Monitoring for Preble's Meadow Jumping Mice Along
Goodhue and Davidson Ditches Off South Boulder Creek

Meaney & Company
2 March 2000

Cary Richardson
City of Boulder Open Space
7315 Red Deer Road
Boulder, CO 80301

Dear Cary:

This letter serves as an addendum to the report entitled "Monitoring for Preble's meadow jumping mice along South Boulder Creek and four ditches" which was submitted to you in November 2000. In this letter I would like to address the management recommendations and suggestions for future research as related to Preble's meadow jumping mice along South Boulder Creek and affiliated ditches. These comments should be considered within the context of the fact that the land use management strategies employed by City of Boulder Open Space and Mountain Parks in the past 20 or more years appears to have done an excellent job of supporting mouse populations along the creek and affiliated ditches.

Management Recommendation

Because of the clear evidence of intensive use by jumping mice of East Boulder Ditch and Enterprise Ditch, we suggest that care be taken with timing and extent of maintenance activities on these two ditches in particular as well as similar ditches with good habitat (see below). Specifically, we suggest that any maintenance work on the ditches avoid the active season and be conducted during the hibernation season, between November 1 and April 30. Risks to the mice at this time should be reduced, however care must be taken that dense stands of shrubs be safeguarded to the extent possible, as mice could be hibernating there. Maintenance activities on the ditches should be limited to the minimum needed to maintain flow and avoid changes to the character of the ditches in terms of vegetation. It is very important to maintain the complex vegetation structure, including dense stands of shrubs and the mixture of forbs and shrubs.

The ongoing weed management activities are to be encouraged. Cattle grazing, at current rates, appears not to cause problems in the northern half (north of South Boulder Road);
however, in the southern portion I recommend keeping the cattle out of the riparian corridor to facilitate willow and other shrub development there as occurs in the north.

**Future Research Needs**

We suggest continuing to evaluate potential use of other ditches by mice; in particular Goodhue and Davidson ditches appear to have good habitat for jumping mice and would be well worth surveying in order to more clearly determine the pattern of ditch use by jumping mice along the South Boulder Creek floodplain area. A large data gap has to do with where jumping mice hibernate both along ditches and in the wide floodplains of Boulder County in general, and South Boulder Creek in particular. This data gap leaves year round land use management for this species as a guessing game rather than relying on empirical data. Radio-telemetry is the best technique to answer these types of questions.

The ongoing population monitoring has been extremely useful in clarifying the fact that while these mice may fluctuate widely at a particular point in time and space, the overall population has maintained some degree of stability. We recommend continuing with this work.

Please feel free to contact me with any questions or issues you might like to discuss.

Sincerely,

*Carron Meaney*

Research Associate,  
Denver Museum of Natural History and Curator Adjoint, University of Colorado Museum
MONITORING FOR PREBLE'S MEADOW JUMPING MICE

ALONG

GOODHUE AND DAVIDSON DITCHES
Off
SOUTH BOULDER CREEK

Meaney & Company
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Prepared for City of Boulder Open Space and Mountain Parks
66 S. Cherryvale
Boulder, Colorado

14 September 2001
INTRODUCTION

There has been much interest in the use of irrigation ditches by Preble’s meadow jumping mice (Zapus hudsonius preblei) in Boulder County and elsewhere. These small mammals are restricted to riparian corridors along the Front Range in Colorado, and certain ditches appear to provide the necessary habitat, whereas others do not. The type specimen for the subspecies was collected along an irrigation ditch near Loveland, Colorado, and in the course of population studies of the subspecies along South Boulder Creek over a number of years (Meaney et al. 2001, Meaney et al. 2000), we have found them in certain ditches but not in others. We had noted that suitable habitat for Preble’s meadow jumping mice existed along two additional ditches. The present survey evaluated these two additional ditches that come off of South Boulder Creek for the presence of these mice: Goodhue and Davidson Ditches. Whereas the previous three years of small mammal research utilized mark-recapture techniques, the present study was a presence/absence survey.

