

JUN 16 2017

College of Natural Resources & Sciences
Humboldt State University

HUMBOLDT STATE UNIVERSITY

INSTITUTIONAL ANIMAL CARE AND USE PROTOCOL FOR THE HUMANE CARE AND USE OF LIVE VERTEBRATE ANIMALS

This box is for the review of the use by the Institutional Animal Care and Use Committee.
Authors should not write or type inside the borders of the box.

Date 1st Received: 6/6/17 Revision 1 Date: 6/13/17 Revision 2 Date: 6/16/17 No. 16/17.W.96-1A

- () E- Procedures are exempt from full IACUC review because they are purely observational, non-invasive, and produce no perceptible discomfort or they concern only the use of tissues from dead animals. To be considered exempt, tissues from dead animals must be obtained from animals euthanized or otherwise killed by means, and for purposes, unrelated to the proposed project. The procedure may be approved by the Chair one additional member of the IACUC.
- ☒ A- Procedures will be minimally invasive or produce relatively little discomfort. Protocols may involve, bleeding, injections, minimal sampling, anesthesia or humane euthanasia without prior invasive manipulation. The procedure may be approved by the Chair and two additional members of the IACUC. Project topics will be reviewed by the IACUC at the next scheduled meeting.
- () B- Procedures will involve prolonged manipulation or be invasive. Protocols may involve surgical or other stimuli inducing pain or distress, but all pain or distress will be mitigated with appropriate anesthetics or analgesics. The procedure may be initially approved by the Chair, the Campus Veterinarian and one additional member of the IACUC. Protocols will be reviewed by the IACUC at the next scheduled meeting.
- () C- Procedures will be invasive and may cause prolonged physiological or psychological stress. Pain, considerable distress, or discomfort may be induced and not mitigated by anesthesia or adequate analgesia (e.g. LD50 experiments, long-term food or water deprivation, etc.). These protocols will be reviewed thoroughly by the IACUC prior to commencement of the project.

Requires Health Assurance ☒ Yes () No

Richard D. Brown 6/15/17
Signature, IACUC Member Date

☒ Approved () Denied

Quintrell for Gretchen Ziesler 6/15/17 - email approval
Signature, IACUC Member Date

☒ Approved () Denied

Signature, Campus Veterinarian (if necessary) Date

() Approved () Denied

F. W. Ziesler 6-16-17
Signature, IACUC Chair Date

() Approved () Denied

Final Committee Decision. All protocols must be approved prior to the start of research.

Protocol Edition 2/15/2017

JUN 16 2017

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INSTRUCTIONS

Federal animal welfare regulations require that an Institutional Animal Care and Use Committee (IACUC) review and approve all activities involving the use of vertebrate animals prior to their initiation. This includes any animals used for the development of experimental methodologies, instructional purposes, research, etc. Approved protocols for ongoing and recurrent activities must be reviewed by the IACUC on an annual basis. However, extensions and amendments requiring an abbreviated application process may be granted for a total of three consecutive years. Compliance with animal welfare regulations is mandatory and is the responsibility of all individuals (including faculty and students) who choose to work with live vertebrate animals.

To avoid the proliferation of submissions, please provide generic descriptions (including multiple routes of compound administrations, minor procedural variations, similar laboratory exercises from a single course, routine exercises used in several courses, etc). When multiple vertebrate species are to be used, please clearly describe all procedures, and all variations thereof, to be used with each individual species.

Please submit your protocols to the Dean's Office, College of Natural Resources and Sciences, Forestry Bldg, Room 101. All protocols should be submitted on the most recent version of the forms downloaded from the IACUC web page (<http://www.humboldt.edu/iacuc>). You can expedite the review process by following these formatting rules: leave an extra blank line between the questions and your responses; leave questions in bold-face type; type your answers in regular (non-bold) type; and do not delete anything from the questions. Please contact the Campus Veterinarian, Dr. Rick Brown, (by phone, 826-3320, or e-mail, RBrown@humboldt.edu) or the Chair of the IACUC, Dr. Rick Zechman (by phone, 826-3546, or by email Rick.Zechman@humboldt.edu) with questions concerning protocol preparation and submission.

