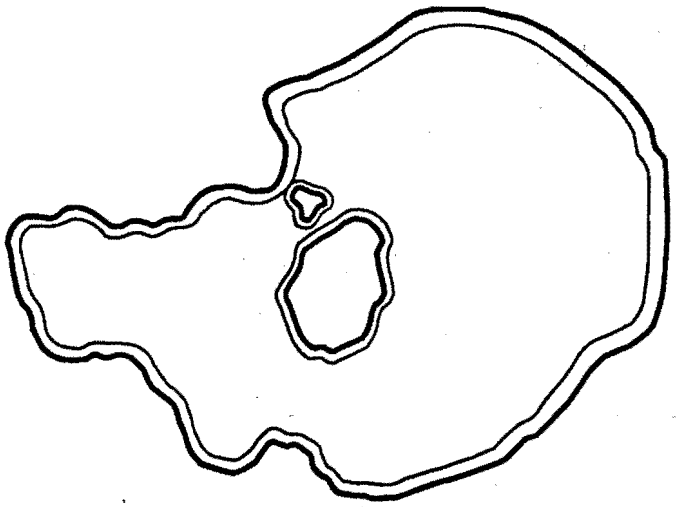
An Auxiliary Report
Prepared for the

MONO BASIN WATER RIGHTS EIR

Wildlife Surveys in Riparian and Wetland Habitats in the Mono Lake Basin and Upper Owens Valley, California



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Mono Basin EIR Auxiliary Report No. 3

An Auxiliary Report
Prepared for the
Mono Basin Water Rights EIR Project

This auxiliary report was prepared to support the environmental impact report (EIR) on the amendment of appropriative water rights for water diversions by the City of Los Angeles Department of Water and Power (LADWP) in the Mono Lake Basin. Jones & Stokes Associates is preparing the EIR under the technical direction of the California State Water Resources Control Board (SWRCB). EIR preparation is funded by LADWP.

SWRCB is considering revisions to LADWP's appropriative water rights on four streams tributary to Mono Lake, Lee Vining Creek, Rush Creek, Parker Creek, and Walker Creek. LADWP has diverted water from these creeks since 1941 for power generation and municipal water supply. Since the diversions began, the water level in Mono Lake has fallen by 40 feet.

The Mono Basin water rights EIR examines the environmental effects of maintaining Mono Lake at various elevations and the effects of possible reduced diversions of water from Mono Basin to Owens Valley and the City of Los Angeles. Flows in the four tributary creeks to Mono Lake and water levels in Mono Lake are interrelated. SWRCB's decision on amendments to LADWP's water rights will consider both minimum streamflows to maintain fish populations in good condition and minimum lake levels to protect public trust values.

This report is one of a series of auxiliary reports for the EIR prepared by subcontractors to Jones & Stokes Associates, the EIR consultant, and contractors to LADWP. Information and data presented in these auxiliary reports are used by Jones & Stokes Associates and SWRCB, the EIR lead agency, in describing environmental conditions and conducting the impact analyses for the EIR. Information from these reports used in the EIR is subject to interpretation and integration with other information by Jones & Stokes Associates and SWRCB in preparing the EIR.

The information and conclusions presented in this auxiliary report are solely the responsibility of the author.

Copies of this auxiliary report may be obtained at the cost of reproduction by writing to Jim Canaday, Environmental Specialist, State Water Resources Control Board, Division of Water Rights, P.O. Box 2000, Sacramento, CA 95810.

WILDLIFE SURVEYS IN RIPARIAN AND WETLAND HABITATS IN THE MONO LAKE BASIN AND UPPER OWENS VALLEY, CALIFORNIA

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INTRODUCTION

This report summarizes the results of surveys for mammals, amphibians and reptiles on study plots in riparian and wetland habitats in the Mono Lake Basin and upper Owens River valley. Surveys were conducted between 6 June and 20 July 1991. The objective of the study was to determine the presence of mammal, amphibian and reptile species on the study plots by performing the following tasks:

Mammal Surveys

1. Livetrapping surveys for small mammals
2. Pitfall trapping surveys for small mammals
3. Track plot surveys for mammals
4. Sign searches for large mammals
5. Incidental observations of mammals
6. Analysis of the contents of owl pellets collected near Simon Springs

Amphibian and Reptile Surveys

1. Intensive search for amphibians and reptiles on study plots
2. Incidental observations of amphibians and reptiles

This report provides an accounting of all species detected on each study plot, summary and interpretation of species occurrence in the habitat types represented by the study plots, and a summary of habitat relationships information for special status species (i.e. those listed as Endangered, Threatened, or of Special Concern).

METHODS

Study Sites

Study plots were selected by Jones and Stokes personnel prior to the initiation of the surveys described in this report. I have reported the results using the habitat categorization devised by Jones and Stokes biologists. Because study plot selection, habitat description and vegetation analysis were performed by Jones and Stokes biologists, the locations and vegetation description for study plots are not reported here.

