

ANNUAL REPORT FOR THE KLAMATH NETWORK INVENTORY PROGRAM: 2002 SMALL MAMMAL INVENTORY

Introduction

In 2001 the Klamath Network of the National Park Service created a study plan to inventory vascular plants and certain vertebrate taxonomic groups. The goal of this inventory program was to document the occurrence of 90% of the vascular plant and vertebrate species present at each of the six units in the Klamath Network. The inventory program would also provide baseline data to be used for a long term monitoring strategy. This study plan indicated that within the Klamath Network, inventories of small mammal communities had the 2nd highest priority to be completed. The goal of this project was to start the inventory of small mammal communities for the Klamath Network.

Methodology

The study methodology for inventorying small mammal communities within the six units of the Klamath Network was based on live trapping specimens through the use of Sherman live traps. Specimens were not collected as voucher specimens this year unless they had already perished in the live trap. Some specimens were vouchered by taking digital images. This methodology had the least possible detrimental impact on the small mammal communities sampled. However, the similar physical characteristics between many small mammal species reduces the effectiveness of vouchering occurrence with digital images.

Trapping was conducted by placing 2 Sherman traps every 10m along a 240m transect. A total of 50 traps were placed at each transect. Each transect was located at least 1km from another transect if possible. Traps were baited with rolled oats and sunflower chips. Traps were pre-baited with rolled oats and sunflower chips for two nights immediately prior to trapping for four consecutive nights. Traps were opened around dusk between 18:00 and 21:00, and checked in the morning between 5:30 and 9:00. Traps were closed while they were being checked in the morning so that no animal spent time in a trap during the day. Transect location was selected by prioritizing habitat strata within each park according to the potential for each strata to add to the 90% documentation level.

Site Information

Transects were linear where conditions allowed, otherwise they would meander or turn as dictated by landscape features. All trap stations were kept at least 10m from the nearest trap station. UTM coordinates and elevation were collected at the start of and end of each transect. Data for the physical and biological habitat characteristics were also taken.

Redwood National Park

3 Transects were placed in Redwood National Park. One meandering transect was placed within a grove of Old Growth coastal redwoods, one meandering transect was placed on a steep hillside with coastal shrub habitat, and the third transect was linear and placed in a

lowland wetland. Two transects placed in REWO were 50m longer than the transects set in the other four units. The transect in the coastal shrub and old growth habitats were both 290m long and had 60 traps each. The transect placed in the wetland habitat was 240m long and had 50 traps.

Oregon Caves National Monument

Six 240m transects were surveyed at Oregon Caves NM. Two linear transects were placed in mature douglas-fir forest, one linear transect along a riparian corridor, and two meandering transects were placed in upland meadow habitat.

Lassen Volcanic National Park

Two 240m transects were surveyed at LAVO. One U-shaped transect was placed in a wet meadow. The second transect meandered and was placed in a dry rocky area. Only two transects were surveyed due to the difficulty of reaching the sites selected for surveying.

Lava Beds National Monument

Three 240m transects were trapped at LABE. One meandering transect was placed in a lava flow area, one linear transect was placed in a ponderosa woodland,. The third transect was linear and placed in a juniper/sagebrush habitat.

Crater Lake National Park

Three 240m transects were trapped at CRLA. One linear transect was set on a rocky hillside (Hillman Peak), one linear transect was placed in a wet meadow/riparian area, and the third transect was linear and placed in a mature lodgepole pine forest.

Results and Recommendations

During the summer of 2002 a total of 27 species were observed from 876 captures. The predominant species observed was the Deer Mouse (*Peromyscus maniculatus*). The Deer Mouse accounted for 36% (317/876) of all captures (table 1). The Deer Mouse was found at all parks, and was captured in all habitat types surveyed. Although this species was predominately associated with wooded or forested areas. The only other species observed with high frequency was the Yellow-pine Chipmunk. A list of species captured and the number of captures for each park is presented in table 1.

Redwood National Park

Thirteen species were recorded from 165 captures during a 680 trap night effort. Trap success averaged 24.3%. The Deer Mouse (*Peromyscus maniculatus*) accounted for 37% (61/165) of all captures, and was present in all three transects surveyed. Seven species were observed that were listed as probably present on the parks species list and were not previously documented in ANCS: the Pinon Mouse (*Peromyscus trueii*), House Mouse (*Mus muscula*), Marsh shrew (*Sorex bendirii*), Pacific Shrew (*Sorex pacificus*), Mole-shrew (*Neurtrichus gibbsii*), Creeping Vole (*Microtus oregoni*), Siskiyou Chipmunk (*Tamias siskiyou*), and the Long-tailed Vole (*Microtus longicaudus*). Four out of five species of shrew thought to occur in the park were observed. Only the Fog Shrew (*Sorex sonomae*) was not observed.

