

Appendix D

Annual Wildlife Monitoring Report for the Kern Water Bank



Mourning Dove (*Zenaida macroura*)

2017 ANNUAL WILDLIFE MONITORING REPORT for the KERN WATER BANK



Submitted to:

KERN WATER BANK AUTHORITY

Prepared by:

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June 18, 2018

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for the
KERN WATER BANK

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June 18, 2018

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Introduction

This report documents the results of the 2017 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 2017 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 monitoring at the KWB in 2017 consisted of nighttime spotlighting surveys conducted on an established route located throughout the KWB. These surveys are conducted annually 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 property. The main predator/competitor species for the San Joaquin kit fox on the KWB are coyotes (*Canis latrans*), bobcats (*Felis rufus*), and American badger (*Taxidea taxus*). Although the non-native red fox (*Vulpes vulpes*) 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 the lesser-travelled areas of the established nighttime spotlighting route were driven by the biologists during daylight hours. This is typically done every season 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 not been any need to significantly alter the established spotlighting route. Additionally, although the KWB experienced significant water recharge in 2017, with nearly all the groundwater recharge ponds containing water, it still was not necessary to modify the survey routes. Figure 1 provides an illustration of the 2017 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 28th, 30th, December 1st; 4th; 5th; and 7th. 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). As in prior years, 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 three times each over the six nights, yielding approximately 150 miles of nighttime spotlighting surveys conducted during the 2017 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/competitor 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 2017 nighttime spotlighting surveys.

A total of 2 coyotes were observed during the surveys on two separate occasions. Each observation was of one adult actively foraging for prey (Figure 1).

One adult bobcat was observed during the 2017 nighttime spotlighting surveys. No observations of American badgers were recorded.

Other mammalian species observations made during the 2017 nighttime spotlighting surveys included: 44 desert cottontail (*Sylvilagus auduboni*), 61 black-tailed jackrabbit (*Lepus californicus*), and 10 kangaroo rat (*Dipodomys* spp.).

Several avian species were observed. Birds of prey observations totaled 40 barn owls (*Tyto alba*), 1 great horned owl, 2 burrowing owls (*Athene cunicularia*), 2 northern harriers (*Circus cyaneus*), and 1 red-tailed hawk (*Buteo jamaicensis*). Other avian species included American coot (*Fulica americana*), gull (*Larus* sp.), California quail (*Callipepla californica*), Canada goose (*Branta canadensis*), cattle egret (*Bubulcus ibis*), cliff swallow (*Petrochelidon pyrrhonota*), great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferus*), loggerhead shrike (*Lanius ludovicianus*), mallard (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), sagebrush sparrow (*Artemisospiza nevadensis*), and white-faced ibis (*Plegadis chihi*).

Discussion

The low number of observations of kit fox and their competitor/predator species that were made during the 2017 nighttime spotlighting surveys are not indicative of what were probably present on KWB. This is easily explained by the conditions that prevailed during the surveys. The KWB was experiencing a record level recharge cycle that saw nearly all the recharge basins and canals at full capacity with water. This resulted in a significant increase in aquatic habitat for numerous water birds, and numerous birds were observed during the nighttime spotlighting surveys. However, the abundant water made for less dry lands for species such as kit fox and their competitor/predator species. This equates to a much smaller area for observations to be made by spotlighting. For example, coyotes are very commonly observed at KWB. The 2 observations of coyotes made in 2017 during the nighttime spotlighting surveys are a dramatic under-sampling of the coyote presence. This conclusion is supported by the numerous visitations by coyotes to the camera stations that were established during the same time period as the nighttime spotlighting surveys (see the discussion on camera station monitoring below).

In 2017 SVB biologists placed a total of 8 cameras in several areas spread throughout the KWB. 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 12 consecutive days and nights from November 27th through December 8th. Figure 1 shows the locations of the 8 camera stations.

No San Joaquin kit fox was photographed at any of the camera stations in 2017. Coyotes were plentiful once again in 2017, visiting 6 of the 8 scent stations. Bobcats were photographed on many occasions at the one of the camera stations located near the Kern Water Bank and Main Canals. No American badgers visited the camera stations in 2017. Other wildlife species photographed included black-tailed jackrabbit, desert cottontail, kangaroo rat, striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), California quail, California horned lark (*Eremophila alpestris actia*), and white-crowned sparrows (*Zonotrichia leucophrys*). Representative photographs of some of the wildlife from the camera station monitoring are provided below.



Coyote at Camera Station 3 attempting to remove bait.



Two coyotes at Camera Station 2. Coyotes were observed in pairs numerous times.



