

Appendix E

2016 Annual Wildlife Monitoring Report for the Kern Water Bank



Killdeer (*Charadrius vociferous*)

2016 ANNUAL WIDLIFE MONITORING
REPORT
for the
KERN WATER BANK



Submitted to:

KERN WATER BANK AUTHORITY

Prepared by:

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Table of Contents

Introduction.....	1
San Joaquin Kit Fox Monitoring.....	1
Introduction	1
Methodology.....	2
Results	2
Discussion	3
Tipton Kangaroo Rat Monitoring	5
Introduction	5
Methodology.....	5
Results	5
Discussion	6
Sensitive Habitat Botanical Monitoring	7
Introduction	7
References	10

Figures

Figure 1. Kern Water Bank Biological Monitoring	11
Figure 2. Results of 2016 Nighttime Spotlighting Surveys at the Kern Water Bank	12
Figure 3. Results of 2016 Tipton Kangaroo Rat Monitoring at the Kern Water Bank	13
Figure 4. Kern Mallow Survey Areas at the Kern Water Bank 2016	14

Introduction

This report documents the results of the 2016 annual wildlife monitoring activities conducted at the Kern Water Bank (KWB). On behalf of the Kern Water Bank Authority (KWBA), biologists from South Valley Biology Consulting LLC (SVB) conducted all monitoring activities contained in this report.

As identified on Page IV-6 the KWB Habitat Conservation Plan/Natural Community Conservation Plan (KWBA 1997), hereinafter referred to as HCP/NCCP, the annual and bi-annual monitoring consisted of the following activities:

- San Joaquin kit fox (*Vulpes macrotis mutica*) monitoring

Nighttime spotlighting surveys to document the presence of San Joaquin kit fox, its predators and competitors, such as coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and bobcat (*Lynx rufus*), as well as several other nocturnal animals on the KWB.

In addition to the prescribed spotlighting surveys, infrared motion camera stations were again used in 2016 to better document kit fox activity on the KWB.

- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) monitoring

Trapping surveys on two established trapping grids to assess known population areas of Tipton kangaroo rats on the KWB.

- San Joaquin woollythreads (*Monolopia congdonii*) and other rare plant species monitoring.

San Joaquin Kit Fox Monitoring

Introduction



San Joaquin kit fox

San Joaquin kit fox monitoring at the KWB in 2016 consisted of nighttime spotlighting surveys conducted on an established route located throughout the KWB. These surveys are conducted annually in an effort to provide an index of San Joaquin kit fox presence. Data collected from the surveys are useful in supplying insights into the densities of not only kit foxes, but also their predator and competitor species that occur within the KWB boundary. The main predator/competitor species for the San Joaquin kit fox on the KWB are coyotes and bobcats. American badger (*Taxidea taxus*) also occurs on the KWB and is observed mostly in small numbers. Although the non-

native red fox is also known to occur in the region, this species has not been observed for many years at the KWB.

Methodology

Prior to conducting the nighttime spotlighting surveys, all of the lesser-travelled areas of the established nighttime spotlighting route were driven by the biologists during daylight hours. This was primarily done in the interest of safety, however, the daylight surveys also allow for identifying areas where the most suitable habitats for San Joaquin kit fox are located and for identifying potential den locations that would be worthwhile to target during the nighttime spotlighting surveys. Although the KWB is a very dynamic place and can vary dramatically from year to year, there has been no need to significantly alter the established spotlighting route for several seasons. Figure 1 provides an illustration of the 2016 survey route.

Nighttime spotlighting surveys were conducted for six nights during the evening hours. Surveys commenced at or immediately after dusk and most surveys generally took from 3 to 3.5 hours to complete. Survey dates included November 10th, 11th, 16th, 17th, 22nd, and 23rd. Because the established survey route is just over 50 miles in length, it was divided into two portions totaling approximately 25 miles each (Figure 1). The East Route consisted of all portions lying east of Enos Lane (Highway 43), and an approximately 6-mile stretch lying west of Interstate 5 and south of the Kern River. The other route, referred to as the West Route, encompassed all remaining portions of the established route that lie west of Enos Lane. Both routes were surveyed equally over the six nights, yielding approximately 150 miles of nighttime spotlighting surveys conducted during the 2016 survey effort.