SITE DESCRIPTION

Goodhue and Davidson Ditches take water from South Boulder Creek. Goodhue Ditch is dated from 1873, and is thus a very junior ditch. Davidson Ditch has its head gate at Eldorado Springs Road, and is also a very junior ditch. Thus both ditches carry water for a relatively short period, as all senior ditches must be satisfied before water can be made available to the more junior ditches. We trapped both ditches on the City of Boulder Open Space and Mountain Parks property east of Cherryvale Road (Figure 1). A large irrigated pasture separates the two ditches.

Both ditches are well vegetated with a combination of trees, shrubs, forbs, and adjacent grasses. The ditches have an overstory of cottonwoods (Populus deltoides), and boxelder (Negundo aceroides), with some Russian-olives (Elaeagnus angustifolia) mixed in. The shrub component contained willow (Salix exigua), leadplant (Amorpha fruticosa), snowberry (Symphoricarpos occidentalis), chokecherry (Padus virginiana), and skunkbrush (Rhus trilobata). Forbs include mullein (Verbascum thapsus), dandelion (Taraxacum officinale), wild rose (Rosa woodsii), yarrow (Achillea sp.), poison ivy (Toxicodendron rydbergii), curly dock (Rumex crispus), and lupine (Lupinus sp.). Grasses include dropseed (Sporobolus sp.), little bluestem (Schizachyrium scoparium), western wheatgrass (Pascopyrum smithii), and horsetail (Equisetum sp.).

METHODS

To continue the trapping schedule we had followed the past four years, and for better comparison, we conducted trapping the third week of June. On Goodhue Ditch, 148 traps were placed; and on Davidson Ditch, 147 traps were placed; this is a total of 1180 trap nights. All captured small mammals were identified, sexed, and marked with ink or hair-clipping. Jumping mice were sexed, aged, weighed, and color-marked so that we could
keep track of the specific individuals and their recaptures. All jumping mice were aged as adults due to the June capture date at which time only adults are found (Nichols and Conley 1982).

This survey was conducted in accordance with U.S. Fish and Wildlife Service "Interim Survey Guidelines for Preble's Meadow Jumping Mouse", revised June 15, 1998. Transects were laid out as one line of traps, on the conjoining side of each of the two ditches. On each transect line, traps were placed 5 m apart, and tagged and numbered with survey tape. Polyester batting and bait (horse sweet feed, a mixture of oats and other grains with molasses) were placed in each trap.

Traps were placed out on the afternoon of 18 June 2001; they were checked at 6:30 A.M. each morning for four mornings, and closed after processing any small mammals captured. They were reopened around 5:00 P.M. each afternoon, and run through 22 June. Closing them during the day results in reduced mortality as no animals are held captive during the warm days or through a 24-hour period. Protocol followed the "Acceptable field methods in mammalogy: preliminary guidelines approved by the American Society of Mammalogists" (Journal of Mammalogy, Supplement to Volume 68, No. 4, 1987).

RESULTS AND DISCUSSION

On Goodhue Ditch, 31 small mammals representing three species were captured: 5 house mice (Mus musculus), 12 deer mice (Peromyscus maniculatus), and 14 Preble's meadow jumping mice (Table 1). On Davidson Ditch, 23 small mammals representing four species were captured: 2 meadow voles (Microtus pennsylvanicus), 19 deer mice, 1 western harvest mouse (Reithrodontomys megalotis), and 1 Preble's meadow jumping mouse (Table 2). With both ditches combined, there were a total of 77 captures (54 individuals and 23 recaptures). Out of 1180 trap nights, the capture rate is 6.5 percent. Jumping mice represented 32 percent of the captures on Goodhue Ditch and 2 percent of the captures on Davidson Ditch, or 21 percent of captures for both ditches combined, a high proportion.

This study shows that Goodhue Ditch is very much occupied by Preble's meadow jumping mice. With only one capture, Davidson Ditch is less clear. We know from the studies along South Boulder Creek that a given site can be occupied one season but not the next (Meaney et al. 2000). Thus it is unclear at this time whether Davidson would be intensely occupied in a subsequent year, or is only used occasionally as was the case in June this year. It is interesting that, considering only native small mammals, the occupied Goodhue Ditch had only two species of small mammals whereas Davidson Ditch had four.