I added two wet meadow study plots near Dechambeau Ponds, referred to as Black Point 1 and 2. These plots were selected in order to represent wet meadow habitat in the lakeshore region. These plots had a dense and continuous cover of Juncus, Distichlis and other plant species. Portions of these plots had moist soil but neither contained standing water. The height of the vegetation was approximately 10-12 inches over the majority of the two study plots, with some

areas of shorter grassy cover. The two plots were established about 100 m northeast (Black Point 1) and 50 m south (Black Point 2) of Black Point 3 (established by JSA biologists).

Livetrapping surveys

Study plots were 20 by 50 meters. At each study plot I established eighteen trap stations. Trap stations were laid out in three parallel lines of six stations each. The three lines were thus 10 meters apart, and trap stations along each line were 10 meters apart. Traps were occasionally set in different configurations to compensate for presence of standing water, impenetrable vegetation, or deviations in the shape of the study plot as origninally set out. Attempts were made in such cases to maintain as nearly as possible the intended trap spacing.

At each trap station, I set 2 Sherman small mammal traps. Traps were baited with a mixture of corn, oats and barley sweetened with molasses (a commercially available horse feed). A small wad of toilet paper was placed in each trap to serve as nesting material.

Traps were operated for three consecutive days except as noted below. Traps were opened in the late afternoon between 1700-2000 and were checked in the morning between 0600-1000. Thus there were 54 trap station/nights for each plot, or 108 trap nights per plot. Captured animals were identified to species and released.

Pitfall trap surveys

A single one gallon pitfall trap was placed in each study plot. As the intent of pitfall trapping was to increase the probability of detecting shrews, each pitfall was placed in a location which appeared to be the most suitable shrew habitat in the study plot. Pitfalls were dug into the ground such that the lip was flush with the ground surface. Pitfall traps were checked twice daily for three days, simultaneously with checking livetraps.

Track plot surveys

Track plot surveys were conducted using 3 foot by 1.5 foot aluminum plates. Each track plot consisted of two of these plates placed in a flat location on the study plot and baited with fish-flavored cat food. The aluminum plates were dusted with diatomaceous earth, a fine, inert powder which was smoothed to facilitate the identification of tracks. Track plots were checked while checking traps.

Large mammal sign searches and searches for amphibians and reptiles

At each site the author and field assistants searched for tracks, scat and other evidence of the presence of large mammals. Simultaneously we searched for amphibians and reptiles. Incidental observations of mammals and reptiles were made while conducting other activities on the site.

Owl pellet analysis

Jones and Stokes biologists conducted bird surveys and vegetation analysis at wet meadow and marsh sites near Simon Springs. The difficulty of reaching these sites made it impractical to conduct trapping surveys during the study period. A roost site used by Long-eared Owls near Simon Springs was visited while making an exploratory trip to the area. A number of pellets were collected in order to determine the occurrence of wetland-associated small mammal species in the general area. I separated all bones from the pellets and identified skulls found in the pellets to species or genus.

RESULTS AND DISCUSSION

Mammal Surveys

Table 1 shows the mammal species encountered at all study plots and the number captured for species which were captured in livetraps. A total of 25 mammal species was detected on the study plots, with a range of 0 to 7 species per study plot. Mammal species detected in habitat types (Table 2) ranged from 1 to 14 per habitat type. Mammal survey results are summarized here by habitat type. Owens River sites are treated separately.

Deciduous Conifer

Twelve species of mammals were detected on the 11 decidous conifer riparian study plots (Table 2). There were more study plots in this habitat type than in any other type sampled during this survey (Table 2). Only willow scrub study plots had more mammal species (14).

Three species were detected only in this habitat type: Douglas Squirrel (*Tamiasciurus douglassii)*, Lodgepole Chipmunk (*Tamias speciosus*), and Yellow-Pine Chipmunk (*Tamias amoenus*). These species are generally associated with conifer forest habitat types. The Douglas Squirrel is associated with a variety of Sierra Nevada conifer forest types, but in the Mono Basin is most common in lodgepole forest. It follows conifer forests down streams into the lower elevations of the basin. Occurring in 90.9% of the study plots in this habitat type, and in no other habitat type, it could be thought of as an indicator species for this habitat in the context of this study. The Lodgepole Chipmunk is closely associated with lodgepole forest and has been found at lower elevations in Lee Vining Canyon and in the Jeffrey Pine forest on the southeast side of Mono Basin. Yellow-Pine Chipmunks are generally associated with Jeffrey Pine and Pinyon Pine/Mountain Mahogany woodlands on the east slope of the Sierra Nevada. Probably more chipmunks of both of these species would have been captured if traps had been operated continuously throughout the day. None of these species is a riparian obligate: their occurrence on the study plots is a consequence of the ability of conifers to follow riparian corridors through more

xeric habitats, such as sagebrush scrub.