Two coyotes during the early morning hours at Camera Station 20.



Bobcat sniffing bait at Camera Station 20.



Bobcat sniffing bait at Camera Station 20 during afternoon.



Two raccoons at Camera Station 20.



Two striped skunks at Camera Station 21.



Black-tailed jackrabbits were photographed at 7 of the 8 Camera Stations.

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 $\frac{1}{4}$ of Section 7, Township 30 South, Range 26 East and the Southeast Area Grid is located in the northwest $\frac{1}{4}$ 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 2017 consisted of four successive nights of trapping. Trapping was conducted at the Strand Grid on August 29th, 30th, 31st, and September 1st; and the Southeast Area Grid was trapped on September 5th, 6th, 7th, and 8th. 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



Adult Tipton kangaroo rat

Results from the 2017 Tipton kangaroo rat monitoring are summarized in Figure 3.

One Tipton kangaroo rat was captured at the Strand Grid in 2017; this individual was an adult female. Other animals trapped at the Strand Grid were as follows: 137 Heermann's kangaroo rats (*Dipodomys heermanni*), 2 Tulare grasshopper mice (*Onychomys torridus tularensis*), 1 San Joaquin pocket mouse (*Perognathus inornatus*), and 40 deer mice.



Juvenile Heermann's kangaroo rat

The trapping effort at the Southeast Area Grid yielded a total of 46 Tipton kangaroo rats, 19 Heermann's kangaroo rats, 1 Tulare grasshopper mouse, 5 San Joaquin pocket mice, and 9 deer mice.



Adult deer mouse

Discussion

The Tipton kangaroo rat populations at KWB appeared to be once again healthy and robust, with 47 individuals trapped in 2017 on the two grids. This was only slightly lower than the 53 individuals trapped the previous year in 2016 (SVB 2017). These are record high numbers for this species at KWB. Likewise for San Joaquin pocket mouse and Tulare grasshopper mouse, their numbers were similar to what was observed in 2016. A total of 6 San Joaquin pocket mice were trapped in 2017, while 4 individuals were trapped in 2016, and 3 Tulare grasshopper mice were trapped in 2017, while 2 individuals were trapped in 2016. The only species with significantly different numbers of individuals trapped in 2017 was Heermann's kangaroo rat. In 2016 only 67 individuals were trapped but their numbers more than doubled in 2017 to 156 individuals trapped at the two grids. This represents a 133% increase over the two years. A further point of interest in regard to Heermann's kangaroo rats is that although the huge majority of the 156 individuals trapped in 2017 were trapped at the Strand Grid (137 individuals) and the remaining 19 individuals were trapped at the Southeast Area Grid. Both these numbers represent nearly identical proportional increases of Heermann's kangaroo rats at both grids from 2016 to 2017, with the species increasing 136% at the Strand Grid and 111% at the Southeast Area Grid.

The habitats are quite different at each grid with the higher quality habitat for Tipton kangaroo rats prevailing at the Southeast Area Grid, where the habitat is Alkali Sink Scrub, while the dense Saltbush Scrub at the Strand Grid is more favorable to the Heermann's kangaroo rat. The large, nearly identical proportional increases in the number of Heermann's kangaroo rats at both grids in 2017, with the other small mammal species remaining nearly constant in numbers over the same time frame, illustrates the exceptional ability of Heermann's kangaroo rats to quickly exploit increases in available food supplies and improved overall habitat conditions.

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 2016- 2017 rain year (October 1, 2016 - September 30, 2017) brought approximately 7.37 inches of precipitation to the Bakersfield area. This represents approximately 120% of the long-term normal of 6.12 inches. This resulted in an exceptional blooming season for almost all plants at the KWB, including the known populations of San Joaquin woollythreads, Hoover's woolly-star, recurved larkspur, and Kern mallow.

San Joaquin woollythreads is the earliest to germinate and bloom of all the special-status plants at KWB. Germination is variable, but in most years with adequate precipitation, individual plants begin to germinate in late January or early February. SVB commenced monitoring of known San Joaquin woollythreads populations at KWB on February 8th. Several hundred plants were observed at the known populations of this species. All plants were easily identifiable and vigorously healthy. Regular visits continued throughout most of the flowering period for San Joaquin woollythreads. Many plants had begun flowering by February 13th. By March 6th essentially all plants were in full bloom. 2017 was an exceptionally favorable year for San Joaquin woollythreads at KWB.



San Joaquin woollythreads (Feb. 8, 2017)



San Joaquin woollythreads in early flowering stage (Feb. 13, 2017).



