

ANNUAL REPORT FOR THE KLAMATH NETWORK INVENTORY PROGRAM: 2003 SMALL MAMMAL INVENTORY

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Introduction

In 2001 the Klamath Network of the National Park Service (NPS) created a study plan to inventory vascular plants and certain vertebrate taxonomic groups within the six NPS units in the Network (Acker et al. 2002). This plan indicated that non-carnivore small mammal communities were the 2nd highest priority for inventory. The goals of the small mammal inventory are to (1) document the occurrence of 90% of the small mammal species currently estimated to occur in each park and (2) provide baseline data in support of a long term monitoring program. The small mammal inventories began in 2002 with five out of six Klamath Network units surveyed—Whiskeytown National Recreation Area (WHIS) was not surveyed in the 2002 inventory. The 2003 season focused only on WHIS, thus completing the initial small mammal inventory for the Network.

Methods

The study methodology for small mammal inventories was based on live trapping specimens through the use of Sherman traps. Selection of sampling sites at WHIS was determined through a stratified random design. Using GIS, a pool of potential survey sites was determined based on the habitat affinities of each species thought to occur but undocumented in WHIS, discussions with park personnel, and analysis of available maps and management plans. A random subsample of this pool was chosen for survey using habitat type and elevation as the stratified blocking factors. This approach insured that sites randomly selected encompassed the full array of habitats and elevation zones present in WHIS.

At each sampling site, two Sherman live traps were placed every 10 meters along a 190 meter transect—a total of 40 traps per transect. Trap stations were located a minimum of 10 meters apart. Transects were linear where conditions allowed—otherwise, they meandered or turned as dictated by landscape features—and were located at least 1 kilometer apart. UTM coordinates and elevations were collected using a Geographic Positioning System (GPS) at the beginning and end of each transect. The average physical and biological habitat characteristics for the entire transect were also recorded.

The traps were pre-baited with rolled oats and sunflower chips and locked open for two nights immediately prior to trapping. The traps were then baited with rolled oats and sunflower chips for four to five consecutive nights of active trapping. During the trapping period, traps were opened and armed 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.

Site Information

We trapped nine sites in WHIS over a six week period in June and July of 2003. The sites selected encompassed the full elevation range (1020-6080 feet) found within WHIS. The Shasta Bally transect (elevation 6080 feet) was near the highest point in the park in a thick manzanita-dominated region at the top of Shasta-Bally. The County Line transect (elevation 4260 feet) was placed along County Line Road in a scattered incense cedar and ponderosa pine woodland with a sparse understory consisting of grasses, rabbit bush, and herbs. The Coggins Park transect (elevation 3920 feet) was located in a mature pine forest with an understory of oaks, maple, and ferns. The Seep transect (elevation 4040 feet) was located in a seep south of Coggins Park, which consisted of sections of land covered by permanent water, sedges, ferns, and mature alder trees. The Rich Gulch transect (elevation 2110-2180 feet) was located in a mature coniferous riparian forest area along a creek. The Red Gulch transect (elevation 2110-2180 feet) was situated in a thick oak, manzanita, and poison oak shrubland. The Paige Bar transect was divided into two sections along Paige Bar road. The first section was 90 meters long and located midslope (elevation 1680 feet) on a dry hillside with scattered pine and grasses. The second section was 100 meters long and ran alongside a creek (elevation 1580 feet) in an oak and pine woodland with a thick fern understory. The Prairie Hill transect (elevation 1435-1460 feet) was located in a small dry meadow along the Shasta-Bally dirt road. The Salt Creek transect was divided into two sections along an intermittent stream riparian corridor in the Salt Creek drainage. The first section was 70 meters long on a steep, rocky draw (elevation 1020-1580 feet). The second section was located along the stream (elevation 1020 feet) and extended for 120 meters. This sample provides valuable baseline information on distribution and abundance of small mammal taxa across the range of environments in the park.