Several of the species occurring in deciduous conifer study plots are associated with understory features within this habitat type. Bushy-tailed Woodrats (*Neotoma cinerea*) prefer riparian habitats with dense brushy cover, generally including some coarse woody debris, such as logs or brush piles. This species occurred on 45.5% of the study plots in this habitat type. It also occurred in the willow scrub study plots and there are locations for the species in deciduous riparian and mixed scrub habitats in the lower Mono Basin (Harris 1982). The Long-tailed Vole (*Microtus longicaudus*) primarily occurs in riparian habitats within the study area. At higher elevations (i.e. above 9,000 feet) it is also common in meadows (Harris 1982). This species is associated with the grass/herb/litter layer near the banks of streams. Riparian sites lacking adequate development (perhaps too dry) of this layer might not support this species even though a canopy layer of deciduous trees or shrubs could be present. For example, Lee Vining study plots 6 and 7 had very steep sided banks. Sagebrush and other sagebrush scrub associated plants were found nearly to the stream bank, and there was little development of a grassy/herb layer. *M. longicaudus* was not detected at these sites. Nuttall's Cottontail (*Sylvilagus nuttallii*) occurs in brushy riparian habitats, or in the shrub layer of riparian sites with a tree canopy. Although it was more frequent in willow scrub and mixed scrub habitat, Nuttall's Cottontail also occurred in 36.4% of the deciduous conifer plots and in decidous riparian plots.

Two species found in this habitat type are common residents of surrounding sagebrush scrub habitat. These are the Great Basin Pocket Mouse (*Perognathus parvus*) and the Sagebrush Chipmunk (*Tamias minimus*).

Three species found on these study plots were found in the majority of the riparian habitat types. The Deer Mouse (*Peromyscus maniculatus*) is ubiquitous, and can be found in virtually any habitat, but is relatively infrequent in wet meadows. Pocket gophers (*Thomomys* spp.) are found wherever there is friable soil and sufficient plant foods. They avoid wet soils, and could be found in virtually any of the study plots except for those with waterlogged soil. In this study, they were most frequent in meadow study plots (83.3%). Based on museum specimen records, the most likely pocket gopher species for the lower Mono Basin is the Northern Pocket Gopher (*T.talpoides*) (Harris 1982). Mule Deer (*Odocoileus hemionus*) were detected on many of the habitat types. This large herbivore feeds in meadows and riparian habitats and also uses riparian habitats for cover and migration corridors.

In summary, the deciduous conifer study plots supported a large number of species because this habitat type provides a corridor of suitable habitat for species ordinarily found at higher elevations or in other habitat types and because it may contain habitat elements (e.g. coarse woody

debris, shrub layer, herb/grass layer) at a particular site which support species requiring such elements. Within this habitat type, differences in the presence or condition of such habitat elements are a key to species diversity of mammals.

Deciduous Riparian

The three deciduous riparian study plots yielded a total of 6 mammal species. In comparison with deciduous conifer study plots, this habitat lacked the conifer-associated Douglas Squirrel, Lodgepole Chipmunk and Yellow Pine Chipmunk. The sagebrush associated Great Basin Pocket Mouse and Sagebrush Chipmunk were also not detected, although the Panamint Kangaroo Rat (*Dipodomys panamintinus*), another sagebrush scrub species, was captured. Neither the Bushy-tailed Woodrat nor the California Ground Squirrel was found in this habitat type, although both have been found in deciduous riparian habitats elsewhere in Mono Basin (Harris 1982). Some of the lower species diversity of this habitat may be due to the low number of study plots in this habitat type.

Willow Scrub

The 7 willow scrub plots yielded 14 species of mammals, more than any other habitat type. Two species were found only in willow scrub study plots: Pinyon Mice (*Peromyscus trueii*) and scat of a porcupine (*Erethizon dorsatum*). Each of these species was found only on a single study plot and neither is restricted to riparian or wetland habitats. The Pinyon Mouse is most common in open pinyon - juniper woodlands, which border Mono Basin above sagebrush scrub habitats. They are also found in sagebrush scrub and can occur in brushy riparian habitats. Pinyon Mice should be considered in the category of species found in drier upland habitats occurring on survey plots because of their proximity to these habitats. Porcupines are found in a variety of conifer forest and riparian habitats in the Mono Basin. Lower elevation riparian habitats and meadows are used during the spring and summer months, when Porcupines feed on a wide variety of plant foods. Dense scrub serves as cover for Porcupines when they venture out of forest habitats. Riparian habitats are important for Porcupines as spring and summer feeding habitat, escape cover and movement corridors.

In addition to Pinyon Mice, several other species associated with drier upland habitats were detected on willow scrub study plots. These included Great Basin Pocket Mouse (1 plot), Panamint Kangaroo Rat (1 plot), Sagebrush Chipmunk (1 plot)

Two species associated with meadow habitats were found on one willow scrub plot, Lee Vining 2. These were the Montane Vole (*Microtus montanus*) and Belding Ground Squirrel (*Spermophilus beldingi*). This study plot differed from all other willow scrub plots in that its herb/grass layer was a wet meadow. In fact, the study plot was contiguous to Lee Vining 4, a meadow study plot which also had these two mammal species. Other willow scrub study plots were less open, drier, or showed evidence of reduction of the herb/grass layer by grazing.

Nuttall's Cottontail (*Sylvilagus nuttallii*) was more frequent in willow scrub (85.7% of plots) and mixed scrub (100% of plots) than in other habitat types. Dense brush provides escape cover for cottontails, which feed in scrub habitats or meadows. Other species found in willow scrub plots occur in a wide variety of riparian habitats or are habitat generalists.