Each survey was conducted by two biologists traveling in a vehicle at approximately 5-10 miles per hour. The biologists each used a 3-million candlepower hand-held spotlight to observe eye-shines and individual animals. A third biologist was responsible for recording the observations onto the data sheet at specified intervals throughout the survey session and to aid in safely navigating the survey route. Double counting of observations was avoided by maintaining a constant communication while surveying and determining pre-defined areas of observation for each biologist. Observations of all identified animals, paying particular attention to kit fox and their predator and prey species, were recorded onto standardized field data sheets. The data sheets were later compiled into a Microsoft Access® database. All San Joaquin kit fox observations and observations of kit fox predator and competitor species, such as coyote, bobcat, and American badger, were recorded using a hand held Global Positioning System (GPS) and later entered into the database.

Results

Results from the nighttime spotlighting surveys are presented in Figure 2. The locations of San Joaquin kit fox and competitor/predator species observations are presented in Figure 1.

There were no observations of San Joaquin kit fox made during the 2016 nighttime spotlighting surveys.

A total of 23 coyotes were observed during the surveys on 13 different occasions. All the observations were adults. Eight of the observations consisted of a single individual, while the remaining five observations consisted of multiple individuals ranging from two to five adults (Figure 1).

No bobcats were observed during the 2016 nighttime spotlighting surveys. However, American badgers were observed on two occasions. Both occasions consisted of a single adult badger.

Other mammalian species observations made during the 2016 nighttime spotlighting surveys included: 1 Unknown species of bat, 91 desert cottontail (*Sylvilagus auduboni*), 151 black-tailed jackrabbit (*Lepus californicus*), 22 mice, and 90 kangaroo rat (*Dipodomys* ssp.).

The only avian species that were observed were a total of 10 barn owl (*Tyto alba*) and three burrowing owl (*Athene cunicularia*).

Discussion

The 2016 season saw a significant increase in the growth of herbaceous vegetation that led to much more seed and herbaceous forage production. This in turn led to an increase in populations for many of the upland species. For example, the 23 coyote observations in 2016 were 187.5% higher than the 8 observations made during the 2015 surveys. Similar increases in observations were also made for almost all of the prey species such as rabbits, kangaroo rats, and mice. Although no observations of bobcats and only two American badgers were made during the 2016 nighttime spotlighting surveys, both these species were observed on several other occasions by SVB biologists during the year. In particular, badgers seem to be on the rise at the KWB. These may be natural fluctuations in the population that may reflect an increase in small mammal prey availability in 2016.

San Joaquin kit fox was not observed during the 2016 nighttime spotlighting surveys; however, one kit fox individual was very active in the Southeast Area in 2016. As discussed below, many photographs were taken of this kit fox at one of the camera monitoring stations during 2016.

In 2016 SVB biologists placed a total of 9 cameras in several areas spread throughout the KWB. In 2015, cattle rendered two camera stations inoperable; however, only one camera station was disturbed on just one evening by cattle in 2016. The disturbance was mild and did not render the station inoperable. An infrared motion detection camera was placed at each station along with a perforated can of cat food that was securely fastened to the ground with a 12-inch metal stake. All cameras were operated

for 14 consecutive days and nights from September 17th through September 30th. Figure 1 shows the locations of the 9 camera stations.

One San Joaquin kit fox was photographed numerous times at the same camera station on 10 of the 14 nights. It is believed that this was the same individual each night. Coyotes were plentiful in 2016, visiting 8 of the 9 scent stations. One bobcat was photographed at the same camera station on two different nights, but no badgers visited the camera stations in 2016. Other wildlife species photographed included black-tailed jackrabbit, desert cottontail, kangaroo rat, and greater roadrunner. Several representative photographs of wildlife from the camera station monitoring are provided below.



San Joaquin kit fox (Sept. 17, 2016)



San Joaquin kit fox (Sept. 19, 2016)



Coyotes visited 8 of the 9 camera stations



Bobcat



Heermann's kangaroo rat were present at 8 of the 9 camera stations



Desert cottontail were photographed in 2016 at most camera stations



Black-tailed jackrabbit were also abundant in 2016



Greater roadrunner at camera station

Tipton Kangaroo Rat Monitoring

Introduction

Tipton kangaroo rat monitoring at the KWB is required annually at two permanently established trapping grids in accordance with the HCP/NCCP. The Strand Grid is located in the northwest ¼ of Section 7, Township 30 South, Range 26 East and the Southeast Area Grid is located in the northwest ¼ of Section 33, Township 30 South, Range 26 East.