San Joaquin woollythreads in full bloom (Mar. 6, 2017)

Several site visits were also made to known populations of Hoover's woolly-star on the KWB in 2017. 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 in early March and continued to be observed into late April in 2017.



Hoover's woolly-star flowering (Apr. 28, 2017)

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 2017, the population was very healthy and vigorous and approximately 700 plants were observed flowering on March 28th.



Recurved larkspur flowering (Mar. 29, 2017)

Known populations of Kern mallow were visited during February, March, and April in 2017. Vegetative plants were first observed on February 8th. Additionally, one new population was observed at KWB in 2017 (see Figure 1). Several hundred plants were observed in full bloom in March and April. Plants were very vigorous and robust.



Kern mallow in vegetative stage (Feb. 8, 2017)



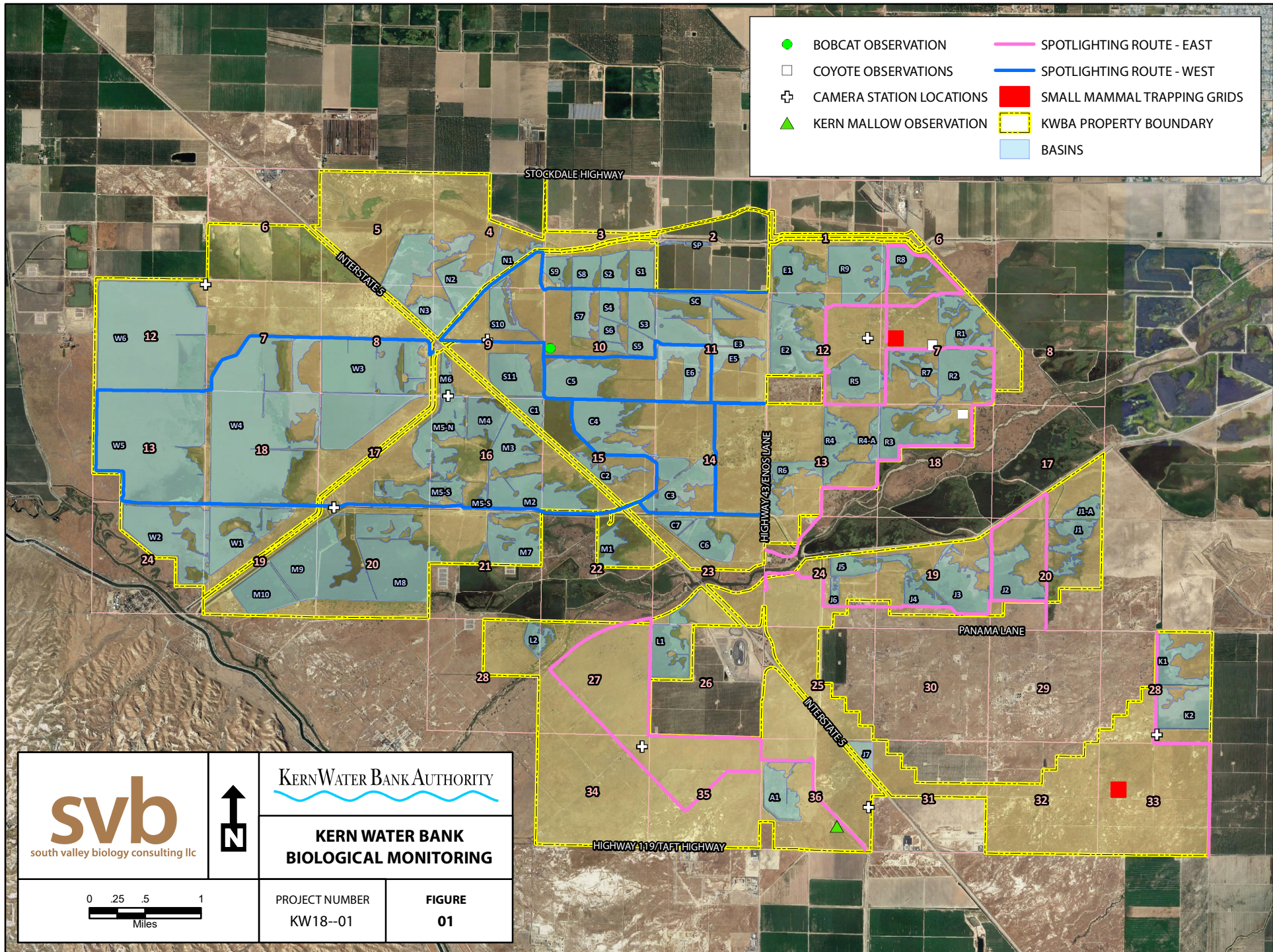
New population of Kern mallow flowering (Mar. 29, 2017).