Mixed Scrub

Nine mammal species were detected on the 5 mixed scrub study plots. Two species were found only in this habitat type: Ermine (*Mustela erminea*) and Bobcat (*Felis rufus*). The ermine captured at Rush Creek 34 was at the lower end of its elevational range. Ermines and other weasels use riparian habitats and meadows but are not restricted to these habitats. A Bobcat track was recorded on a track plot at Rush Creek 31. This wide-ranging predator uses riparian habitats and meadows but is not restricted to these habitats.

As noted previously, Nuttall's Cottontail occurred on 100% of the mixed scrub study plots. Two other species which were relatively frequent in this habitat type were the Bushy-tailed Woodrat, also found in deciduous conifer riparian plots, and the Long-tailed Vole, also found in deciduous conifer, deciduous riparian and willow scrub study plots.

Other species found in this habitat type were found in a variety of habitat types or were upland species found in contiguous habitat.

Meadow

Six mammal species were found on the 6 meadow study plots. Two of these could be considered characteristic of meadow habitats in general: the Montane Vole and Belding Ground Squirrel. Montane Voles were also found on lakeshore meadow and saltgrass study plots. As previously noted, this species was also detected on a willow scrub study plot with wet meadow herb/grass layer. Belding Ground Squirrels were also detected on Owens River meadow plots and on one willow scrub study plot with wet meadow herb/grass layer.

Pocket gophers (Thomomys spp.) were more frequent in this habitat than in any other. Other species found on meadow plots include Nuttall's Cottontail, which feeds in meadows near shrub cover, Deer Mice, a habitat generalist, and Coyotes, which utilize a variety of habitats.

Recovering Riparian

Nine mammal species were found on the 5 plots in this habitat type. These plots, which could be described as in the early stages of regeneration of riparian vegetation, largely were characterized by species of surrounding dry upland habitats. Five of the nine mammal species could be described as upland species: Black-tailed Hare (*Lepus californicus*), Sagebrush Chipmunk, Great Basin Pocket Mouse, Panamint Kangaroo Rat, and Sagebrush Vole (*Lagurus curtatus*). Other species found in this habitat type occur in a wide variety of habitats, and none were unusually frequent on these study plots.

Owens River Willow Scrub

A single species, the Western Harvest Mouse (*Reithrodontomys megalotis*), was found on the single study plot in this category. Harvest mice were also found on the Owens River meadow plots. Western Harvest mice were not detected on any of the Mono Basin study plots, though their remains were found in owl pellets collected near Simon Springs. They prefer meadow and marsh habitats and have been found in a number of wetland and riparian locations in Mono Basin in previous years, such as Mono Lake County Park, Simon Springs, Dechambeau Ponds, and Dechambeau Creek. They are also occasionally found in upland habitats.

Owens River Meadow

Five species were found on the five Owens River willow plots. Belding Ground Squirrels were found on 3 (60%) of the study plots, and were also found on meadow study plots in Mono Basin. A Western Harvest mouse and Vagrant Shrew were each captured on a single study plot. Deer Mice and Mule Deer were also detected on these study plots.

Lakeshore Saltgrass

Three mammal species were detected on the four lakeshore saltgrass study plots. Black-tailed hares are characteristic of open, dry upland habitats. Montane voles were detected on half of the study plots. The two study plots on which this species was found had a cover of saltgrass which was dense and continuous on some portion of the plot. A grass layer thick enough to provide cover is a habitat requirement of this species, and characteristic runways and scat were evidence of vole activity. Coyote scats were found on one of the saltgrass study plots.

Lakeshore Wet Meadow

The Montane Vole, was found on the two wet meadow study plots near Dechambeau Ponds. Runways and scat were found on both plots in the dense, tall layer of rushes and grasses. No other species was found on these study plots.

Lakeshore Willow

Three species were found on the single study plot in this habitat. Nuttall's Cottontail was also frequent in riparian willow and mixed scrub habitat types. The California Ground Squirrel and Golden-mnantled Ground Squirrel were the other two species found on this plot. California Ground Squirrels are associated with rock outcrops, tufa formations and brush piles in the Mono Basin. Golden-mantled Ground Squirrels are most common in conifer forests and pinyon - juniper woodlands, but they have been frequently sighted near the west side of Mono Lake in riparian habitats and tufa groves.

This study plot was relatively dry, with virtually no herb/grass layer, perhaps accounting for

the relatively small number of species encountered.

Owl Pellet Analysis

Results of the analysis of owl pellet contents from the vicinity of Simon Springs are shown in Table 3. Many of the prey items identified in the pellets are species which occur in sagebrush scrub. The primary significance of the pellet data for this study is the presence of montane and long-tailed voles and western harvest mice in the pellets. These are species which prefer mesic habitats and would be expected in the extensive wet meadows of the Simon Springs area. Their presence in this sample of owl pellets suggests that they occur in some part of Simon Springs wetland region.

Amphibian and Reptile Searches

Searches for amphibians and reptiles had a low success rate. Only three species were detected during the study, two were detected on study plots.

The Sagebrush Lizard (*Sceloporus graciosus*) was found on 11 study plots. This species is associated with sagebrush scrub habitat. The study plots on which this species occurred, listed by habitat type, were as follows:

Recovering (5/5 plots): WD1, PD2, PD3, RD4, RD5
Mixed Scrub (3/5 plots): R31, R34, R42
Deciduous Conifer (2/11 plots): LV6, LV9
Willow Scrub (1/7 plots): P3

The Western Aquatic Garter Snake was detected on one study plot , R5 (willow scrub). This species was also sighted about 1/4 mile northeast of plot R42 along Rush Creek and about 1 mile downstream (northeast) of plot R43, also along Rush Creek.