- ♦ Please allow ten working days for review of proposals to conduct minimally invasive procedures and an excess of one month for review of proposals to conduct invasive procedures; note that these time periods are minimal and assume that no revisions will be necessary prior to approval. ALWAYS verify approval (Office of the Chair of the IACUC; 826-3256) before starting your project. Authors of protocols should contact the Campus Veterinarian, the Chair of the IACUC or Violet McCrigler in the CNRS Dean's Office, if they haven't heard any news after 10 days following protocol submission.



Julie Tucker <jlt7002@humboldt.edu>

Time sensitive fwd: IACUC revisions - 16/17.W.96-A

Gretchen Ziegler <gziegler@ci.eureka.ca.gov>
To: Julie L Tucker <julie.tucker@humboldt.edu>
Cc: Richard N Brown <richard.brown@humboldt.edu>

Fri, Jun 16, 2017 at 2:18 PM

OK, I am fine to sign off this version as well. J

Gretchen Ziegler
Zoo Director
Sequoia Park Zoo
707-441-4227

From: Julie L Tucker [mailto:julie.tucker@humboldt.edu]
Sent: Friday, June 16, 2017 1:24 PM
To: Gretchen Ziegler <gziegler@ci.eureka.ca.gov>
Cc: Richard N Brown <richard.brown@humboldt.edu>

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1. **Faculty Project Leader:** William Bean

Department Affiliation: Wildlife

2. **Project Title:** Range-wide giant kangaroo rat monitoring and population genetics

3. **Email address(es) of the Faculty Project Leader and other corresponding applicants:**

bean@humboldt.edu

4. **Names of others handling live animals in the absence of, or not directly supervised by, the faculty project leader, and their qualifications to perform the procedures indicated. (Do not include class rosters here - see 8 below):**

Alyssa Semerdjian – graduate student in Bean's lab. Alyssa has worked with small mammals for 4 field seasons, 3 of which took place in the Carrizo Plain National Monument. She has handled several hundred giant kangaroo rats and a variety of other small mammal species. Bean has observed her handling animals and trained her on genetic sampling techniques before allowing her to work independently.

Ivy Widick – graduate student in Bean's lab. Widick worked with giant kangaroo rats under the previous protocol during summer of 2016 after receiving extensive training from Bean. She has worked trapping small mammals since 2013.

5. **Will the described project be funded?** ☒ Yes ☐ No

If funded, will the funds be administered by the HSU Sponsored Programs Foundation (SPF)?

☒ Yes ☐ No

If funded, but not administered by the HSU SPF, then list the unit that will administer the funds:

Click or tap here to enter text.

6. **Proposed starting date (the starting date cannot precede date of approval, and all protocols must be renewed or extended annually).** The Annual Protocol Review Form must be approved on or before the anniversary of the approval date to indicate termination of the project or to request extension of the dates of approval.

Upon IACUC approval

7. **Provide a brief, non-technical, description of the project. Your response should include the proposed goals, general methods, and educational or scientific objectives that the proposed use is designed to meet.**

The main goal of this project is to collect genetic samples (via hair tufts) of giant kangaroo rats. Giant kangaroo rats are a state- and federally-endangered rodent endemic to the Coast Ranges of California, and western edge of the San Joaquin Valley. In the Ciervo-Panoche Natural Area, giant kangaroo rats occur in small populations of approximately 10-200 individuals. Many of these populations occur on private land. A key criterion for down-listing giant kangaroo rats to "threatened" is to protect remaining

habitat in the Ciervo-Panoche Natural Area to ensure that this population persists. By collecting genetic samples, we will estimate the relatedness of individual sub-populations within the Ciervo-Panoche, which will further allow us to identify the sub-populations most important for long-term persistence.

A secondary goal of this project is to monitor giant kangaroo rat density and distribution throughout their range. To do so, we will trap at up to 75 potentially occupied sub-populations to determine whether giant kangaroo rats are present. In addition, at select sites throughout their range, we will mark individual rats with non-toxic, Monel #1 aluminum ear tags in order to estimate density.

8. Is the primary purpose of the project for ☐ instruction, ☒ research, or ☐ both?

Based on your answer, please address the relevant questions below.