Methodology

The Strand Grid and the Southeast Area Grid are both standard 110-meter by 110-meter, 144-station, small mammal trapping grids. Each grid consists of twelve equidistant rows, spaced 10 meters apart. Monitoring efforts at each grid in 2015 consisted of four successive nights of trapping. Trapping was conducted at the Southeast Area Grid on September 13th, 14th, 15th, 16th; and the Strand Grid was trapped on October 4th, 5th, 6th and 7th. This technique yielded a total of 1,152 trap nights.

A 12-inch x 3-inch x 3.5-inch Sherman live trap was placed at each trap location. Each trap was baited using a millet-based seed mix. A wadded paper towel was also included in each trap to provide insulation material for the captured animals. The traps were baited and set in the evening and checked prior to sunrise the following morning. Two biologists worked independently on separate trap rows and checked 72 traps each morning. This technique was utilized to help reduce the handling time and minimize stress to the captured animals. Each captured animal was identified to species and the individual's weight, age, and sex were also recorded onto a standardized data sheet. After all data were collected and recorded, the animal was temporarily marked ventrally with a non-toxic ink marker and then immediately released. To further minimize subsequent handling times, males were marked with a blue marker and females were marked with red. Additionally, an individual was weighed only once and no re-weighing of recaptured animals was conducted.

Deer mice (*Peromyscus maniculatus*) were not handled in the same manner as all the other species. When a deer mouse was captured, no data on sex, weight, or any other parameter was collected. Therefore, the number of deer mice reported here includes recaptures. This was a safety consideration intended to minimize potential exposure to Hantavirus.

Results

Results from the 2016 Tipton kangaroo rat monitoring are summarized in Figure 3.

Six Tipton kangaroo rats were captured at the Strand Grid in 2016. Other animals trapped at the Strand Grid were as follows: 58 Heermann's kangaroo rats (*Dipodomys heermanni*), 1 San Joaquin grasshopper mouse (*Onychomys torridus tularensis*), and 48 deer mice.

The trapping effort at the Southeast Area Grid yielded a total of 47 Tipton kangaroo rats, 9 Heermann's kangaroo rats, 1 San Joaquin grasshopper mouse, 6 San Joaquin pocket mice (*Perognathus inornatus*), and 6 deer mice.

Discussion

2016 proved to be an excellent year for Tipton kangaroo rats at the KWB. The 53 individuals trapped in 2016 is a record high for the trapping effort in the history of the KWB. This is an astounding change from 2015, when no Tipton kangaroo rats were trapped at either of the trapping grids (SVB 2016). Results from the recently established Southeast Area Grid in 2016 are especially pleasing. In all, 47 of the 53 Tipton kangaroo rats trapped in 2016 were trapped at the Southeast Area Grid. The habitat at this grid location is high quality alkali sink habitat that was in excellent condition after the favorable rainfall during the 2015-2016 rain year. It is very encouraging to have had such an increase of Tipton kangaroo rats at this grid, while simultaneously seeing a much smaller increase in the number of Heermann's kangaroo rats at this grid. Only 9 Heermann's kangaroo rats were trapped at this grid. It appears from these data that the Tipton kangaroo rats were better able to exploit the abundant seed production from the favorable rainfall. Trapping results at the nearby Coles Levee Ecosystem Preserve also found record numbers of Tipton kangaroo rats trapped at all of the grids where this species is found (SVB 2017).

The results for San Joaquin pocket mouse in 2016 are interesting. It was reported from the 2015 trapping results that San Joaquin pocket mice were trapped in higher numbers than any other small mammal species at the Southeast Area Grid and the 7 individuals trapped at the Strand Grid was a record high for that grid (SVB 2016). It appears that when the populations of kangaroo rats are depressed, this may favor the San Joaquin pocket mouse. This may be a direct function of less competition, or other environmental factors may also be important. Anecdotally, there does seem to be a positive correlation with San Joaquin pocket mice increasing their numbers in years when habitat conditions are not as favorable for kangaroo rats.



