2008 ANNUAL WILDLIFE MONITORING REPORT
for the
KERN WATER BANK

SUBMITTED TO:

KERN WATER BANK AUTHORITY

PREPARED BY:

LIVE OAK ASSOCIATES, INC.
an Ecological Consulting Firm

June 2, 2009

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Submitted to:

Kern Water Bank Authority
1620 Mill Rock Way, Suite 500
Bakersfield, CA 93311

Prepared by:

Live Oak Associates, Inc.
8200 Stockdale Highway, M10-293
Bakersfield, CA 93311

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1.0 INTRODUCTION

This report documents the results of the 2008 annual wildlife monitoring activities conducted at the Kern Water Bank (KWB). On behalf of the Kern Water Bank Authority (KWBA), Live Oak Associates, Inc. conducted all monitoring activities.

As identified in the KWBA Habitat Conservation Plan/Natural Community Conservation Plan (Section IV-6), 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 and its predators, such as coyote (*Canis latrans*) and red fox (*Vulpes vulpes*), as well as other nocturnal animals 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

Additional appropriately-timed surveys to assess historical occurrences of San Joaquin woollythreads and recurved larkspur (*Delphinium recurvatum*) were also conducted in the sensitive habitat areas on the KWB.

2.0 SAN JOAQUIN KIT FOX MONITORING

2.1 Introduction

San Joaquin kit fox monitoring at the KWB in 2008 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 have proven useful in supplying insights into the densities of not only kit foxes, but also their predator and competitor species within the boundaries of the KWB. The main predator/competitor species for the San Joaquin kit fox on the KWB is the coyote and bobcat (*Felis rufus*). Another species that is occasionally observed on the KWB is the red fox.

2.2 Methodology

As a precautionary measure, lesser-travelled areas of the established nighttime spotlighting route were driven and walked during daylight hours prior to conducting the nighttime spotlighting surveys in 2008. In 2005 and 2006 when water deliveries were high, this pre-survey examination of the spotlight route was conducted in an effort to identify areas that were flooded so an alternative route could be established. In 2007, the concern was that exceptionally dense vegetation had grown up on portions of the route, making vehicle travel, especially at night, on overgrown portions of the route unsafe or impossible. In 2008, the pre-survey examination of the established nighttime spotlighting route did not reveal any unsafe or overgrown areas. As a result, no alterations to the established route were required. Figure 1 provides an illustration of the 2008 survey route.

Nighttime spotlighting surveys were conducted for six nights during the hours of 5:15 P.M. to 8:45 P.M. on December 9th, 16th, 18th, 29th, 30th, and 31st. Because the established survey route is just over 50 miles in length, it was divided into roughly two equidistant portions totaling approximately 25 miles each (Figure 1). The East Route consisted of all portions lying east of Enos Lane 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 which equates to approximately 150 miles of nighttime spotlighting surveys conducted during this survey effort on the KWB in 2008.

Two biologists conducted the surveys while travelling in a vehicle at approximately 5-10 miles per hour. Each biologist used a 3-million candlepower hand-held spotlight to observe wildlife. Double counting of observations was avoided by both observers maintaining a constant communication while surveying. Observations of all animal 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 and bobcat (*Felis rufus*) were recorded onto a field map at the time of the survey and then compiled into the database at a later date.

2.3 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.

One San Joaquin kit fox observation was made on December 29th approximately 500 feet west of Pond R1 in the northwest ¼ of Section 7, Township 30 South, Range 26 East, (MDB&M) (Figure 1). This observation was of one adult kit fox foraging within the Strand Oilfield portion of the KWB.

A total of 25 coyotes were observed during the surveys. All observations were of adults. Most observations consisted of a single individual (10 observations); however, seven observations consisted of either 2 or 3 coyotes in a group (Figure 1).

Six bobcats were observed during the 2008 nighttime spotlighting surveys. The observations were largely spread throughout much of the KWB; however, in almost all cases, bobcats were observed in close proximity to dense stands of trees or shrubs.

Other notable mammalian species observed during the 2008 nighttime spotlighting surveys were: 162 desert cottontails (*Sylvilagus audubonii*), 125 black-tailed jackrabbits (*Lepus californicus*), 33 kangaroo rats (*Dipodomys* ssp.), 2 mice, and 6 raccoons (*Procyon lotor*).