Recommendations for surveying next year center on finding and discriminating between two chipmunk species that are listed as probably present but lack any voucher specimens or documentation: Allens Chipmunk (*Tamias senex*), and the Sonoma Chipmunk (*Tamias sonomae*). Collection of a voucher specimen for the Siskiyou Chipmunk should also be a priority and might be accomplished by instructing personnel to collect fresh road kills when found. Modification of the trapping schedule should be done so that sherman live traps are left open during the morning after the traps are checked at dawn, and rechecked and closed in two to three hours. By running the Sherman live traps for a few hours during the morning it would be possible to document the presence of the different chipmunk species. Live trapping during the early morning would also allow the park to collect and document the presence of the diurnal Golden-mantled Ground Squirrel (*Spermophilus lateralis*). Location of transects should focus on different forested habitat types to facilitate capture of the different chipmunks and the Western red-backed Vole, and the White-footed Vole. Transects located in riparian corridors would increase the chances of capturing a White-footed Vole (*Arborimus albipes*), although the use of Sherman live traps is not a very effective method for trapping this species. Placing transects within areas of Sitka Spruce forests would help facilitate the capture of both the Fog Shrew and Western red-backed Vole.

Recommendations for data management activities center on examining the Eutamias references in ANCS. Eutamias is an outdated designation and is now Tamias. There is a vouchered specimen listed for *Tamias townsendii*, but no date listed for when it was collected or when or by whom it was identified. This specimen should be re-examined to determine if it is *T. townsendii* or *T. siskiyou*.

Oregon Caves National Monument

Six species were observed from 269 captures. Trapping effort was 1050 trap nights, and trap success averaged 25.6%. All five species observed during the trapping period were already known to be present at the park. Documentation of mice and vole species was very limited during the 2002 season. Only one species of Cricetine mice was observed during the 2002 trapping session. The Deer Mouse (*Peromyscus maniculatus*) accounted for 49% (132/269) of all captures at ORCA. The Deer Mouse is found throughout the region and was observed in all of the habitats surveyed this summer at all five parks. The mouse is especially prevalent in wooded or forested habitats. The Siskiyou Chipmunk was captured 100 times and accounted for 37% of all captures.

The Western red-backed Vole (*Clethrionomys californicus*), was the only vole captured this summer at ORCA. Three other species of Microtine mice (Voles) are known to occur within the monument, and five other species of voles could occur within the monument boundaries. The Western red-backed Vole is usually associated with closed canopy forests with lots of downed logs. None of the grassland associated voles were observed even though both meadows existing in the monument were surveyed. The only species captured this summer at ORCA that is not primarily associated with forested habitats was the Vagrant Shrew (*Sorex vagrans*).

Recommendations for surveying during the 2003 season. An important consideration for surveyers next year should be clarification and accurate documentation of the Townsendii complex of chipmunks. This summer it was not possible to determine with absolute accuracy if the chipmunks captured were *T. siskiyou* or *T. townsendii*. Based on pelage characteristics all specimens were classified as *T. siskiyou* or *T. townsendii*. It is recommended that specimens be collected for verification by recognized experts at museums or universities. It is also recommended that surveys focus on finding grassland inhabiting species in the meadows during the spring or early summer. We conducted surveys in the meadows late in the summer. Most of the herbaceous vegetation in the meadows had already died and desiccated. Therefore the density of any vole and mice populations in the meadows might have already started to decline at the time of our surveys. Trapping should also be conducted around the guide shack, and visitor center, as an unidentified vole specimen was observed on the steps to the visitor center on July 23, 2002. And the only voucher vole specimen (*A. longicaudus*) for ORCA was taken from the guide shack.

Recommendations for data management. Prepared specimens of *Phenacomys longicaudus* (*Arborimus*), *Tamias siskiyou*, *Neotoma fuscipes*, and *Sorex trowbrigii* are listed in "The Land Mammals of Oregon" for Oregon Caves. These specimens should be added to ANCS and the voucher list for species. The genus *Phenacomys* should be changed to *Arborimus* for *A. longicaudus* and *Arborimus albipes*.

Lassen Volcanic National Park

Nine species were recorded from 133 captures. Trapping effort was 400 trap nights with an average trap success of 33.3%. The ubiquitous Deer Mouse accounted for 58% (76/132) of all captures. Two species were observed that are not on the species list for LAVO. One of these species was field identified as the Merriam Shrew (*Sorex merriami*). The other species observed that is not on the species list is the California Vole (*Microtus californicus*). Vouchers were obtained for both the Merriam Shrew and the California Vole. These specimens are being sent to the Museum of Vertebrate Zoology at Berkeley for confirmation and preparation of study skins.

Recommendations for surveying next year include focusing on drier habitats in the Eastern part of the park where great basin habitat might be present. A large percentage of species listed by the park as 'probably present' rely on juniper woodland habitats. Trapping in any juniper woodland habitat that exists in the park could provide information on the occurrence of the Pinon Mouse (*Peromyscus truei*), the Great-Basin Pocket Mouse (*Perognathus parvus*), and the Least Chipmunk (*Tamias minimus*). Because such a large number of the small mammals that are not documented in the park could be present in juniper woodlands, this habitat type should become a priority for the 2003 trapping season.