If the primary purpose is for instruction, list the course number and write the CRN for this semester (note that this CRN will need to be updated with any future offering of the course covered by this protocol).

Course # (e.g. ZOOL 356): Click or tap here to enter text.

CRN: Click or tap here to enter text.

Will all of the enrolled students in the course denoted by the CRN above participate in the use of animals covered by this protocol? ☐ Yes ☐ No

If no, then provide a list of the students exposed to, or otherwise using, live vertebrate animals.

Click or tap here to enter text.

Describe the learning objectives that justify 1) the use of, and 2) duplication of procedures involving, live animals for instruction.

Click or tap here to enter text.

If the primary purpose is for research, explain how you determined that this protocol does not unnecessarily duplicate previously published observations or experiments; please include:

1. **the type of literature searches conducted:**

We searched Web of Science and Google Scholar

2. **keywords used:**

"dipodomys ingens" OR "giant kangaroo rat"

3. **range of dates searched:**

After 1900; searches were performed initially in 2007-2008 and have been updated since then with keyword alerts

4. **other resources used:**

A full literature review of previous giant kangaroo rat research conducted by Bean demonstrated the novelty of this research. Literature review was performed in 2007-2008 using Web of Science, and keywords "Dipodomys ingens", with additional literature identified from forward- and backward-reference lists. Bean is aware of more recent research since 2008 via a Google Scholar e-mail update for keywords "Dipodomys ingens." The population genetic research proposed is a novel attempt to understand connectivity among giant kangaroo rat populations. Initial work by Good et al.

(1997) and Loew et al. (2005) used only a handful of microsatellite markers, and fewer than 50 samples from our study area. While this research confirmed high levels of genetic diversity among populations of giant kangaroo rats, they were not able to resolve sub-population structure within the Ciervo-Panoche Natural Area. Further, the on-going monitoring work will provide novel insights into giant kangaroo rat demography in response to climate variability. Since 2012, Bean has maintained a number of keyword search alerts for giant kangaroo rat research, including the keywords listed above, and he is generally aware of other biologists working on this species and their research.

9. Will any of the animals described in this protocol be housed in an animal facility?

☐ Yes ☒ No

If yes, check the appropriate facility below:

- ☐ Biological Sciences Animal Rooms
- ☐ Fish Hatchery
- ☐ Samoa Aquaponics
- ☐ Telonicher Marine Lab
- ☐ Wildlife Pens
- ☐ Zebra Fish Development Lab
- ☐ Other. Please list: Click or tap here to enter text.

9a. Facility managers must be consulted prior to submitting protocol form. Please enter the date the manager was consulted: Click or tap here to enter text.

10. Scientific name, common name, and characteristics of all species to be used. List species separately to explain variation in use. Please also list the total numbers of animals to be used or substantially affected by this project.

For field studies, please list all target species and note their status (not protected = NP; protected, including species of special concern or candidate species = P; considered by the state or federal government to be threatened = T, considered by the state or federal government to be endangered = E); also list non-target species that are likely to be impacted. List the range of numbers of individuals to be used for each species.

TARGET SPECIES - please attach additional pages if needed

Latin Binomial(s)	Common name(s)	Sex	Age or Wt Range	Status	Numbers
See attached	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.

Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.	Select One	Click or tap here to enter text.

NON-TARGET SPECIES – *please attach additional pages if needed*

Latin Binomial(s)	Common name(s)	Status	Numbers
<i>Peromyscus spp.</i>	Deer mouse, brush mouse, pinyon mouse	NP	100
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Select One	Click or tap here to enter text.

- 11. Explain why a smaller number would not allow you to meet your objectives (please provide justification based on statistical or other logical reasoning). If this is a field project, and you cannot predict the exact number of animals to be sampled, please give your best estimate and an explanation of the variables that will determine your sample size. N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.**

The main goal of this study is to assess relatedness and connectivity among sub-populations in the Ciervo-Panoche Natural Area and across their range. Our research is mostly dictated by the number of sites at which we have to trap, and a minimum number of trapping nights at each site. In order to describe their full range, we must trap in multiple locations in multiple counties. We have estimated the expected number of individuals to trap based on our previous research.