A total of 26 barn owls (*Tyto alba*) and only 4 burrowing owls (*Athene cunicularia*) were observed throughout the KWB during the 2008 nighttime spotlighting surveys. Several other bird species including great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferus*), lesser nighthawk (*Chordeiles acutipennis*), loggerhead shrike (*Lanius ludovicianus*), pigeon (*Columba livia*), red-tailed hawk (*Buteo jamaicensis*), and western meadowlark (*Sturnella neglecta*) were also observed during the surveys.

Western toads (*Bufo boreas*), bullfrogs (*Lithobates catesbiana*), and Pacific tree frogs (*Pseudacris regila*) were commonly heard and often observed along the KWB Canal during the surveys, but no attempt to count individuals of these species was made.

2.4 Discussion

The implementation of an aggressive grazing program for 2007 – 2008 helped remove much of the overgrowth of vegetation that occurred during the 2005 – 2006 high water deliveries. This definitely opened up many portions of the KWB allowing for greater visibility and more representative sampling during the 2008 nighttime spotlighting surveys, especially for observations of smaller animals such as kangaroo rats and lagomorphs. Therefore, it is recommended that for any future years when the herbaceous vegetation has the potential to become overly dense, similar grazing considerations be made to help maximize the observations of kit foxes and other wildlife during the nighttime spotlighting surveys.

The single observation of the adult San Joaquin kit fox made during the 2008 nighttime spotlighting surveys marks the first kit fox observed during the surveys since 2005. There were three observations of San Joaquin kit fox made during other annual monitoring activities in 2006 and 2007, but no kit fox were observed during the nighttime spotlighting surveys during that period. The Strand Oilfield portion of the Kern Water Bank where the 2008 kit fox observation was made supports a mix of native/naturalized habitats that are very suitable for kit foxes, including a relatively abundant prey base of kangaroo rats, mice and lagomorphs. Several potential dens have been observed in the area, but no confirmed active or known dens have been seen to date. Future attempts to identify active dens will be made during the spring botanical surveys and other ongoing monitoring activities.

The 25 coyote observations made during the 2008 nighttime spotlighting surveys at the KWB were very similar to the 2007 observations of 28 (10.7% decrease). Coyotes are commonly observed during both daylight and nighttime hours throughout much of the KWB. However, the conservation lands adjacent to Coles Levee Ecosystem Preserve in Sections 27, 34, and 35 (Figure 1), seem to consistently be one of the areas where many coyote observations area made.

It is not clear why this is the case; however, the proximity of the area to the adjacent almond grove and grape vineyard may make the area attractive to foraging coyotes. Additionally, the kangaroo rat and mice populations appear to be relatively abundant in the area, given the typical abundance of burrows observed in that area.

The six bobcat observations made during the 2008 nighttime spotlighting surveys at the KWB were 3 times higher than what were observed in either 2006 or 2007 (2 bobcat observations were made in each of those years). Several more incidental observations of bobcats were made during other monitoring activities in 2008. It is encouraging to see that this species appears to be doing relatively well at the KWB.

3.0 TIPTON KANGAROO RAT MONITORING

3.1 Introduction

Tipton kangaroo rat monitoring at the KWB consists of annual trapping surveys conducted at two permanently established trapping grids located in areas that are known to support this species. The Strand Grid is located in the northwest ¼ of Section 7, Township 30 South, Range 26 East, and the Taft Highway Grid is located in the northeast ¼ of Section 36, Township 30 South, Range 25 East (Figure 1).

3.2 Methodology

The Strand and Taft Highway grids are 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 the grids were concentrated on one grid at a time and concluded when four successive nights of trapping had been completed. Trapping was conducted on September 30th, October 1st, 2nd, and 3rd at the Taft Highway Grid and November 4th, 5th, 6th, and 7th at the Strand Grid. This technique yielded total of 576 trap nights at each grid for a total of 1,152 trap nights for the entire monitoring effort.

A Sherman live trap was placed at each trap location and was baited using a peanut butter-coated birdseed mix. A wadded paper towel was also included in each trap in an effort 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 at each grid. This technique was utilized in an effort to help reduce the handling time and minimize any stress to the captured animals. Each captured animal was identified to species and their weight, age and sex were also recorded onto standardized datasheets. After all data was collected and recorded, the animal was temporarily marked on its abdomen with a non-toxic ink marker.