Recommendations for data management include updating the species list to incorporate the findings of the ongoing small mammal inventory program being conducted by LAVO personnel. The 3 voucher specimens for *Clethrionomys gapperi* should be examined to

insure that it was not *Clethrionomys californicus*. There is a very large distance between LAVO and the nearest known population of this species.

Lava Beds National Monument

Eight species were observed from 164 captures during 600 trap nights. Trap success averaged 27.3%. The Yellow-pine Chipmunk (*Tamias amoenus*) accounted for 52% (85/163) of all captures. Unfortunately all 8 species observed are already known to be present at the park, and a voucher specimen already exists for all eight species. The Yellow-pine Chipmunk accounted for 52% (85/163) of all captures.

Trapping for next year should continue using the randomly selected sites that were determined this year. There are no recommendations for targeting specific species or habitats within LAVE at this time.

Crater Lake National Park

Eight species were observed from 145 captures during a 600 trap night effort. Trap success averaged 24.2%. The Pacific Jumping Mouse (*Zapus trinotatus*) accounted for 37% (54/147) of all captures. Unique captures included an Ermine (*Mustela erminea*) along with a Mazama Pocket Gopher (*Thomomys mazama*). The other six species observed were all known to be present at the park.

Recommendations for surveying in the 2003 season include focusing effort on delineating the Townsend complex of chipmunks in the park. Road kills and other specimens should be collected to attempt to accurately document the four different *Tamias* species that are likely present within the park. Modification of the trapping schedule should be attempted so that sherman live traps are left open during the morning after the traps are checked at dawn, and rechecked and closed in two to three hours. By running the Sherman live traps for a few hours during the morning it would be possible to document the presence of the different chipmunk species. Inventory surveys should also attempt to document the presence of the pinon mouse (*Peromyscus truei*), the White-footed Vole, the Heather Vole (*Phenacomys intermedius*), and the Townsend's Vole (*Microtus townsendii*). The Pinon Mouse inhabits dry areas with Pinon Pine and/or juniper trees. The White-footed Vole inhabits dense woodlands along riparian corridors. The Heather Vole appears to be rather general in its habitat affinities and surveys for it could be conducted in montane/subalpine meadows, along riparian corridors near woodlands, and in stands of Douglas-fir or Engelmann Spruce. The Townsend's Vole can be difficult to live trap, but is easily taken by snap traps, and is found in wet grassland habitats such as lowland meadows, boggy areas and marshes.

Data management recommendations include checking on the voucher of *Clethrionomys gapperi* and *Clethrionomys californicus*. It is unlikely that both species are present at the park. The voucher specimen lists *C.g.mazama*. Yet only *C.g.idahoensis* is supposed to occur in Oregon. Further information that this voucher may be incorrectly identified is *C. californicus mazama* is one of the three recognized sub-species of *C. californicus* to occur in Oregon. Also, *Clethrionomys occidentalis* is no longer used and should be changed to *Clethrionomys californicus*. The genus *Eutamias* should be changed to *Tamias*. Voucher specimens collected from Crater Lake National Park for four species:

Phenacomys (Arborimus) intermedius, *Sorex sonomae*, *Tamias senex*, and *Sorex pacificus*, are all listed in the “The Land Mammals of Oregon”. *Sorex pacificus* is not even on the species list for Crater Lake. These specimens should be located and their information entered into ANCS, and the species list updated as needed.

Table 1.

Species Name	REDW	ORCA	LABE	LAVO	CRLA
<i>Clethrionomys californicus</i>	0	1	0	0	0
<i>Microtus californicus</i>	4	0	0	26	0
<i>Microtus longicaudus</i>	1	0	0	1	0
<i>Microtus oregonii</i>	14	0	0	0	0
<i>Mus musculus</i>	1	0	0	0	0
<i>Mustela erminea</i>	0	0	0	0	1
<i>Neotoma fuscipes</i>	1	0	0	0	0
<i>Neurotrichus gibbsii</i>	1	0	0	0	0
<i>Perognathus parvus</i>	0	0	12	0	0
<i>Peromyscus maniculatus</i>	61	132	9	76	39
<i>Peromyscus crinitus</i>	0	0	38	0	0
<i>Peromyscus truei</i>	37	0	13	0	0
<i>Reithrodontomys megalotis</i>	0	0	2	0	0
<i>Sorex bendirii</i>	3	0	0	0	0
<i>Sorex merriami</i>	0	0	0	3	0
<i>Sorex pacificus</i>	24	0	0	0	0
<i>Sorex palustris</i>	0	0	0	0	5
<i>Sorex trowbridgii</i>	7	1	0	4	0
<i>Sorex vagrans</i>	10	5	0	7	8
<i>Spermophilus lateralis</i>	0	0	3	0	0
<i>Sylvilagus nuttallii</i>	0	0	1	0	0
<i>Tamias amoenus</i>	0	0	85	2	38
<i>Tamias siskiyou</i>	1	30	0	0	0
<i>Tamias speciosus</i>	0	0	0	12	0
<i>Tamias townsendii</i>	0	100	0	1	1
<i>Thomomys mazama</i>	0	0	0	0	1
<i>Zapus trinotatus</i>	0	0	0	0	54
Total Captures	165	269	163	132	147