- 12. Source of the animals (or tissues) to be used for captive studies or the location of study area(s) for field studies. For transportation, storage, and use of tissues from carcasses, explain the circumstances of death. If this information is unknown, provide the name and contact information for the person or company from which the samples are to be obtained.**

The main study area is the Ciervo-Panoche Natural Area, located in and around Panoche, CA, in eastern San Benito County and western Fresno County. A small amount of sampling will also occur in the Carrizo Plain, California, in eastern San Luis Obispo County, and the Kettleman Hills, western Kings County, California.

13. Will live vertebrate animals be maintained in captivity for greater than 12 hours?

☐ Yes ☒ No

If yes, describe where and how the animals will be housed (include all relevant husbandry details):

Click or tap here to enter text.

Who will be responsible for their daily care?

Click or tap here to enter text.

14. List the specific procedures likely to affect the behavior, physiology or wellbeing of live animals.

Live trapping and handling of small mammals using Sherman live traps

15. Mark the level of expected pain or distress caused by your methods below.

- ☐ The methods described are purely observational and non-invasive OR will involve only the tissues or carcasses of dead animals; behavior of live animals will not be influenced intentionally.
- ☐ The methods will affect behavior, but no animals will be captured or handled (e.g. baiting animals, cameras in close proximity to animals, production of noises within normal limits of volume and frequency)
- ☐ The methods involve capture or handling without anesthesia, but only for a brief period for measurement or observation. No samples will be collected.
- ☒ The methods involve capture or handling without anesthesia, and routine samples (hair, blood, etc.) will be collected or euthanasia will be performed; this may involve use of routine pharmaceuticals to promote health (e.g. antibiotics, vitamins, fluids). This work may also involve temporary marking, placement of permanent tags, or fitting with telemetry transmitters or GPS receivers.
- ☐ The methods require use of anesthesia to mitigate distress or facilitate handling, and routine samples (hair, blood, etc.) will be collected or euthanasia will be performed. As above, this work may involve temporary marking, placement of permanent tags, or fitting with telemetry transmitters or GPS receivers.
- ☐ The methods require use of anesthesia to mitigate pain or distress, and procedures will be invasive enough to require pain killing drugs (analgesics) upon revival. Sampling and marking may be performed as above.
- ☐ The methods will cause pain or considerable distress, but analgesics will not be used to mitigate the pain (e.g. surgeries from which animals are revived without provision of

analgesics).

- ☐ The methods will be invasive and cause prolonged physiological or psychological stress without adequate mitigation of pain or distress. This may involve allowing animals to progress to death without provision of euthanasia or analgesia (e.g. LD50 experiments or long-term food or water deprivation).

16. Provide a complete and detailed description of all procedures to be performed involving live vertebrate animals. This response should justify comments made in # 13-15 and provide a detailed explanation of all procedures that affect animal behavior, physiology or wellbeing. Your response must address the handling and restraint of animals; deprivation of food or water; use of chemicals or biological agents; sampling methods for removal of biological samples; surgical and post-surgical procedures. N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.

Monitoring and genetic sampling will consist of three trapping designs. In order to produce estimates of density comparable to an existing project at UC-Berkeley, we will set 61 traps each at 8 sites across giant kangaroo rat range. Traps will be set 10 m apart in a checkerboard fashion, and trapping at each site will take place for three consecutive nights, once per year. All animals will be processed and released as quickly as possible at the site of capture.

In order to collect genetic samples, and determine presence/absence of giant kangaroo rats at each subpopulation, we will set between 5 and 30 traps on top of active burrows. Trapping will occur for 3 to 5 nights at each site.

In order to monitor giant kangaroo rats throughout their range, we will set 15 traps in grids throughout their range in areas with suspected colonies. We will also set between 5 and 10 track plates in areas with suspected colonies. Trapping will occur for 3 to 4 nights at each site.