The Great Basin Spadefoot Toad was seen at Dechambeau Ponds, but was not found at any of the nearby wet meadow study plots.

Special Status Species

This study did not involve surveys designed specifically to locate mammal Species of Concern or mammal species listed as Threatened or Endangered. No species in any of these categories were detected on the study plots. This section reviews the occurrence of such species in the study area and reviews their habitat relationships in the Mono Basin. The following special status mammal species are known to occur in the Mono Basin.

Pygmy Rabbit (*Brachylagus idahoensis*) - California Species of Special Concern
White-tailed Hare (*Lepus townsendii*) - California Species of Special Concern
Mountain Beaver (*Aplodontia rufa*) - Federal Candidate Species, Category 2
Sierra Nevada Red Fox (*Vulpes vulpes necator*) - California Threatened
Wolverine (*Gulo gulo luteus*) - California Threatened
American Badger (*Taxidea taxus*) - California Species of Special Concern

Two of these species, Sierra Nevada Red Fox and Wolverine, have not been found within the elevational range of this study and will not be further considered here. The other species are known to occur within the study area. Their occurrence and habitat relationships are discussed below.

Pygmy Rabbit

The Pygmy Rabbit is endemic to the Great Basin of western North America. In California it occurs in eastern Modoc, Lassen and Mono counties (Williams 1986). Within the Mono Basin region, Pygmy rabbits have been captured or sighted at a number of locations (Williams 1986, Harris 1982).

The preferred habitat of Pygmy Rabbits is dense stands of large sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus* spp.), and greasewood (*Sarcobatus vermiculatus*) in areas of friable soil (Green and Flinders 1980, Weiss and Verts 1984). The patchy distribution of this species (Green and Flinders 1980, Williams 1986) may be due to preference for denser patches of shrubs within a larger expanse of sagebrush scrub. Burrows of Pygmy Rabbits, as well as runways, are closely associated with this preferred microhabitat. Sagebrush was the preferred food in two studies in Idaho, with grasses becoming important in summer (Green and Flinders 1980).

In the Mono Basin region, Pygmy Rabbits have been sighted or captured in habitats such as those described above. Pygmies have been sighted in dense sagebrush and in greasewood scrub on the sandy soil northeast of Mono Lake, in sagebrush/rabbitbrush scrub on Black Point, in sagebrush scrub near Bodie (Harris 1982). The dense buffaloberry/willow thickets near Mono Lake County Park have also been the location of Pygmy Rabbit sightings (Harris 1982).

To summarize, the habitat types which were the primary focus of this study do not appear to be required habitats for pygmy rabbits. They may use willow or mixed scrub habitats near the lakeshore. Effects of water regime or grazing on sagebrush scrub density and plant size would appear to be more significant issues for this species.

White-tailed Hare

The White-tailed Hare occurs primarily above 8,000 feet in summer, but migrates to lower elevations in winter (Merriam 1904, Grinnell et al 1930, Orr 1940, Larrison 1976, Harris 1982). Thus the study area would be primarily an area of winter and spring use by White-tailed Hares. White-tailed Hares have been recorded in the Mono Basin from Mono Mills and the Mono Craters west and north around the lake to Dechambeau Ponds. Sightings below 8,000 feet range from

December through April (Harris 1982). Specific locations corresponding to the vicinity of study sites in this study include upper Rush Creek (Merriam 1904) and Dechambeau Ponds (Harris 1982), but this species probably occurs widely throughout the study area in winter and spring.

White-tailed Hares use a variety of habitats within their considerable elevational range, including meadows, sagebrush scrub, alpine fell-fields, and coniferous forests. Within these habitats they prefer open microhabitats with scattered shrubs or trees to provide cover. A wide variety of foods are reported (Lim 1987) but primary foods are grasses and forbs. Sagebrush is an important winter food in California (Orr 1940). In winter, White-tailed Hares browse on shrubs and grasses protruding through snow; in spring they feed on the succulent new growth of grasses and forbs (Lim 1987). Movement downslope probably facilitates food-finding. This hypothesis is supported by the observation that White-tailed Hares which remain at high elevations during winter tend to be found on wind-swept slopes (Harris 1982).

Of the habitats surveyed during this study, meadows are probably the most important for White-tailed Hares. Hares probably use meadows in the lower part of Mono Basin as feeding habitat during winter and spring.

Mountain Beaver

The Mountain Beaver is a medium-sized rodent which prefers dense, moist riparian thickets. Willow and aspen thickets along streams, springs and wet meadows are typical habitats in the Sierra Nevada. Often Mountain Beaver burrow systems are integrated with tunnels through dense brush and have water running freely through the sytem. Many kinds of forbs and shrubs are consumed, and twigs can be important winter browse. In the Mammoth Lakes area, Steele (1989) found that haystacks collected by Mountain Beavers included larkspur, cow parsnip, lupine and aspen as important components.

