigera*)	2
				Cottontop cactus (*Homalocephala polycephala*)	T	Buckhorn cholla (*Cylindropuntia acanthocarpa*)	3
				Engelmann's hedgehog cactus (*Echinocereus engelmannii*)	T	Parish's goldeneye (*Bahiopsis parishii*)	5
				Sandmat (*Euphorbia* sp.)	1	Dead white thorny shrub	7
				Desert mistletoe (*Phoradendron californicum*)	1	Desert mistletoe (*Phoradendron californicum*)	T
				Chuckwalla's delight (*Bebbia juncea*)	1	Desert tea (*Ephedra californica*)	1
				White bursage (*Ambrosia dumosa*)	2	*Bare ground*	*50*
				Bare ground	*45*		
Very rocky; 20-30 foot-deep canyon surrounded by rock pavement community		Creosote/ironwood flat; silty with mixed gravel		Wash running through mixed scrub habitat; sandy-silt with rocks		Similar habitat to #8 - dry cactus wash; wash is gravelly, surrounding area is silt-gravel	

#8		#9		#10		#11	
9/10/2021		9/10/2021		9/10/2021		9/10/2021	
Species	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**
Chuckwalla's delight (*Bebbia juncea*)	20	Creosote bush (*Larrea tridentata*)	22	Creosote bush (*Larrea tridentata*)	20	Creosote bush (*Larrea tridentata*)	20
Desert ironwood (*Olneya tesota*)	6	Krameria sp.	18	Krameria	4	Catclaw acacia (*Senegalia greggii*)	6
Blue palo verde (*Parkinsonia florida*)	10	White bursage (*Ambrosia dumosa*)	6	Chinchweed (*Pectis papposa*)	6	Chinchweed (*Pectis papposa*)	12
Engelmann's hedgehog cactus (*Echinocereus engelmannii*)	T	Lotebush (*Ziziphus obtusifolia*)	5	Saharan mustard (*Brassica tournefortii*)	6	*Krameria* sp.	6
Munz's cholla (*Cylindropuntia munzii*)	4	*Cryptantha* sp.	T	Jojoba (*Simmondsia chinensis*)	2	Boxthorn (*Lycium* sp.)	8
White bursage (*Ambrosia dumosa*)	8	Mediterranean grass (*Schismus* sp.)	1	Branched pencil cholla (*Cylindropuntia ramosissima*)	T	Cholla (*Cylindropuntia* sp.)	1
Saharan mustard (*Brassica tournefortii*)	6	Mojave yucca (*Yucca schidigera*)	2	Sandmat (*Euphorbia* sp.)	1	California barrel cactus (*Ferocactus cylindraceus*)	1
Mediterranean grass (*Schismus* sp.)	3	Desert tea (*Ephedra californica*)	1	White bursage (*Ambrosia dumosa*)	2	Saharan mustard (*Brassica tournefortii*)	10
Coryphantha sp.	1	*Bare ground*	*50*	Desert tea (*Ephedra californica*)	3	Mojave yucca (*Yucca schidigera*)	3
Catclaw acacia (*Senegalia greggii*)	2			Tall spindly plant	T	Jojoba (*Simmondsia chinensis*)	2
Creosote bush (*Larrea tridentata*)	3			California barrel cactus (*Ferocactus cylindraceus*)	T	Parish's goldeneye (*Bahiopsis parishii*)	1
Bare ground	*45*			*Bare ground*	*60*	Smallseed sandmat (*Euphorbia polycarpa*)	3
						Desert tea (*Ephedra californica*)	T
						Lotebush (*Ziziphus obtusifolia*)	1
						White bursage (*Ambrosia dumosa*)	2
						Fringed amaranth (*Amaranthus fimbriatus*)	1
						Trailing windmills (*Allionia incarnata*)	T
						Bare ground	*40*
Gravelly wash running through a dry cactus habitat; ocotillo nearby (100 m)		Gravel-silt; creosote-dominant with smoke tree wash nearby; no mountains nearby		More gravelly/firm than #11, less diversity/total cover		Very diverse flora/habitat; relatively sandy, with nearby small washes	