Extra-long Sherman traps, with the door bent back slightly, or with a gap at the top to allow space for giant kangaroo rat's tails, will be set at dusk, baited with white millet, and stuffed with a small paper towel to provide insulation. We will begin to check traps at midnight, with all traps closed before sunrise. Trapping will not take place in inclement weather (in the unlikely event of precipitation, or if temperatures are predicted to drop below 7°C). We will then perform following tasks on each captured individual:

- release individual from Sherman trap into cotton bag or 1 gallon Ziploc bag
- apply non-toxic aluminum #1 Monel ear tag to right and left ear, or mark either the left or right hind foot with a non-toxic permanent marker if newly-captured
- weigh, age, sex and check for presence of ectoparasites
- measure length of skull and length of hind foot
- collect two hair tufts, of approximately 10-20 hairs each, from the haunches of each individual captured

Individuals that are re-captured during the same trapping session will be weighed, and we will record their tag, then release them. For individuals captured in a previous trapping session but not captured in the current season, we will take all measurements but not a hair tuft. Trapping methods have been approved by the United States Fish & Wildlife Service in an endangered species recovery permit, a Memorandum of Understanding from the California Department of Fish & Wildlife, and conform to standards set by the American Society of Mammalogists (Sikes et al. 2011).

17. Use of animals for teaching or research requires consideration of alternative procedures to reduce the number of animals used and the pain and suffering caused by animal use. Explain how you determined whether alternative procedures were feasible for your study.

Please refer to the Altweb website (<http://altweb.jhsph.edu/resources/searchalt/>), which provides

links links to search engines and provides general information on alternatives, for help in searching for alternatives to animal use.

1. the type of literature searches conducted:

Searched Altweb website for non-animal alternatives to this research

2. keywords used:

We searched separately for keywords "genetic sample", "genetic sampling", "permanent marker", "small mammal", "kangaroo rat", "kangaroo rats", "ear tag" and "ear tags"

3. range of dates searched:

all dates up to day of submission (Jun 14 2017)

4. other resources/methods used to determine alternative procedures:

We relied on guidelines from the ASM and consultation with U.S. Fish & Wildlife Service to determine appropriate methods for trapping and collecting genetic materials

18. Describe alternative procedures that were considered and rejected and a brief explanation of why the alternative procedures were rejected. N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.

We have considered relying solely on non-invasive survey methods for giant kangaroo rats (e.g., sign surveys), however previous research determined (Bean et al. 2012, Wildlife Society Bulletin) that this was an unreliable approach to determining GKR population size and distribution. In order to understand connectivity and demography between sub-populations, we considered using radio collars on individual rodents to assess movement between sub-populations. The expense of this approach, coupled with low emigration rates, made it unfeasible. Further, previous experience with attaching radio collars to giant kangaroo rats suggested a much higher level of discomfort than the temporary discomfort of removing hair tufts. We also considered a greater use of mark-recapture estimates at multiple sites to identify sources and sinks, however again the costs prohibited this approach. In addition, the number of rats that would need to be captured, handled, and ear-tagged, would likely be an order of magnitude higher than the number required for a population genetics approach. We also considered using an expert-driven landscape model of connectivity, however experience with these models suggests they are rarely accurate, or provide a low level of resolution in understanding connectivity between populations.

19. Identify serious human health risks (non-routine exposures to risk, disease agents, toxic chemicals, dangerous environmental conditions, etc.,) to which any participants might be exposed during the routine performance of the duties proposed herein.

The major risk in this study is the use of old, unmaintained roads on remote, public lands. All participants will take required driver safety training through HSU and follow proper safety procedures. In addition, they will be provided with a handheld radio to communicate with local Bureau of Land Management staff in the event of an emergency. The field crew will be expected to check in every morning to confirm they arrived safely back at their trailer, and staff from Bureau of Land Management will be notified if no contact has been made. An additional concern is the potential transmission of Hantavirus in this area. However, deer mouse prevalence is quite low, and to our knowledge there are no known records of transmission from kangaroo rats to humans. We therefore do not expect to use respirators, however individuals will be advised to keep their head away from traps while checking them and to use hand sanitizer regularly. Deer mice will not be targeted for trapping and, if captured, will be released immediately without handling.

Describe steps taken to mitigate risks.