3.3 Results

Results from the 2008 Tipton kangaroo rat monitoring are summarized in Figure 3. No Tipton kangaroo rats were captured in 2008.

A total of 22 individual Heermann's kangaroo rats (*Dipodomys heermanni*) were captured during the 2008 small mammal trapping effort. Fourteen individuals were captured on the Strand Grid, while 8 individuals were trapped at the Taft Highway Grid.

The only other species captured during the 2008 monitoring effort was Tulare grasshopper mouse (*Onychomys torridus tularensis*). Four grasshopper mice were trapped at the Taft Highway Grid.

3.4 Discussion

The number of Heermann's kangaroo rats trapped in 2008 increased by almost 38% over what was observed in 2007. This species has experienced wild fluctuations in number over the years, probably largely due to precipitation levels and subsequent production and availability of seed. Tulare grasshopper mouse is rarely trapped during the annual monitoring effort at either the Strand or Taft Highway grids. It is unclear why they were trapped in 2008 at the Taft Highway Grid, but it is worth noting that grasshopper mice were also trapped in unusually high numbers at the neighboring Coles Levee Ecosystem Preserve (Live Oak Associates, Inc. 2009, in preparation).

No Tipton kangaroo rats were trapped during the 2008 monitoring effort. In fact, none have been trapped since 2006. It is likely that the population of Tipton kangaroo rats is relatively small at the KWB; however at least one or two individuals are typically trapped in any given year. Because very few individuals are trapped during the annual monitoring effort, even in years when numbers are up on the neighboring Coles Levee Ecosystem Preserve, it may be worthwhile to consider an alteration in the monitoring effort. Other areas of the KWB Conservation Lands probably support this species, as many areas with suitable habitat and active kangaroo rat burrows are known. Two of the more promising areas may be on lands bordering the Ten Section Oilfield and in the saltbush scrub habitats north of the existing Taft Highway Grid. Both of these areas could potentially be well suited for the establishment of permanent grid locations to index tipton kangaroo rats at the KWB. An investigative live trapping effort of these or and/or other areas could provide valuable insight on the distribution of this species on the KWB.

4.0 SENSITIVE HABITAT BOTANICAL MONITORING

Four special-status plant species are known to occur at the KWB. These are: Hoover's woolly-star (*Eriastrum hooveri*), San Joaquin woollythreads (*Monolopia congdonii*), recurved larkspur (*Delphinium recurvatum*), and slough thistle (*Cirsium crassicaule*). In addition, the KWB contains habitat for several other special-status plant species (see KWBA Habitat Conservation Plan/Natural Community Conservation Plan, Volume II, Section III-1).

For the past few years, only one extant population of San Joaquin woollythreads located in the northwest ¼ of Section 7 has been observed on the KWB. This population is monitored annually by conducting site visits during the blooming period (typically late February to early April) and collecting basic data such as the number of individual plants, vigor and phenological stage at the time of the site visit. This population has varied in number from year to year, from no individuals being observed in very dry years, to as many as 200 or more in more favorable years. In 2008 this population was visited on several occasions beginning in mid-February and continuing through March and April. Only one plant was observed in 2008, and the plant did not produce any flower heads prior to senescence. San Joaquin woollythreads is an annual species that is known to be highly dependent upon adequate precipitation for germination and growth (USFWS 1998). The total precipitation was only about 29% of normal for the 2007 – 2008 rain year in the Bakersfield area. Because of the extremely low precipitation, it is not at all unexpected that germination was almost non-existent. This population is the only known extant population on the KWB and it will continue to be monitored annually; however, many other areas of suitable habitat and at least two other occurrences of San Joaquin woollythreads have previously been reported on or very near the KWB (CNDDB 2008). No new data on these occurrences have been reported since they were first described. Attempting to locate these, and other occurrences of San Joaquin woollythreads on the KWB will be a priority for the future special-status plant survey efforts, as there is a strong possibility that this species occurs in other areas of the KWB.