Tipton kangaroo rat



San Joaquin pocket mouse

Sensitive Habitat Botanical Monitoring

Introduction

Five special-status plant species have historically been reported to occur at the KWB. These are: Hoover's woolly-star (*Eriastrum hooveri*), San Joaquin woollythreads (*Monolopia congdonii*), recurved larkspur (*Delphinium recurvatum*), Horn's milk-vetch (*Astragalus hornii* var. *hornii*), and slough thistle (*Cirsium crassicaule*). However, the USFWS now considers Kern mallow (*Eremalche kernensis*) to include the purple or pink-flowered populations where the populations include pistillate-flowered plants (*E. parryi* ssp. *kernensis*). This is a significant change from the policy that had been in place for many years that only considered the white-flowered populations to be "true Kern mallow". The change in designation is based upon the results of the 5-year review for the species that was published in August of 2013 (USFWS 2013). As a result of this designation, the range of the protected Kern mallow includes many additional areas, including portions of the KWB where the pink or purple-flowered plants occur. Because Kern mallow is listed as a federal endangered species and plants meeting this revised definition of Kern mallow (i.e., populations of pink or purple-flowered plants with pistillate plants present) are known to occur on the KWB, this species is now also targeted for surveys in favorable years of rainfall when this species is identifiable.

The 2015- 2016 rain year (October 1, 2015 - September 30, 2016) in the Bakersfield area, received approximately 5.51 inches of precipitation. This represents approximately 90% of the long-term normal of 6.12 inches. This resulted in an excellent blooming season for almost all plants at the KWB, especially for populations of San Joaquin woollythreads, Hoover's woolly-star, recurved larkspur, and Kern mallow.

SVB commenced monitoring of San Joaquin woollythreads populations at KWB in 2016 on January 25th. Several hundred plants had germinated at the known populations of this species and were primarily in the early rosette stage of growth. Most plants were small in stature, but appeared healthy. Regular visits continued throughout the flowering period for San Joaquin woollythreads. On February 9th, plants were much larger and still very healthy looking. No plants had begun flowering, but many plants did appear to have immature buds that looked to be within just a few days from blooming. On February 24th essentially all plants observed were well into the flowering stages. On March 2nd, the population was in prime bloom with many robust plants sporting numerous mature flowers.

Ryan O'Dell with the Hollister Field Office of the Bureau of Land Management continued their work with San Joaquin woollythreads on the KWB in 2016. Mr. O'Dell and SVB biologist Jim Jones visited one of the larger populations of San Joaquin woollythreads on March 19th. Mr. O'Dell collected one or two seed heads from approximately 20 individual plants. The seed was used to germinate and grow seedlings in the laboratory to provide material for chromosome counts to help determine the genetic structure of differing populations of San Joaquin woollythreads throughout the range of the species.

Preliminary results from this genetic study indicate that the populations of San Joaquin woollythreads on the KWB are most similar to populations located in the Lost Hills area of Kern County (Ryan O'Dell, pers. comm.).



San Joaquin woollythreads rosettes (Jan. 25, 2016)



San Joaquin woollythreads in bud stage (Feb. 9, 2016)



San Joaquin woollythreads flowering (Feb. 24, 2016)



San Joaquin woollythreads full bloom (Mar. 2, 2016)

Several site visits were also made to known populations of Hoover's woolly-star on the KWB in 2016. This species occurs in many areas at the KWB in a variety of habitats. The larger, healthier plants tend to be associated with cryptogamic crusts within saltbush scrub habitats. Flowering individuals were observed beginning about March 2nd and continued to be observed into early April.



Hoover's woolly-star flowering (Mar. 28, 2016)

Recurved larkspur occurs at the KWB within one sector of the conservation bank lands on both the eastern and western sides of the Alejandro Canal. In 2016, the population was very healthy and vigorous and approximately 500 – 750 plants were observed flowering and fruiting on March 28th.