Capture rates appear to be low this year, as we have found in the montane portions of Boulder County and in Pike National Forest (Meaney & Company 2001a, Meaney and Company 2001b). Similar low capture rates were found this year as well in Comanche
National Grassland (Cheri Jones, personal communication). Although the exact reasons for this are not known, it may be due to a dry summer in 2000 combined with low snow cover over the winter and a late, wet snowstorm in June 2001. Furthermore, small mammals are known to fluctuate in numbers in time and space.

In 2000, we captured 35 jumping mice on Enterprise Ditch with only 50 traps (200 trap nights), and 15 animals on East Boulder Ditch, also with 50 traps. No small mammals were captured on Shearer Ditch and only 7 deer mice were captured on Marshalville Ditch. The captures of jumping mice were lower on Goodhue and Davidson Ditches than on Enterprise or East Boulder Ditches, although this is difficult to compare in light of the comparison across different years.

All of the jumping mice captured were adults, as juveniles would not be surface-active yet and are typically not caught prior to July 7 (Nichols and Conley 1982). The details for each of the 15 individuals are shown in Table 3. The first individual captured, a male, weighed only 12 g. This low weight for an adult is indicative of weight loss during hibernation that has not yet been regained since emergence. Of the 15 jumping mice caught, there was only one recapture, itself a low rate. Most (11 of 15) were reproductive, indicated by descended testes for the males or nipples visible for the females.

In previous studies we found a pattern of intense jumping mouse use of certain ditches (East Boulder and Enterprise), and no use of others (Shearer and Marshalville). We had surmised that this was related to the seniority and concomitant flow season in the occupied ditches. However, Goodhue Ditch has a late appropriation date (1873, not senior) but is occupied. The present study indicates that other factors must also be involved.

We present potentially relevant characteristics of ditches that have been trapped along South Boulder Creek and whether they are occupied in Table 4. The occupied ditches (East Boulder, Enterprise, Goodhue, Davidson, and Dry Creek Ditches) all have the following characteristics:

- Adjacent upland grasslands
- Rich and complex plant communities
- A well-developed shrub component
- A low level of ditch maintenance

A long flow season more closely mimics a natural creek and seems likely to be an important factor. But surprisingly, two of the occupied ditches (Goodhue and Davidson) don’t have long flow seasons. Jumping mice are relatively vagile, and may well disperse when the water dries up; determination of where they go would be of considerable interest. The ditch capacity and the average, maximum, and minimum number of days of flow also are shown in Table 4, and were thought to be possible measures of flow season. However, none of these characteristics correlate well with whether a ditch is occupied.
The unoccupied Schearer Ditch has steep banks, few grasses and forbs, no shrubs, and a high water table with saturated soils. Marshalville Ditch does have well-defined banks and patches of shrubs, but the water flow is erratic and there are few grasses or forbs; the water table appears variable. We included Dry Creek Ditch (also known as New Dry Creek Carrier or New Dry Creek Ditch) in Table 4. City of Boulder Open Space staff had captured jumping mice on this ditch south of Baseline Reservoir in the mid-to-late 1990s. We conducted a presence/absence survey in 1998 and did not find them along a north-south stretch on the east side of Baseline Reservoir (Meaney 1998). In this north-south section, the banks are very steep and plant diversity is low.

In summary, the characteristics of seniority, physical ditch capacity, and number of days of flow don’t appear to be factors tied to presence of mice, at least not as stand-alone factors. Banks that are sloping rather than steep and eroded would appear to present an optimal topography, as is the case for East Boulder Ditch and at least parts of Goodhue Ditch. However, Enterprise Ditch has very steep banks and the mice were very much present. Uplands on adjacent lands with good grasses, high plant species richness and presence of shrubs appear key. Some period of saturation does not seem to present a problem. The level of ditch maintenance seems to be important; it occurs in five occupied ditches and not in the two unoccupied ones. The assessment of this characteristic was very qualitative. Development of categories to better define ditch maintenance would be of use. In this report, we gauged “low ditch maintenance” by the lack of disturbed or bare soil and the presence of well-developed vegetation.