Mountain Beavers are found in suitable habitat in the Mono Basin area at many locations at higher elevations, including Lee Vining Canyon and Lundy Canyon. The first record for the Mountain Beaver in the immediate vicinity of Mono Lake was a sighting in the South Tufa area in 1976 (Steele 1989). Here a single individual was observed foraging near a lakeshore seep among tufa towers. Though moist, this habitat seemed unusual because of the salinity of the soils near the shoreline and the use of tufa as a shelter site. This sighting was the basis for the inclusion of the Mono Basin population of Mountain Beavers as a candidate species, category 2 by the U.S. Fish and Wildlife Service (1982).

In the intervening period, some additional sightings have accumulated. Observations have been made at the following sites:

1. Road kill near Tioga Lodge, highway 395, pers. obs. 1981, T2N, R26E, SE 1/4 of NE 1/4 sec 31
2. Road kill near Jungle Industries brine shrimp plant, highway 395, pers. obs. 1984, T2N, R26E, SE 1/4 of sec 30
3. Road kill near Mono Inn, highway 395, D. Parker, pers. comm. 1990, T2N, R26E, NE 1/4 of SW 1/4 sec. 30.
4. Animal and sign sighted, Dechambeau Creek, west of Mono Lake County Park, D Marquardt pers. comm. 1990

These sightings were all associated with streamside or spring-associated willow/mixed scrub thickets. The sightings suggest that there is a population of Mountain Beavers occupying a band of moist shrub thicket habitat along the west side of Mono Lake. This habitat is connected in places with corridors of suitable habitat along streams reaching into the higher Sierra, where mountain beavers have been known to occur.

Moist willow scrub and mixed scrub habitats in the Mono Basin are suitable habitats for Mountain Beavers. An increase in these habitat types, or an increase in the moistness of existing patches of these habitats, could be beneficial to Mountain Beavers. Possible benefits would include establishment of corridors linking the lower Mono Basin to existing populations at higher elevations and increasing the area of suitable habitat near existing populations in the lower Mono Basin.

American Badger

Badgers occur in open habitats with friable soils and populations of burrowing rodents (Williams 1986). Preferred habitat east of the Sierra Nevada includes perennial grasslands, low canopy stages of sagebrush and bitterbrush scrub (Airola, ed. 1980). In Mono Basin, Badgers are found from the lakeshore to high elevations. Badgers have been sighted in lower Mono Basin in the vicinity of Mono Lake County Park and in lower Lundy Canyon (Harris 1982). Of the habitat types sampled in these surveys, meadows with populations of ground squirrels or pocket gophers would be suitable foraging habitat for this predator.

SUMMARY

Twenty-five species of mammals were detected on 50 study plots in 11 habitat types. The number of mammal species ranged from 1 to 7 per study plot and from 1 to 14 per habitat type. The habitat types were ranked in number of species as follows: willow scrub (14 species), deciduous conifer (12 species), mixed scrub and recovering plots (9 species each), deciduous

riparian and meadow plots (6 species each), Owens River meadow (5 species), lakeshore saltgrass and lakeshore willow (3 species each), Owens River willow and lakeshore meadow (1 species each).

Recovering plots, those which were in the early stages of regeneration of riparian vegetation, had a relatively small number of species. Most of these were characteristic of surrounding sagebrush scrub. The other species were widespread habitat generalists. Thus one certain conclusion from this survey is that conversion of streamside habitat with sagebrush scrub to riparian or wetland vegetation would increase the species diversity of mammals.

Further comparisons between habitat types are complicated by several factors. First, species characteristic of surrounding dry upland habitats (e.g. sagebrush scrub) frequently occurred on the riparian and wetland study plots. On the recovering plots, this is expected, since the predominant vegetation on these plots was sagebrush scrub. Secondly, the number of plots differed between habitat types. Habitat types which were well represented could have their species totals inflated by the occurrence of a species at only a single plot. The odds of such chance detections are increased with greater sample size. Secondly, there were differences within habitat types which could be as important as the differences between habitat types. For example, some species (e.g. Nuttall's Cottontail, Bushy-tailed Woodrat) prefer the brushy portions of riparian habitats. The presence of this canopy layer in a deciduous or deciduous conifer plot might make the plot resemble willow or mixed scrub study plot. As another example, the willow scrub plot Lee Vining 2 contained meadow associates (Montane Vole and Belding Ground Squirrel) as a result of its wet meadow understory. Thus changes in the quality of existing habitats, as well as changes in the amount of habitat types, could have important effects on mammal distribution and abundance within Mono Basin.

No special status mammal species were found on the study plots. Increase in meadow habitat or meadow habitat quality (i.e. wetter, more plant cover) would probably benefit White-tailed Hares and American Badgers based on knowledge of their habitat use and occurrence in Mono Basin. Increase in the amount or wetness of willow and mixed scrub habitats would probably benefit Mountain Beaver and possibly Pygmy Rabbit populations.