Two occurrences of recurved larkspur have been reported in one of the Sensitive Habitat areas of the KWB in the southern ½ of Section 36, north of Taft Highway and west of Interstate 5. This area was visited again in 2008 during March and April but no recurved larkspur was observed. An expanded search for this species at this location and at other suitable locations will be put forth in future years, especially when precipitation levels are at or above normal.

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United States Fish and Wildlife Service. 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.

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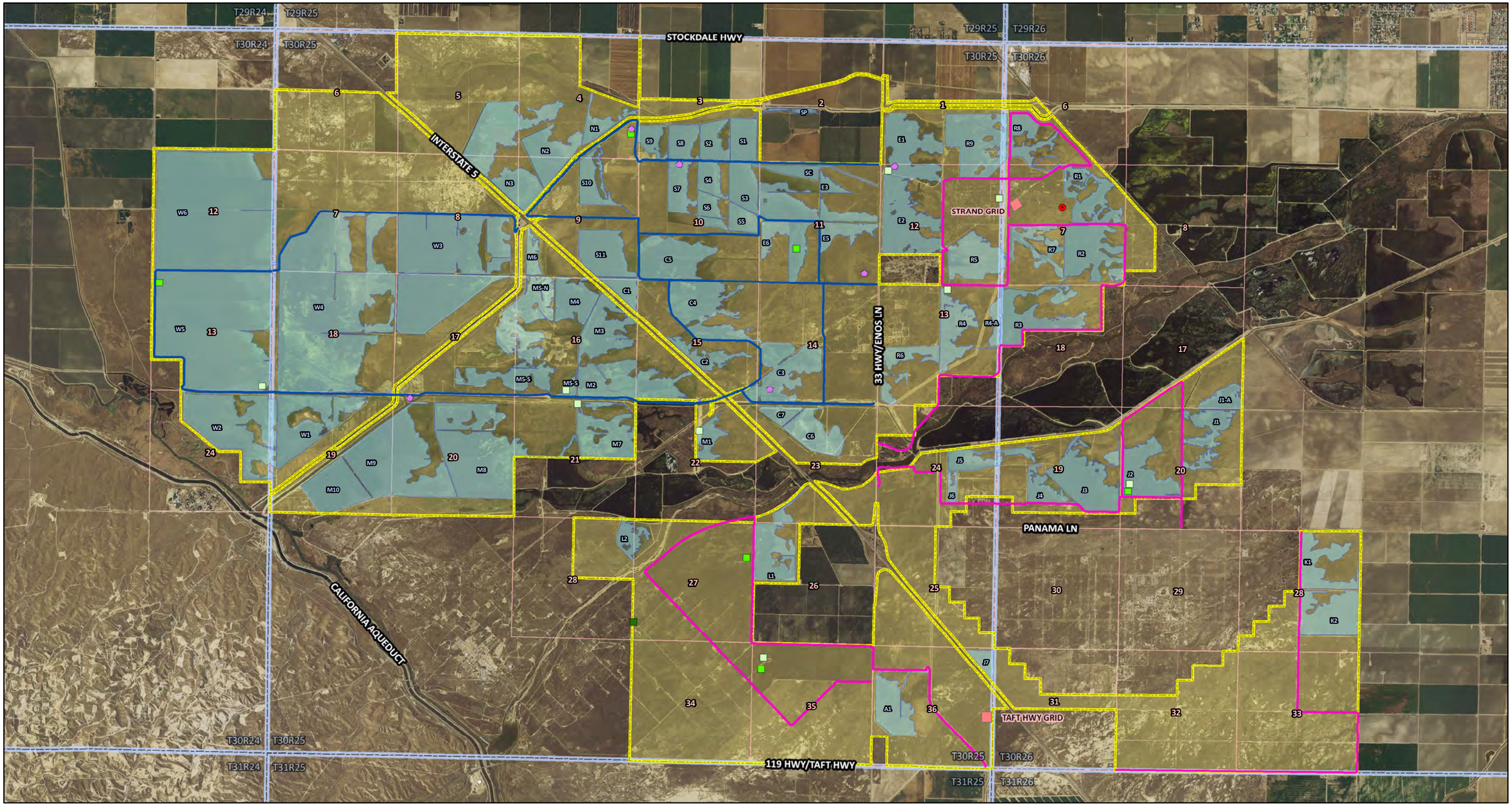
KERN WATER BANK BIOLOGICAL MONITORING



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- SAN JOAQUIN KIT FOX OBSERVATION
- BOBCAT OBSERVATIONS
- COYOTE OBSERVATIONS
- TWO COYOTE OBSERVATIONS
- THREE COYOTE OBSERVATIONS
- SPOTLIGHTING ROUTE - EAST
- SPOTLIGHTING ROUTE - WEST
- TRAPPING GRIDS
- BASINS
- KWB PROPERTY BOUNDARY

LIVE OAK ASSOCIATES, INC.