Using the seven ditches described in Table 4, the qualities of high plant species richness, good upland grasslands with some saturation, shrubs present, and a low level of ditch maintenance appear closely tied with the presence of jumping mice. These are qualities known to be associated with good habitat. More surprising is the seeming lack of importance of a long period of flow and gently sloping banks, qualities that mimic a perennial stream. But they are not always characteristic of the occupied ditches. Thus some characteristics appear to be more predictive but others may have compensating factors. In relation to flow, it is also possible that the mice move elsewhere as the ditch dries up. Another consideration is the fact that a particular ditch may be occupied in certain sections and not in others. Dry Creek Ditch is occupied south of Baseline Reservoir, but not east of it. We are unfamiliar with what, if any, the habitat distinctions are between these two stretches of the ditch. Schearer Ditch contains some suitable habitat at its confluence with South Boulder Creek; it could well be occupied at that point but not where it was trapped just east of Cherryvale.

**MANAGEMENT AND RESEARCH NEEDS**

Because of the clear evidence of intensive use by jumping mice of certain ditches with high population estimates and capture rates, such as East Boulder Ditch, Enterprise Ditch, and Goodhue Ditch, we suggest that care be taken with timing and extent of maintenance activities. Specifically, we suggest that any maintenance work on the ditches avoid the active season and be conducted during the hibernation season, between November 1 and
April 30. Direct risks to the mice at this time should be reduced. However care must be taken that dense stands of shrubs be safeguarded to the extent possible, as mice could be hibernating there and these represent very important habitat components during the active season as well. Maintenance activities on the ditches should be limited to the minimum needed to maintain flow and avoid changes to the character of the ditches in terms of vegetation. It is very important to maintain the complex vegetation structure, including dense stands of shrubs and the mixture of forbs and shrubs.

The ongoing weed management activities are to be encouraged. Cattle grazing, at current rates, appears not to cause problems in the areas where the grazing regime or fencing serve to protect the riparian vegetation. We recommend keeping the cattle out of the riparian corridor to facilitate willow and other shrub development, or to allow them there only for very brief periods so that vegetation is not damaged.

An evaluation of ditch maintenance activities and scheduling on Open Space and Mountain Parks properties would be useful to pinpoint problems ahead of time, such as when maintenance activities are to be anticipated. A large data gap has to do with where jumping mice hibernate along ditches. Do they use the vegetated banks, or do they move to distant or drier pockets of cover? This data gap leaves year-round land-use management for this species difficult due to a lack of empirical data.

REFERENCES


Table 1. Total individual captures of small mammals on Goodhue Ditch (South Boulder Creek System), Boulder, Colorado. 18-22 June 2001.

<table>
<thead>
<tr>
<th>Species</th>
<th>Adult Male</th>
<th>Female</th>
<th>Subadult Male</th>
<th>Female</th>
<th>Juvenile Male</th>
<th>Female</th>
<th>Total Male</th>
<th>Female</th>
<th>Unknown</th>
<th>Total All</th>
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<tbody>
<tr>
<td><em>Mus musculus</em> House Mouse</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5 (3)</td>
</tr>
<tr>
<td><em>Peromyscus maniculatus</em> Deer Mouse</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>12 (12)</td>
</tr>
<tr>
<td><em>Zapus hudsonius preblei</em> Preble's Meadow Jumping Mouse</td>
<td>9</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>5</td>
<td>0</td>
<td>14 (1)</td>
</tr>
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</table>

All values based on 148 traps and 592 trap nights. 26 closed traps, leaving 88% of traps unsprung. Values in parentheses ( ) indicate recaptures.
Table 1. Total individual captures of small mammals on Davidson Ditch (South Boulder Creek System), Boulder, Colorado. 18-22 June 2001.