Recurved larkspur flowering and fruiting (Mar. 28, 2016)

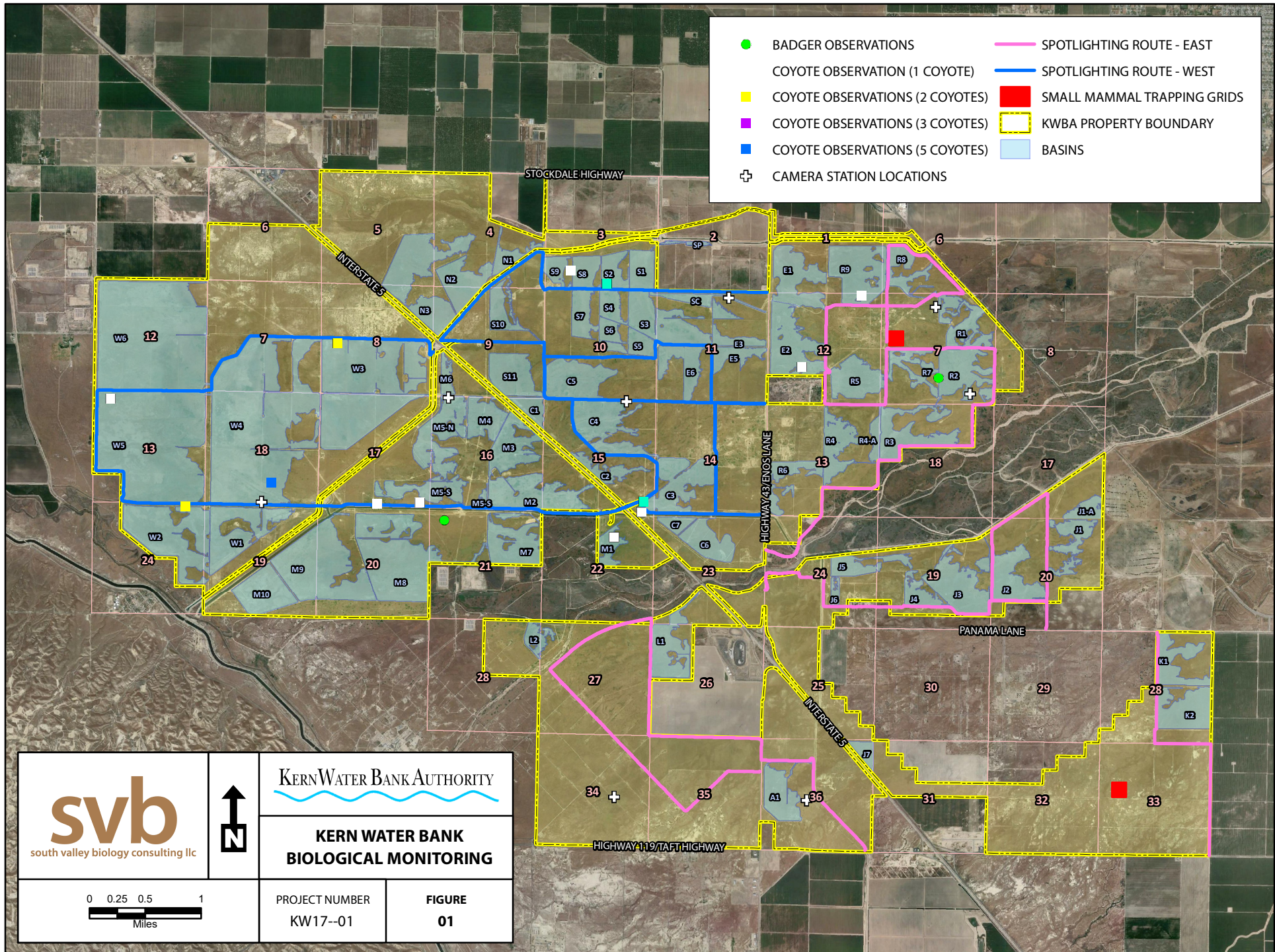
The pink-flowered Kern mallow was targeted for specific surveys in several areas throughout the KWB (Figure 4). SVB biologists observed populations of this species in each of the survey areas shown on Figure 4. Any population that contained pistillate plants within the population were considered to be Kern mallow. This species is likely located elsewhere in grassland and shrubland communities at the KWB. Most occurrences observed in 2016 consisted of fairly large numbers of individuals, ranging from a few hundred to as many a few thousand plants.