Swat 5 Wash		#12		Box Canyon 1		#13	
9/12/2021		9/12/2021		5/23/2021		9/12/2021	
Species	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**
Smoke tree (*Psorothamnus spinosus*)	4	White bursage (*Ambrosia dumosa*)	10	Blue palo verde (*Parkinsonia florida*)	8	Creosote bush (*Larrea tridentata*)	7
Chuckwalla's delight (*Bebbia juncea*)	16	Creosote bush (*Larrea tridentata*)	6	Desert lavender (*Condea emoryi*)	8	Chuckwalla's delight (*Bebbia juncea*)	5
Needle grama (*Bouteloua aristidoides*)	T	Sandmat (*Euphorbia* sp.)	15	Pygmy cedar (*Peucephyllum schottii*)	3	"Berberis"	1
Smallseed sandmat (*Euphorbia polycarpa*)	2	Chinchweed (*Pectis papposa*)	10	Creosote bush (*Larrea tridentata*)	8	Blue palo verde (*Parkinsonia florida*)	5
Chinchweed (*Pectis papposa*)	3	vine	T	Cheesebush (*Ambrosia salsola*)	5	Mediterranean grass (*Schismus* sp.)	1
Catclaw acacia (*Senegalia greggii*)	4	Chia (*Salvia columbariae*)	T	white bare thorny shrub	8	Beavertail cactus (*Opuntia basilaris*)	T
Trailing windmills (*Allionia incarnata*)	T	Saharan mustard (*Brassica tournefortii*)	1	Brittlebush (*Encelia farinosa*)	2	Boxthorn (*Lycium* sp.)	5
Blue palo verde (*Parkinsonia florida*)	T	Jojoba (*Simmondsia chinensis*)	2	Chuckwalla's delight (*Bebbia juncea*)	4	Guadalupe cryptantha (*Cryptantha maritima*)	4
pale yellow flower shrub	2	Fringed amaranth (*Amaranthus fimbriatus*)	T	Catclaw acacia (*Senegalia greggii*)	2	Buckwheat (*Eriogonum* sp.)	T
succulent trifoliate shrub	2	Trailing windmills (*Allionia incarnata*)	T	Notch-leaved phacelia (*Phacelia crenulata*)	5	Desert ironwood (*Olneya tesota*)	2
Fringed amaranth (*Amaranthus fimbriatus*)	2	Chuckwalla's delight (*Bebbia juncea*)	1	Climbing milkweed (*Funastrum cynanchoides* var. *hartwegii*)	1	*Bare ground*	*70*
Bare ground	*65*	Brittlebush (*Encelia farinosa*)	4	Chia (*Salvia columbariae*)	2		
		Blue palo verde (*Parkinsonia florida*)	1	Cottontop cactus (*Homalocephala polycephala*)	T		
		Phacelia sp.	T	*Bare ground*	*40*		
		Krameria sp.	1				
		Bare ground	*50*				
silty with mixed gravel adjacent to dirt wall with many burrows		minor upland drainage on 15 degree slope; gravelly		fairly even dominance of the 8% shrubs; canyon wash with sandy-gravelly soils and rocks common on surface, not hard-packed		Similar to #12; upland drainage	

Box Canyon 2		#14		9-Mile 1		9-Mile Wash 2	
9/9/2021		9/12/2021		5/24/2021		9/11/2021	
Species	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**	**Species**	**Cover (%)**
Desert lavender (*Condea emoryi*)	8	Creosote bush (*Larrea tridentata*)	4	Catclaw acacia (*Senegalia greggii*)	10	Rough jointfir (*Ephedra aspera*)	2
Chuckwalla's delight (*Bebbia juncea*)	12	Schott's indigo bush (*Psorothamnus schottii*)	8	Anderson's thornbush (*Lycium andersonii*)	3	Desert ironwood (*Olneya tesota*)	3
Pygmy cedar (*Peucephyllum schottii*)	4	Desert ironwood (*Olneya tesota*)	8	Desert ironwood (*Olneya tesota*)	6	Desert lavender (*Condea emoryi*)	2
Catclaw acacia (*Senegalia greggii*)	8	Chuckwalla's delight (*Bebbia juncea*)	5	Desert lavender (*Condea emoryi*)	2	Schott's indigo bush (*Psorothamnus schottii*)	25
Brittlebush (*Encelia farinosa*)	4	Guadalupe cryptantha (*Cryptantha maritima*)	4	White bursage (*Ambrosia dumosa*)	1	Buckhorn cholla (*Cylindropuntia acanthocarpa*)	2
Creosote bush (*Larrea tridentata*)	3	Buckwheat (*Eriogonum* sp.)	1	Notch-leaved phacelia (*Phacelia crenulata*)	1	White bursage (*Ambrosia dumosa*)	5
Notch-leaved phacelia (*Phacelia crenulata*)	T	Saharan mustard (*Brassica tournefortii*)	T	Spanish needle (*Palafoxia arida*)	T	Ocotillo (*Fouquieria splendens*)	5
Bare ground	*65*	Mediterranean grass (*Schismus* sp.)	2	Ocotillo (*Fouquieria splendens*)	1	Mediterranean grass (*Schismus* sp.)	T
		Sandmat (*Euphorbia* sp.)	T	Guadalupe cryptantha (*Cryptantha maritima*)	T	Guadalupe cryptantha (*Cryptantha maritima*)	1
		Brittlebush (*Encelia farinosa*)	1	little prostrate plant	T	Brittlebush (*Encelia farinosa*)	1
		Branched pencil cholla (*Cylindropuntia ramosissima*)	1	Hairypod pepperweed (*Lepidium lasiocarpum*)	T	Smallseed sandmat (*Euphorbia polycarpa*)	T
		Bare ground	*65*	Brittlebush (*Encelia farinosa*)	2	*Bare ground*	*50*
				Lance-leaved ditaxis (*Ditaxis lanceolata*)	T		
				Blue palo verde (*Parkinsonia florida*)	3		
				Creosote bush (*Larrea tridentata*)	5		
				Big galleta (*Hilaria rigida*)	1		
				Rock hibiscus (*Hibiscus denudata*)	T		
				California fagonbush (*Fagonia laevis*)	1		
				Buckhorn cholla (*Cylindropuntia acanthocarpa*)	1		
				Teddy bear cholla (*Cylindropuntia bigelovii*)	T		
				Bare ground	*65*		
Rocky box canyon		sparse mixed shrubland; bajada/flat		wash with dark bedrock, large gravel bottom, various-sized rocks to boulders, not hard-packed		Small, rocky, upland wash; granite boulders nearby; silty, very rocky	