FIGURE 1

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SOURCE: USGS/KWBA/LOA

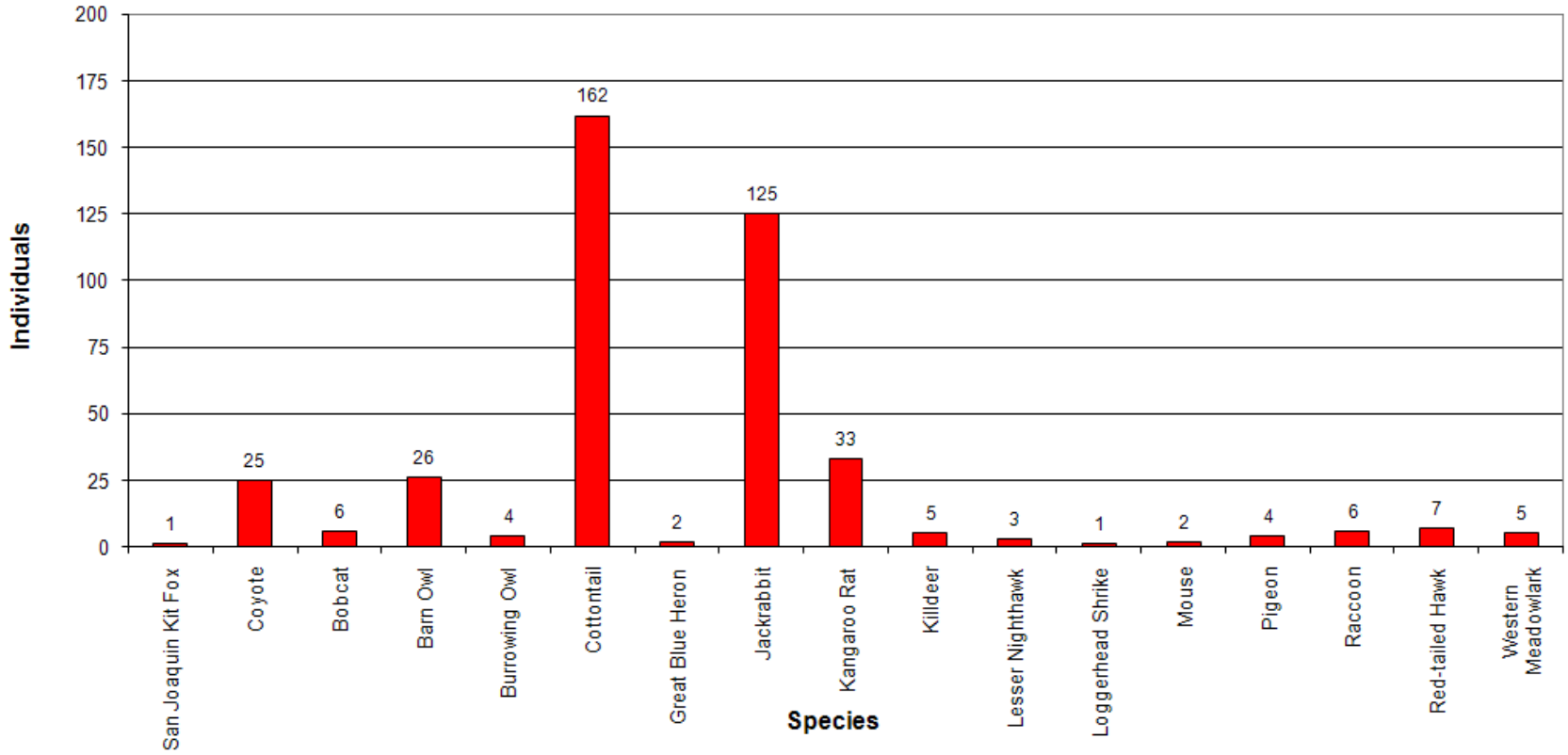