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Table 1. Occurrence of mammal species on Mono Basin and Owens Valley study plots. The mammal species found on each study plot are shown. Numbers indicate the total number of captures, while those species detected by sightings, sign, tracks or scat are indicated as present (P) and those detected by tracks on track plots are indicated with the symbol T. The two individual *Sorex vagrans* were the only captures in pitfall traps. Symbols used in labelling study plots are LV (Lee Vining Creek), W (Walker Creek), P (Parker Creek), R (Rush Creek), N (Navy Beach), O (Owens Valley), BP (Black Point), LVT (Lee Vining Tufa).

Species	LV1	LV2	LV4	LV5	LV6	LV7	LV9	LV10
Sorex vagrans								
Lepus californicus								
Sylvilagus nuttallii				P	P		P	
Spermophilus beldingi		P	P					
Spermophilus beecheyi								
Spermophilus lateralis								
Tamias speciosus	1				1			
Tamias amoenus							3	
Tamias minimus							1	
Tamiasciurus douglasii	P			P,T	P	P	P	
Thomomys spp.		P	P					
Perognathus parvus								
Dipodomys panamintinus								
Reithrodontomys megalotis								
Peromyscus maniculatus	16				16	6	12	
Peromyscus trueii								
Neotoma cinerea					2	4	2	
Microtus montanus		1	1					
Microtus longicaudus	7			5				
Lagurus curtatus								
Erethizon dorsatum								
Canis latrans								
Mustela erminea								
Felis rufus								
Odocoileus hemionus	P	P		P	P		P	

Table 1, continued

Species	W1	W2	W3	W4	W5	W7	WD1
Sorex vagrans				1			
Lepus californicus							
Sylvilagus nuttallii		P	P	P	P		P
Spermophilus beldingi						P	
Spermophilus beecheyi							
Spermophilus lateralis							
Tamias speciosus							
Tamias amoenus							
Tamias minimus							
Tamiasciurus douglasii	P						
Thomomys spp.		P	P			P	
Perognathus parvus				3			2
Dipodomys panamintinus							
Reithrodontomys megalotis							
Peromyscus maniculatus	14	15	10	8	9		17
Peromyscus trueii							
Neotoma cinerea							
Microtus montanus							
Microtus longicaudus			1	1			
Lagurus curtatus							
Erethizon dorsatum							
Canis latrans					P	T	P
Mustela erminea							
Felis rufus							
Odocoileus hemionus	P	P			P		P

Table 1, continued

Species	P1	P2	P3	P4A	P4B	P6	PD2	PD3
Sorex vagrans								
Lepus californicus								P
Sylvilagus nuttallii			P		P	P		
Spermophilus beldingi								
Spermophilus beecheyi								
Spermophilus lateralis								
Tamias speciosus								
Tamias amoenus								
Tamias minimus			1				3	P
Tamiasciurus douglasii	P				P			
Thomomys spp.	P	P	P	P		P		
Perognathus parvus							2	3
Dipodomys panamintinus			1	3				
Reithrodontomys megalotis								
Peromyscus maniculatus	8	5	23	19	20	9	14	16
Peromyscus trueii								
Neotoma cinerea								
Microtus montanus								
Microtus longicaudus			8	1				
Lagurus curtatus							1	
Erethizon dorsatum						P		
Canis latrans								
Mustela erminea								
Felis rufus								
Odocoileus hemionus							P	P

Table 1, continued

Species	R1A	R1B	R3	R5	R31	R34	R36	R37
Sorex vagrans								
Lepus californicus								
Sylvilagus nuttallii				P	P	P	P	P
Spermophilus beldingi								
Spermophilus beecheyi			P					
Spermophilus lateralis								
Tamias speciosus								
Tamias amoenus								
Tamias minimus		1	2					
Tamiasciurus douglasii	P	P						
Thomomys spp.								
Perognathus parvus			1					
Dipodomys panamintinus								
Reithrodontomys megalotis								
Peromyscus maniculatus	20	15	14	8	4	10		8
Peromyscus trueii				5				
Neotoma cinerea	2		P					1
Microtus montanus								
Microtus longicaudus	1	1			1			1
Lagurus curtatus								
Erethizon dorsatum								
Canis latrans							T	
Mustela erminea						1		
Felis rufus					T			
Odocoileus hemionus			P					P

Table 1, continued

Species	R39	R40A	R40B	R42	R43	RD4	RD5
Sorex vagrans							
Lepus californicus							
Sylvilagus nuttallii		P		P	P		P
Spermophilus beldingi							
Spermophilus beecheyi							
Spermophilus lateralis							
Tamias speciosus							
Tamias amoenus							
Tamias minimus							
Tamiasciurus douglasii							
Thomomys spp.		P	P				
Perognathus parvus				8			1
Dipodomys panamintinus						1	
Reithrodontomys megalotis							
Peromyscus maniculatus	19	2	2	19	12	12	14
Peromyscus trueii							
Neotoma cinerea				P			
Microtus montanus							
Microtus longicaudus							
Lagurus curtatus							
Erethizon dorsatum							
Canis latrans							
Mustela erminea							
Felis rufus							
Odocoileus hemionus					P		