Kern mallow pistillate plant (Mar. 8, 2016)

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- United States Fish and Wildlife Service. 2013. *Eremalche kernensis* (Kern mallow) 5-year review: Summary and evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, CA. August 2013.



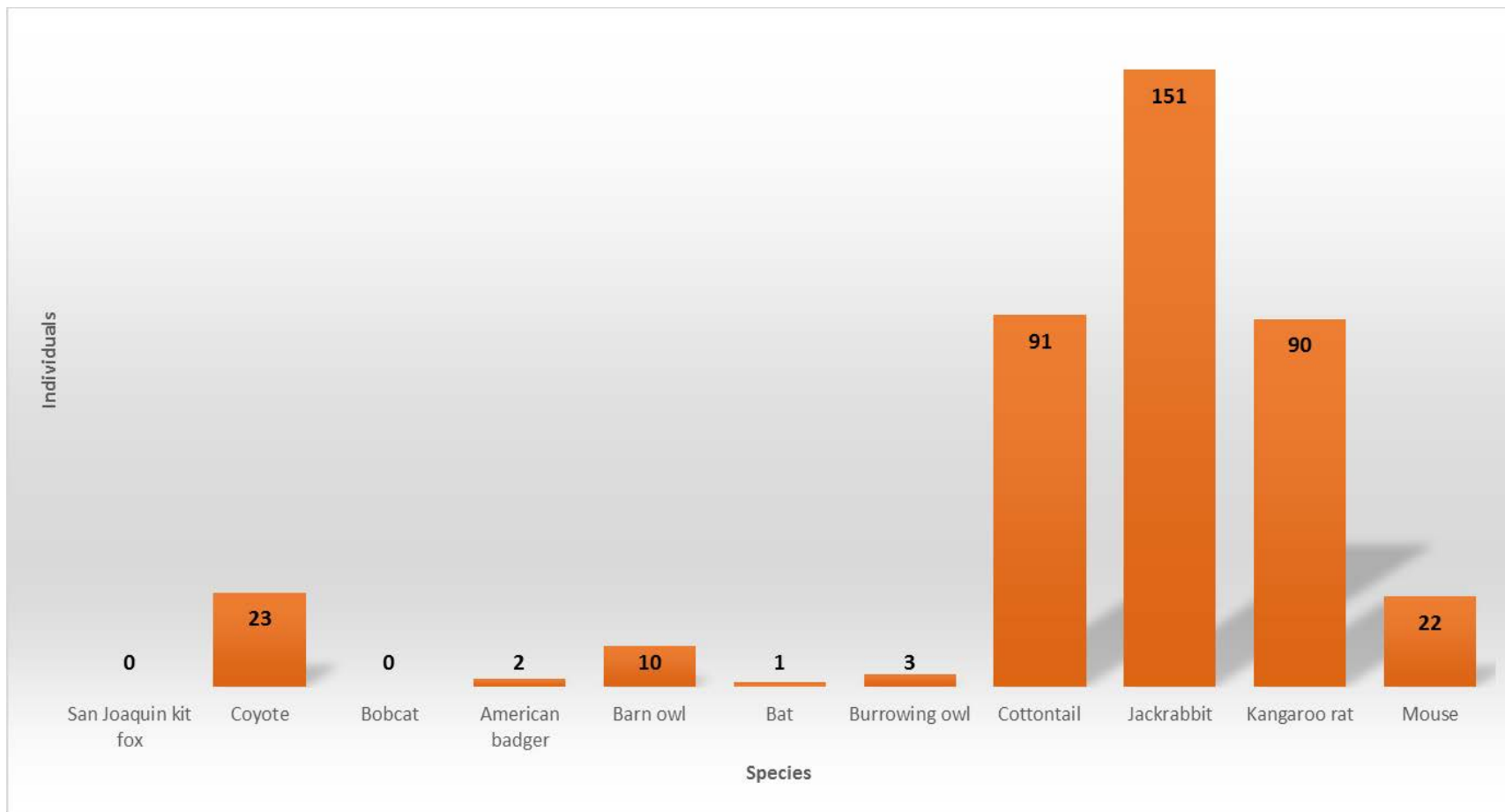


Figure 2. Results of 2016 nighttime spotlighting surveys at the Kern Water Bank.