See above

20. Describe the fate of the animals upon completion of the protocol. Include (1) the procedure for euthanasia whether necessary as an experimental termination or in the case of unanticipated, accidental, injury whenever animals will be confined or handled and (2) the method of verification of death. Chemical euthanasia methods must include an appropriate, pharmaceutical-grade, drug, the route, and the dose to be used. Applicants should review the current Guidelines for Euthanasia (or its replacement in the Code of Federal Regulations), and justify any variations from the approved methods. Note that the Responsible Faculty Member must report unexpected deaths to the IACUC immediately and that N/A is an inappropriate response unless the protocol covers only the transportation, use, and/or storage of carcasses or tissues.

All animals will be released after capture. In over 9,000 trapping nights conducting very similar work between 2010-2016, Bean has had no trap mortalities or injuries. In the event of an unanticipated major injury, animals will be anesthetized by placing them in an enclosed glass jar with 1-2mL of isoflurane applied to cotton balls for 5-10 minutes, followed by euthanasia with cervical dislocation, following established guidelines for euthanasia of small rodents. We will observe animals for signs of life for several minutes following application of these procedures to ensure euthanasia. Isoflurane will be obtained in accordance with state and federal law in collaboration with Dr. Rick Brown, Department of Wildlife.

21. I certify by checking each of the boxes below, that all of the following are true:

- ☒ I have read and agree to abide by the "Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training at HSU," and that I will make copies of these principles and other pertinent guidelines available to those persons who work under my supervision, and that deviations from this protocol, including any unanticipated injuries or death of animals, will be reported *immediately* to the IACUC.
- ☒ My level of supervision will be such that the procedures outlined in this protocol will be carried out in a humane and a scientifically acceptable manner as described herein.
- ☒ I take responsibility for the conduct of anyone working under this approved protocol, and I will supervise the research to ensure that no work is conducted that is not covered herein or in a separate approved protocol.
- ☒ I will ensure that no work described in this protocol will begin until the protocol has been fully approved by the IACUC, and that I will adhere to all deadlines and procedure outlined in the HSU ANIMAL WELFARE ASSURANCE in accordance with the PHS Policy for Humane Care and Use of Laboratory Animals.
- ☒ I am aware that my research might require permits from federal and/or state agencies that regulate the harassment, capture, transport, captive maintenance, handling and manipulation of live vertebrate animals.
- ☒ My research will be conducted in accordance with all relevant federal and state laws.
- ☒ My study does not unnecessarily duplicate previous studies using live vertebrate animals, as determined through literature database searches.
- ☒ I have considered the use of less invasive procedures, use of fewer numbers of animals and have determined that the methods proposed in this protocol are justified for the research and/or instructional objectives described herein.

I am aware that the following Acts apply to my study (check all that may apply):

- ☒ [Animal Welfare Act](#)
- ☒ [State of California Fish and Game Commission](#) (Title 14) - Scientific Collecting Permit(s)
- ☒ [Endangered Species Act](#)
- ☐ [Fishery Conservation and Management Act](#)
- ☐ [Lacey Act](#)
- ☐ [Marine Mammal Protection Act](#)
- ☐ [Convention on International Trade in Endangered Species of Wild Fauna and Flora](#)
- ☐ Other: please list Click or tap here to enter text.



Signature, Responsible Faculty Member

6/17/17

Date

Latin binomial	Common name	Sex	Age or Weight Range	Number
** <i>Dipodomys ingens</i>	Giant kangaroo rat	Both	All	500
<i>Dipodomys heermanni</i>	Heermann's kangaroo rat	Both	All	300
<i>Dipodomys venustus</i>	Narrow-faced kangaroo rat	Both	All	75
<i>Dipodomys inornatus</i>	San Joaquin pocket mouse	Both	All	250
<i>Perognathus californicus</i>	California pocket mouse	Both	All	50
<i>Chaetodipus nelsoni</i>	Nelson's antelope ground squirrel	Both	All	10
* <i>Ammospermophilus nelsoni</i>	Dusky-footed woodrat	Both	All	5
<i>Neotoma fuscipes</i>	Southern grasshopper mouse	Both	All	60
<i>Onychomys torridus</i>				

***Federally and state endangered

*State threatened