Results and Recommendations

During the summer of 2003, ten species were recorded from 426 captures (Table 1) during a 1560 trap night effort. Trap success averaged 27%. The deer mouse (*Peromyscus maniculatus*) was the most frequently captured species, comprising 70% of the recorded observations (298/426). The brush mouse (*Peromyscus bolyii*) was the second most common (114/426; 27%) species observed. The other eight species captured were observed fewer than six times each. Three species on the species list but not previously confirmed within WHIS were observed: the Sonoma Chipmunk (*Tamias sonomae*), Allen's Chipmunk (*Tamias senex*), and the Vagrant Shrew (*Sorex vagrans*). Two other species were observed that were not listed as confirmed, although voucher specimens from 1911 were recently found: the California vole (*Microtus californicus*), and the Trowbridge shrew (*Sorex trowbridgii*).

Table 1. Number and identity of species captured on each transect in WHIS.

	Paige Bar	Salt Creek	Red Gulch	Shasta Bally	Rich Gulch	Prairie Hill	Coggins Park	Seep	County Line
<i>Microtus californicus</i>	0	1	0	0	0	0	0	0	0
<i>Neurotrichus gibbsii</i>	0	0	0	0	0	0	0	1	0
<i>Neotoma fuscipes</i>	0	0	0	0	0	0	0	0	6
<i>Peromyscus boylii</i>	14	8	35	11	19	21	2	0	4
<i>Peromyscus maniculatus</i>	11	12	27	88	59	25	39	21	16
<i>Peromyscus truei</i>	0	0	1	0	0	0	0	0	0
<i>Sorex trowbridgii</i>	1	0	0	0	0	0	0	0	0
<i>Sorex vagrans</i>	0	0	0	0	0	0	0	2	0
<i>Tamias senex</i>	0	0	0	1	0	0	0	0	0
<i>Tamias sonomae</i>	0	0	0	1	0	0	0	0	0

Of the 28 small mammal species listed on the WHIS species list, 21 are currently confirmed as present in the park. Seven species are still listed as possibly present, giving the park a confirmation level of 77%. The seven species of small mammals thought to be present in the park but still undocumented include species with very diverse habitat requirements. To reach the 90% documentation level four or five species listed as probably present will need to be confirmed. To improve the chances of documenting additional species, any future surveys should be conducted in the spring when small mammal populations are at their highest densities.

The three most easily documented species include the yellow pine chipmunk (*Tamias amoenus*), the black rat (*Rattus rattus*), and the water shrew (*Sorex palustris*). The yellow pine chipmunk should be found in lower elevation ponderosa pine dominated forest stands of the park. Identification of this chipmunk is potentially difficult, but can be done if park personnel familiarize themselves with the tail, back, and facial markings of this and the other two chipmunks present in the park. The black rat will most likely be found in the developed sections of the park or near abandoned outbuildings and home sites. Surveying for the water shrew should center on productive streams with permanent water, or inaccessible regions of the Whiskeytown Reservoir. Proper identification of this large species of shrew can easily be accomplished because of the large stiff hairs located on the rear ankles.

Documentation of the other small mammal species possibly present in the park will require trapping within areas that meet the specific habitat requirements of the species. The western red-backed vole (*Clethrionomys californicus*) requires old growth or mature coniferous forests that have closed canopies with a lot of downed logs. In contrast, the California kangaroo rat (*Dipodomys californicus*) is usually

found in brushy areas with few or no trees and prefers shallow soils with sparse ground cover (Verts and Carraway 1998). The bushy-tailed woodrat (*Neotoma cinerea*) is likely restricted by nesting sites, which are often found in trees or in rock fissures (Verts and Carraway 1998). Surveying for this species might be optimized by locating woodrat den sights and then trapping those areas to distinguish the bushy-tailed woodrat from the more common dusky-footed woodrat. The last undocumented species is the long-tailed vole (*Microtus longicaudus*). This generalist species can be found in a variety of habitats, including riparian zones, forest/meadow edges, and marshes (Verts and Carraway, 1998). Surveys for it should be conducted in the spring when densities are highest.

References

Acker, S., M. Brock, K. Fuhrmann, J. Gibson, T. Hofstra, L. Johnson, J. Roth, D. Sarr, and E. Starkey. 2002. A study plan to inventory vascular plants and vertebrates: Klamath Network, National Park Service. Unpublished Report on File, Klamath Network, National Park Service

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