Table 1, continued

Species	O1	O2	O3	O4	O5	O6
Sorex vagrans			1			
Lepus californicus						
Sylvilagus nuttallii						
Spermophilus beldingi		P		2	1	
Spermophilus beecheyi						
Spermophilus lateralis						
Tamias speciosus						
Tamias amoenus						
Tamias minimus						
Tamiasciurus douglasii						
Thomomys spp.						
Perognathus parvus						
Dipodomys panamintinus						
Reithrodontomys megalotis			1			2
Peromyscus maniculatus			1	7	2	
Peromyscus trueii						
Neotoma cinerea						
Microtus montanus						
Microtus longicaudus						
Lagurus curtatus						
Erethizon dorsatum						
Canis latrans						
Mustela erminea						
Felis rufus						
Odocoileus hemionus		P				

Table 1, continued

Species	N1	N2	N3	BP1	BP2	BP3	LVT
Sorex vagrans							
Lepus californicus	P	P					
Sylvilagus nuttallii							P
Spermophilus beldingi							
Spermophilus beecheyi							P
Spermophilus lateralis							P
Tamias speciosus							
Tamias amoenus							
Tamias minimus							
Tamiasciurus douglasii							
Thomomys spp.							
Perognathus parvus							
Dipodomys panamintinus							
Reithrodontomys megalotis							
Peromyscus maniculatus							
Peromyscus trueii							
Neotoma cinerea							
Microtus montanus	P	P		P	P		
Microtus longicaudus							
Lagurus curtatus							
Erethizon dorsatum							
Canis latrans	P						
Mustela erminea							
Felis rufus							
Odocoileus hemionus							

Table 2. Occurrence of mammal species in different habitat types. For each habitat category surveyed in this study, the frequency of occurrence of each mammal species is shown. The number of study plots at which each species occurred is given, as well as the percent frequency of study plots in which the species was detected (in parentheses). For each habitat type, the number of study plots (N plots) and the total number of mammal species (N species) is shown.

Species	Deciduous Conifer	Deciduous Riparian	Willow Scrub	Mixed Scrub	Meadow	Recovering
Sorex vagrans			1 (14.3)			
Lepus californicus						1 (20.0)
Sylvilagus nuttallii	4 (36.4)	1 (33.3)	6 (85.7)	5 (100)	2 (33.3)	2 (40.0)
Spermophilus beldingi			1 (14.3)		2 (33.3)	
Spermophilus beecheyi	1 (9.1)					
Spermophilus lateralis						
Tamias speciosus	2 (18.2)					
Tamias amoenus	1 (9.1)					
Tamias minimus	3 (27.3)		1 (14.3)			2 (40.0)
Tamiasciurus douglasii	10 (90.9)					
Thomomys spp.	1 (9.1)	2 (67.7)	3 (42.9)	1 (20.0)	5 (83.3)	
Perognathus parvus	1 (9.1)		1 (14.3)	1 (20.0)		4 (80.0)
Dipodomys panamintinus		1 (33.3)	1 (14.3)			1 (20.0)
Reithrodontomys megalotis						
Peromyscus maniculatus	10 (90.9)	3 (100)	6 (85.7)	5 (100)	3 (50.0)	5 (100)
Peromyscus trueii			1 (14.3)			
Neotoma cinerea	5 (45.5)			2 (40.0)		
Microtus montanus			1 (14.3)		1 (16.7)	
Microtus longicaudus	4 (36.4)	1 (33.3)	2 (28.6)	3 (60.0)		
Lagurus curtatus						1 (20.0)
Erethizon dorsatum			1 (14.3)			
Canis latrans			1 (14.3)		2 (33.3)	1 (20.0)
Mustela erminea				1 (20.0)		
Felis rufus				1 (20.0)		
Odocoileus hemionus	5 (45.5)	1 (33.3)	3 (42.9)	1 (20.0)		3 (60.0)
N (plots)	11	3	7	5	6	5
N (species)	12	6	14	9	6	9

Table 2, continued

Species	Owens Meadow	Owens Willow	Lakeshore Saltgrass	Lakeshore Meadow	Lakeshore Willow
Sorex vagrans	1 (20.0)				
Lepus californicus			2 (50.0)		
Sylvilagus nuttallii					1 (100)
Spermophilus beldingi	3 (60.0)				
Spermophilus beecheyi					1 (100)
Spermophilus lateralis					1 (100)
Tamias speciosus					
Tamias amoenus					
Tamias minimus					
Tamiasciurus douglasii					
Thomomys spp.					
Perognathus parvus					
Dipodomys panamintinus					
Reithrodontomys megalotis	1 (20.0)	1 (100)			
Peromyscus maniculatus	3 (60.0)				
Peromyscus trueii					
Neotoma cinerea					
Microtus montanus			2 (50.0)	2 (100)	
Microtus longicaudus					
Lagurus curtatus					
Erethizon dorsatum					
Canis latrans			1 (25.0)		
Mustela erminea					
Felis rufus					
Odocoileus hemionus	1 (20.0)				
N (plots)	5	1	4	2	1
N (species)	5	1	3	1	3

Table 3. Contents of owl pellets collected near Simon Springs, 28 June, 1991. Numbers of individuals are based on counts of skulls.

Species	Number
Sorex spp.	6
Leporid spp.	1
Reithrodontomys megalotis	5
Peromyscus spp.	11
Microtus montanus	19
Microtus longicaudus	3
Microtus spp.	3
Lagurus curtatus	2
Perognathus parvus	10
Dipodomys spp.	6