References

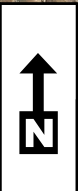
Kern Water Bank Authority. 1997. Habitat conservation plan/natural community conservation plan. Prepared by Kern Water Bank Authority. October 2, 1997.

South Valley Biology Consulting LLC. 2017. 2016 annual wildlife monitoring report for the Kern Water Bank. Prepared by South Valley Biology Consulting LLC for the Kern Water Bank Authority. June 16, 2017.

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.

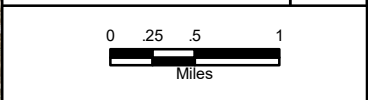


- BOBCAT OBSERVATION
- COYOTE OBSERVATIONS
- + CAMERA STATION LOCATIONS
- ▲ KERN MALLOW OBSERVATION
- SPOTLIGHTING ROUTE - EAST
- SPOTLIGHTING ROUTE - WEST
- SMALL MAMMAL TRAPPING GRIDS
- KWBA PROPERTY BOUNDARY
- BASINS



KERN WATER BANK AUTHORITY

**KERN WATER BANK
BIOLOGICAL MONITORING**



PROJECT NUMBER
KW18--01

FIGURE
01

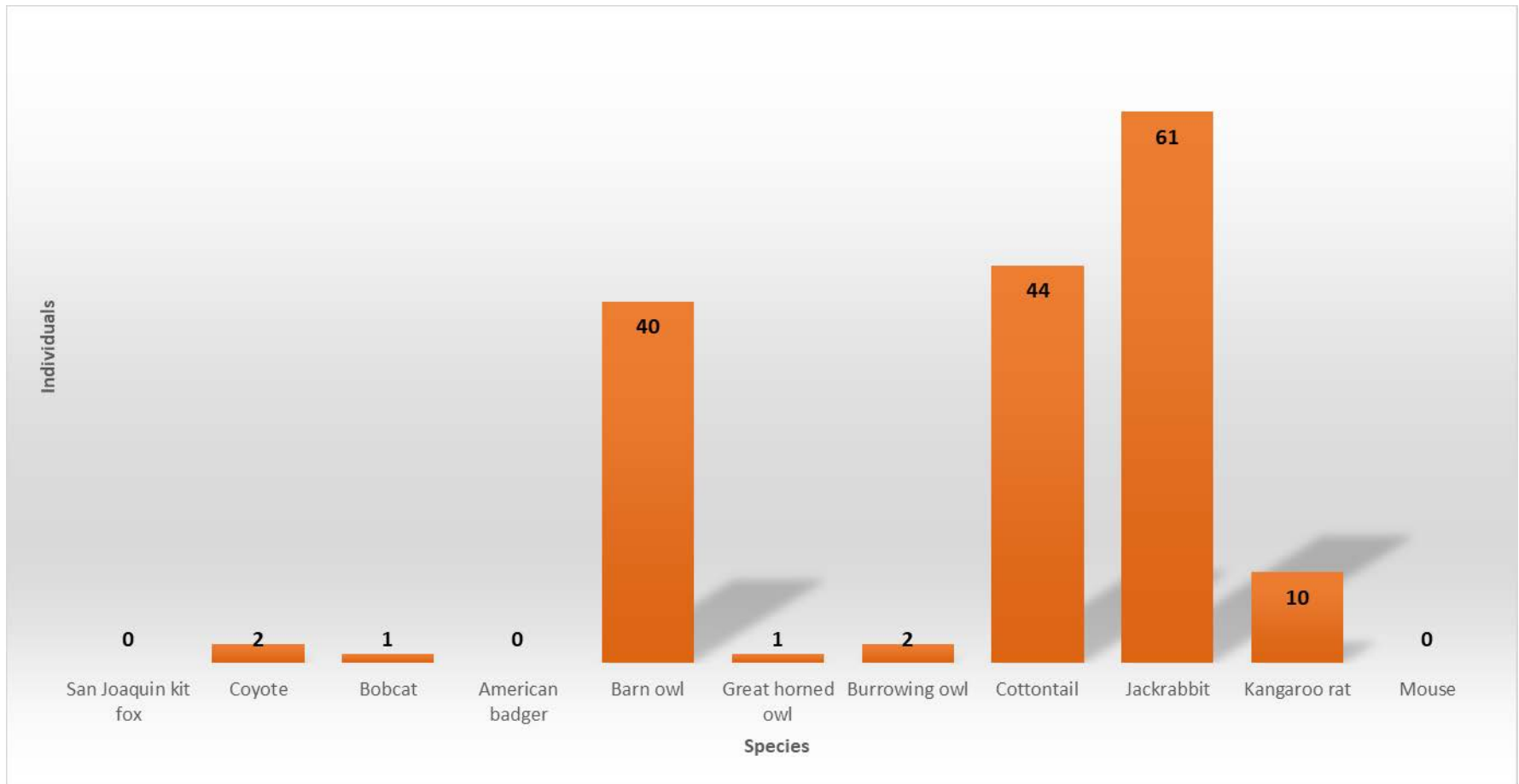


Figure 2. Results of 2017 nighttime spotlighting surveys at the Kern Water Bank.