Figure 2. Nighttime spotlighting survey results 2008

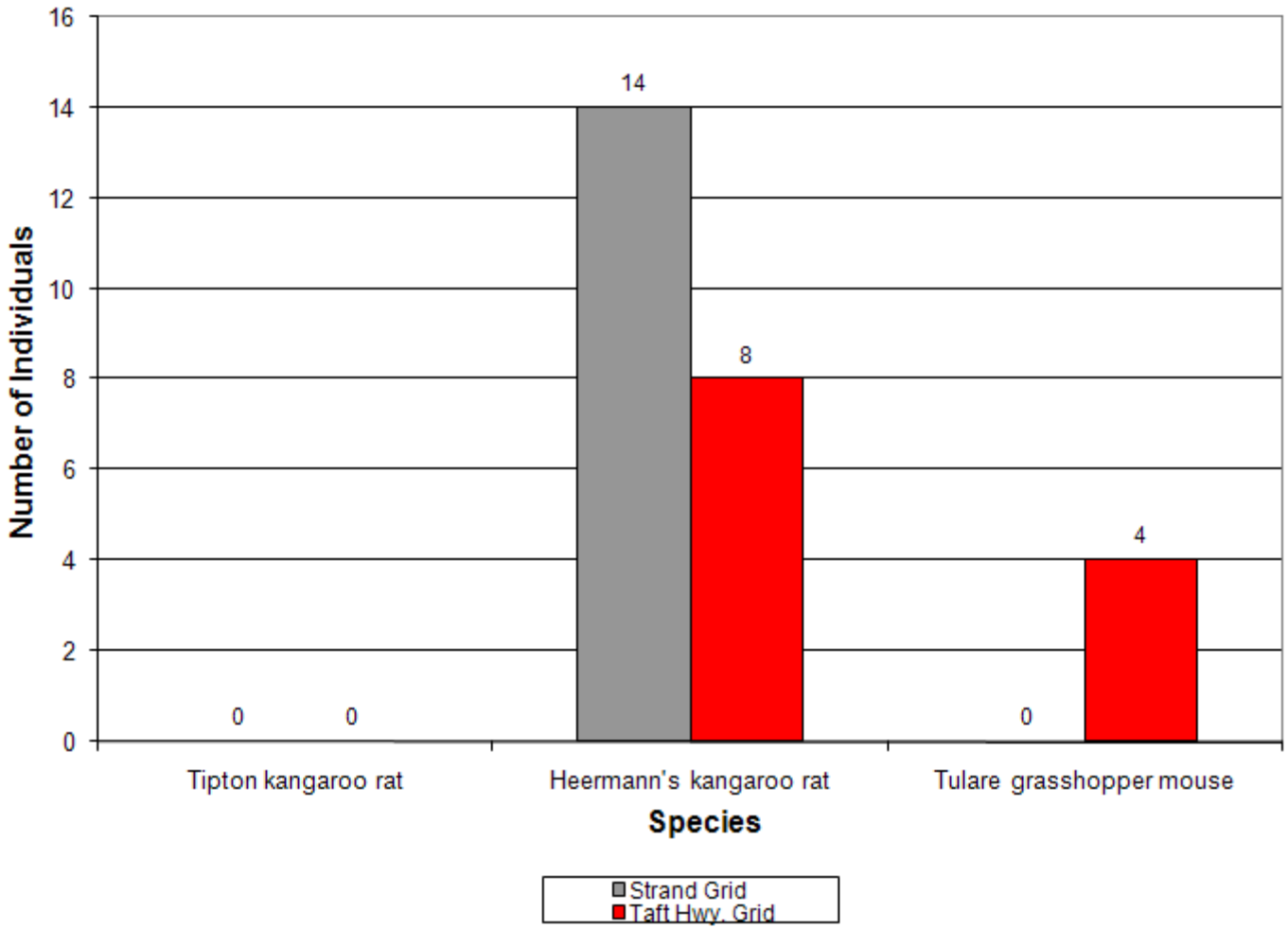

Figure 3. Tipton kangaroo rat monitoring results 2008