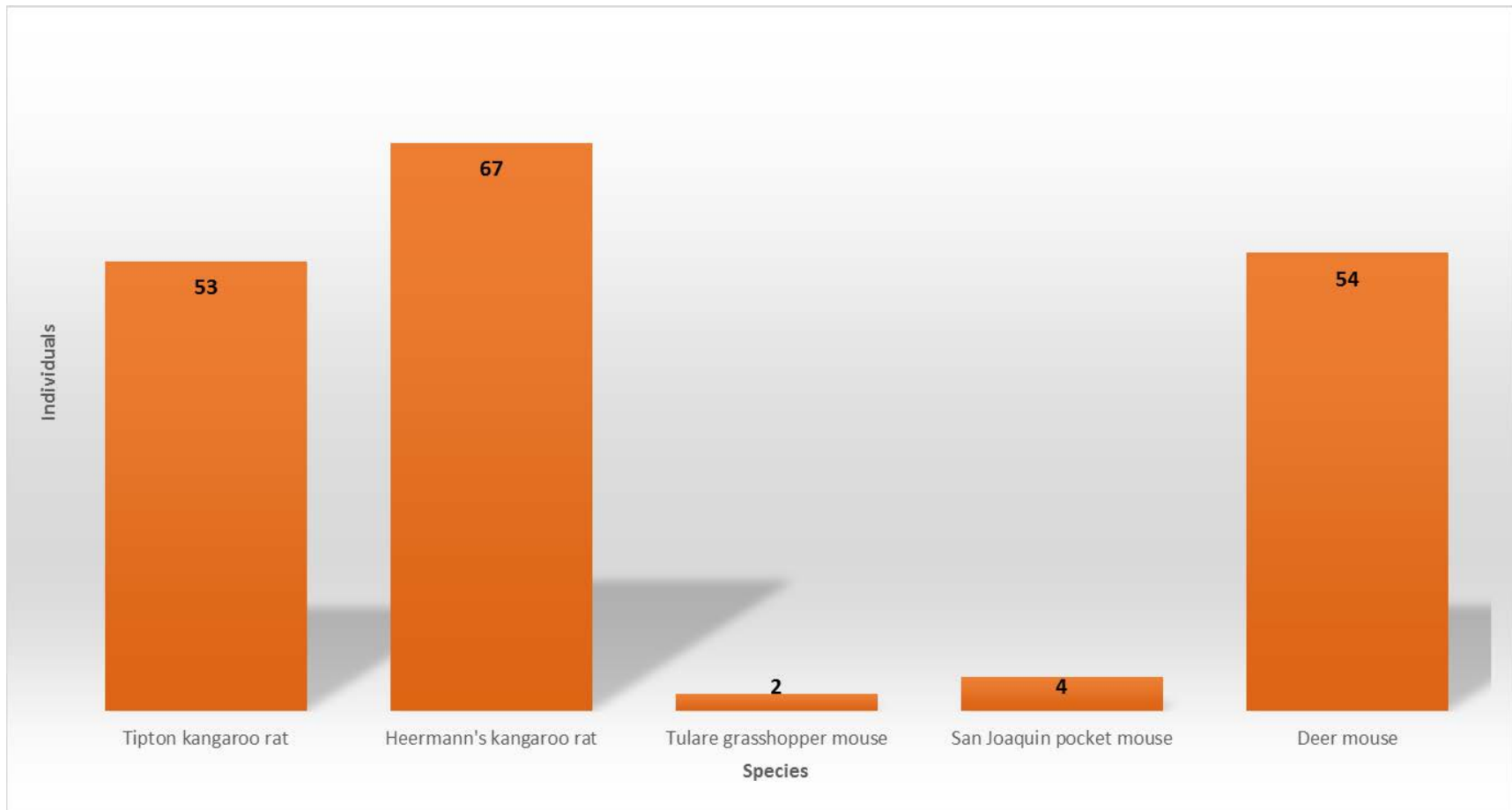


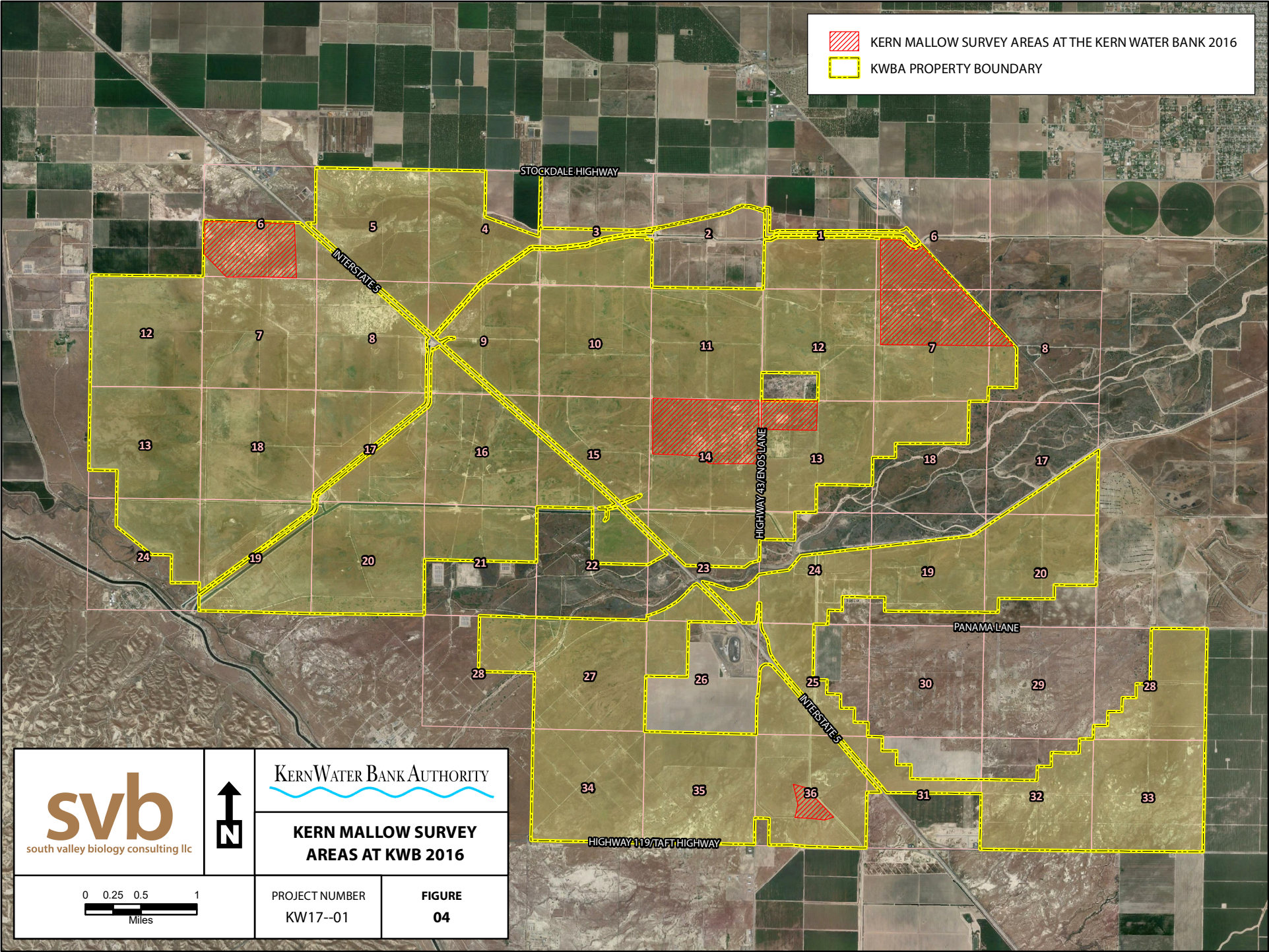


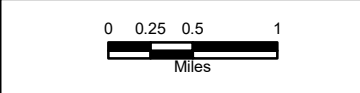
Figure 3. Results of 2016 Tipton kangaroo rat monitoring at the Kern Water Bank.

 KERN MALLOW SURVEY AREAS AT THE KERN WATER BANK 2016
 KWBA PROPERTY BOUNDARY



KERN WATER BANK AUTHORITY

KERN MALLOW SURVEY AREAS AT KWBA 2016



PROJECT NUMBER
KW17--01

FIGURE
04