<table>
<thead>
<tr>
<th>Species</th>
<th>Adult</th>
<th>Female</th>
<th>Subadult</th>
<th>Male</th>
<th>Female</th>
<th>Juvenile</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Unknown</th>
<th>Total</th>
<th>All</th>
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<tr>
<td><em>Microtus pennsylvanicus</em></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
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<tr>
<td>Meadow Vole</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Peromyscus maniculatus</em></td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>7</td>
<td>19</td>
<td>(6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deer Mouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Reithrodontomys megalotis</em></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Harvest Mouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><em>Zapus hudsonius preblei</em></td>
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<td>0</td>
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<td>1</td>
<td>(1)</td>
<td></td>
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<td></td>
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<tr>
<td>Preble's Meadow Jumping Mouse</td>
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<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Total                                      | 23    | (7)    |

All values based on 147 traps and 588 trap nights. 9 closed traps, leaving 93% of traps unsprung. Values in parentheses () indicate recaptures.
Table 2. Dates of captures, reproductive condition, and color marking of Preble’s meadow jumping mice on Goodhue and Davidson Ditches, Boulder, Colorado. 19 - 22 June 2001.

<table>
<thead>
<tr>
<th>ID</th>
<th>19 June</th>
<th>20 June</th>
<th>21 June</th>
<th>22 June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>male/12g, N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue/orange</td>
<td>female/20g, N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td>male/16g, N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink</td>
<td></td>
<td>male/18g, R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink/green</td>
<td></td>
<td>male/17.5g, R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink/orange</td>
<td></td>
<td>male/16.5g, R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/pink</td>
<td></td>
<td>male/17g, R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink/green/orange</td>
<td></td>
<td>female/18g, R</td>
<td>nipples visible</td>
<td></td>
</tr>
<tr>
<td>Black/pink/green</td>
<td></td>
<td>female/18.5g, R</td>
<td>nipples visible</td>
<td></td>
</tr>
<tr>
<td>Pink/blue</td>
<td>female/21g, R</td>
<td>nipples visible</td>
<td></td>
<td>female/23g, R</td>
</tr>
<tr>
<td>New</td>
<td></td>
<td>female/22g, N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New</td>
<td></td>
<td>male/20g, R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New</td>
<td></td>
<td>female/18.5g,</td>
<td>nipples visible</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td>male/7g, R</td>
</tr>
<tr>
<td>New</td>
<td></td>
<td>female/21g, R</td>
<td>nipples visible</td>
<td></td>
</tr>
</tbody>
</table>

Note: all animals are adults.
R = Reproductive; N = Non-reproductive.
Table 3. Characteristics of irrigation ditches that have been trapped for Preble’s meadow jumping mice. All take water from South Boulder Creek, Boulder, Colorado.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>East Boulder Ditch</th>
<th>Enterprise Ditch</th>
<th>Marshallville Ditch</th>
<th>Schearer Ditch</th>
<th>Goodhue Ditch</th>
<th>Davidson Ditch</th>
<th>Dry Creek Ditch (New Dry Creek Carrier)</th>
</tr>
</thead>
</table>
| Long flow season?  
| Appropriation Date (1800s)            | 4/62               | 2/65             | 6/65               | 6/60           | 6/73          | 4/72           | No water rights                          |
| Physical Ditch Capacity (cfs)         | 24                 | 35               | 40                 | 26             | 75            | 100            | ?                                       |
| Banks somewhat sloping and vegetated  | Y, banks shallow, 2 ft or so | N, steep banks | Y                   | N              | Banks intermediate, 3-15 ft | Steep banks, 15 ft in most places | Steep cut banks, Gently sloping in parts |
| Plant species richness                | Y                  | Y                | N                  | N              | Y             | Y              | Variable                                |
| Uplands with good grass, degree of saturation | Y, saturated at times | Y, saturated at times | Y, saturated | Y, saturated at times | Y, saturated at times | Y, not saturated                   |
| Shrubs present                        | Y                  | Y                | Y                  | N              | Y             | Y              | Y                                       |
| Low level of ditch maintenance?       | Y                  | Y                | N                  | N              | Y             | Y              | Y                                       |
| Average number of days water run      | 125                | 98               | 56                 | 88             | 41            | 45             | ?                                       |
| Max number of days water run          | 175                | 215              | 95                 | 155            | 71            | 73             | ?                                       |
| Min number of days water run          | 78                 | 27               | 12                 | N/A            | 5             | 9              | ?                                       |
| Comments                               | Has excellent jumping mouse habitat where it comes off SBC | Hayfield adjacent, mowed to within 15-20 ft | Hayfield adjacent, mowed to within 15-20 ft | Transports water from SBC to channel of Dry Creek |
| Occupied?                             | Y                  | Y                | N                  | N, although M. Bakeman caught mice close by | Y             | Y, but only 1 capture in 588 trap nights | Y south of Baseline Reservoir |
|                                       |                    |                  |                    |                |               |                | N east of Baseline Reservoir            |
APPENDIX