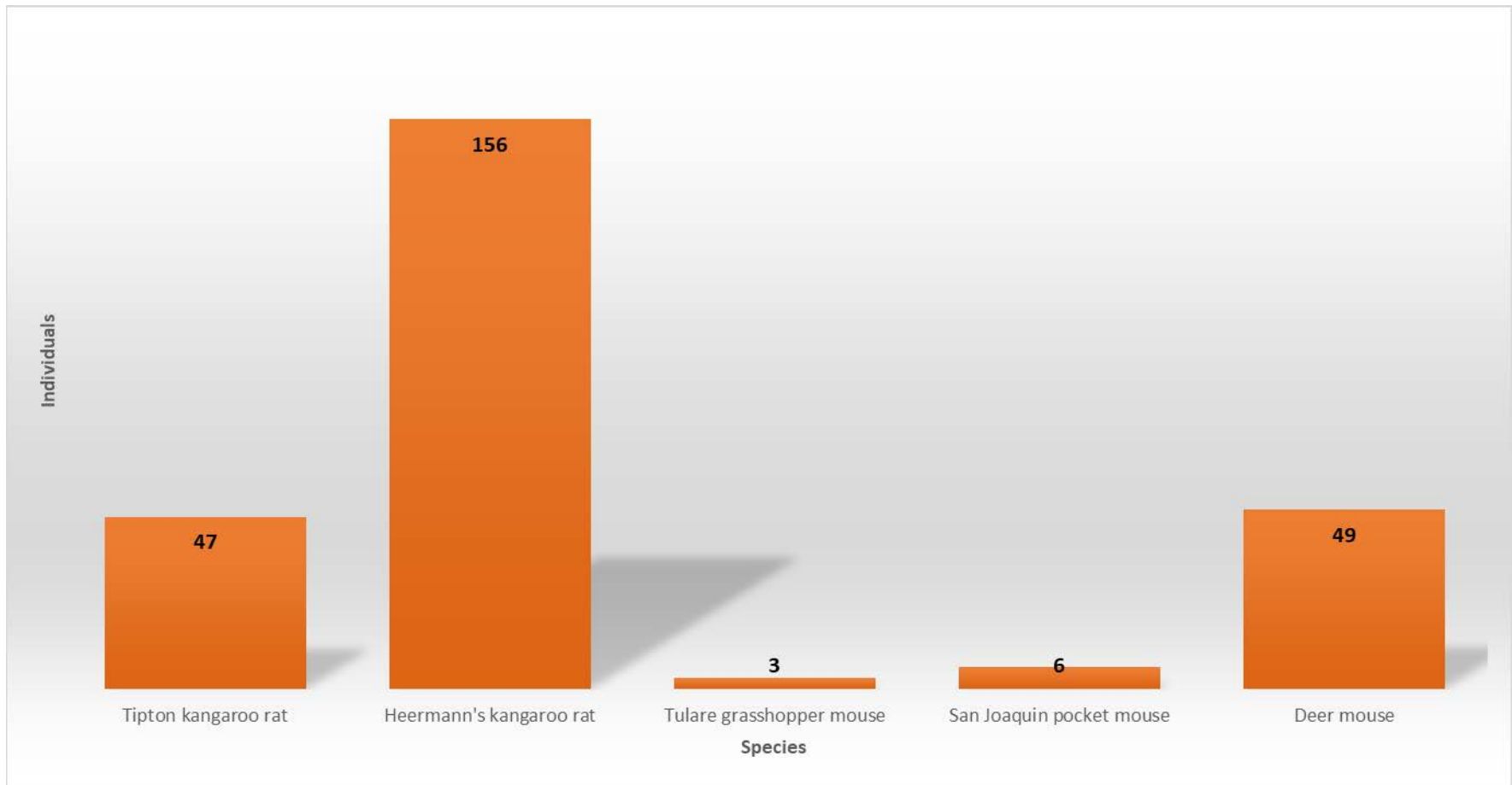


Figure 3. Results of 2017 Tipton kangaroo rat monitoring at the Kern Water Bank.