U.S. FISH AND WILDLIFE SURVEY FORM
<table>
<thead>
<tr>
<th>Description</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveyor</td>
<td>Stake</td>
</tr>
<tr>
<td>Location</td>
<td>Boulder, CO</td>
</tr>
<tr>
<td>UTM Coordinates</td>
<td>1310111036</td>
</tr>
<tr>
<td>Elevation</td>
<td>2323</td>
</tr>
<tr>
<td>Descriptive Site Name</td>
<td>South Boulder Creek</td>
</tr>
<tr>
<td>Site Name</td>
<td>Boulder Creek</td>
</tr>
<tr>
<td>Land Ownership</td>
<td>City of Boulder</td>
</tr>
<tr>
<td>General Habitat Description</td>
<td>Wet meadow, Plans Riparian</td>
</tr>
<tr>
<td>Dominant Plant Community</td>
<td>Grasses, shrubs, shrubs, wet meadows, Plans Riparian</td>
</tr>
<tr>
<td>Wildfire History</td>
<td>Great Basin Pinyon-Juniper Woodlands, ponderosa-pinyon-juniper woodlands, ponderosa pine forest</td>
</tr>
<tr>
<td>Associated Animal Species</td>
<td>Bird, Rodent, Rattlesnake, Rodent</td>
</tr>
<tr>
<td>Trapping Information</td>
<td>Number of Traps Trapped</td>
</tr>
<tr>
<td>Weather conditions prior to and during survey</td>
<td>Not recorded</td>
</tr>
</tbody>
</table>

**Preble's Data**

- Date of Preble's trapped or seen: 15 April 2001
- Number of Preble's trapped or seen: 15
- Sketch of surveyed area showing trails: Specific area disqualified (can be done on required U.S. Forest Service Form)
- Perimeter from water (in): 3.5 m
- Evidence of reprod. - Weights: (grams) 14.6, 16.6, 20.6
- Not marked permanently: Yes
- Not marked temporarily: No
- Marked by: Stake
- Marked with: Stake
- Species: Zapus hudsonius preblei, Preble's Meadow Jumping Mouse
5. 3.5m  ♂  reputable  17.5g  not marked permanently

6. 3.5m  ♂  reputable  16.5g  

7. 3.5m  ♂  reputable  17.5g  

8. 3.5m  ♀  reputable  18.5g  "  (swollen vulva)

9. 3.5m  ♂  reputable  18.5g  "  

10. 3.5m  ♂  ♂♂  reputable  21g  "  (nipples visible)

11. 3.5m  ♂  not reputable  16.5g  "

12. 3.5m  ♂  reputable  20g  "

13. 3.5m  ♀  reputable  22.5g  "

14. 3.5m  ♂  reputable  now "

--- 3.5m

* captured 1st day / Recap Day 4

20g

24g

Davidson Ditch

6m  ♂  reputable  26g  not marked permanently

nipples visible "pear shape"
Evidence of disease: predation or injury: None

Genetic Material Obtained: Yes \(\times\) No \(\times\) Forwarded to

Specimen(s): Yes \(\times\) No \(\times\) Forwarded to

SUBMIT THIS FIELD DATA FORM WITH THE SURVEY REPORT
Zapus hudsonius princei: Injury-Mortality Documentation

Found dead

Found severely injured, euthanized

Slightly injured, returned to wild

Died during handling

Date/Time:

Location:

Weather Conditions:

Approximate Time Trap Set:

Time Trap Checked:

Old Technician(s) Present:

Information:

Species:

PIT TAG Number:

- Weight (g):

Total Body Length (mm):

Tail Length (mm):

Hindfoot Length (mm):

Ear Length (mm):

Sex:

Reproductive Condition(s):

Description of Injury:

Details of Probable Reasons for Injury or Mortality:

Signature of Technician(s): John K. Ruggles, Lauretta Whittemore

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