Lassen Transect Resurvey
2007 Annual Report

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For Introduction and Project Goals, please see Lassen Transect Resurvey 2006 Annual Report available at: http://mvz.berkeley.edu/Grinnell/lassen/index.html

A. Mammal Surveys

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Introduction

The "Lassen Transect" is an approximately 3,125 square mile swath of northern California extending from the Sacramento River to the Nevada border (Figure 1). Within the transect are a wide variety of habitats, including the grassy plains of the Central Valley, the foothill oak woodlands, dense conifer forest, subalpine peaks and meadows, glacial lakes, sagebrush flats and high desert. The transect includes all of Lassen Volcanic National Park and Eagle Lake, large sections of the Lassen National Forest and the Tehama Wildlife Area, and portions of the Great Basin ecological region.

The terrestrial vertebrates of the Lassen Transect were originally surveyed from 1924 through 1929 by Joseph Grinnell, the founding Director of U.C. Berkeley's Museum of Vertebrate Zoology (MVZ), and his colleagues Joseph Dixon and Jean Linsdale. They visited more than 50 sites throughout the region, documenting the distributions of more than 350 species of birds, mammals, reptiles and amphibians, and collecting approximately 4,500 specimens. They summarized their results in the 1930 monograph "Vertebrate Natural History of a Section of Northern California through the Lassen Peak Region" (University of California Press). For many areas in the transect, their survey remains the most comprehensive vertebrate inventory yet conducted. Their specimens housed at the MVZ are still being used for wide variety of scientific research projects.

The resurvey of the Lassen Transect began in the summer of 2006 and is expected to take two to three years to complete. Resurvey efforts include inventorying the local bird, mammal, reptile and amphibian species as close as possible to the historic sites; collecting a few representative samples of each species as voucher specimens; taking extensive notes on the local habitats; and re-photographing specific sites that were photographed 85 years ago by Joseph Grinnell and his colleagues. The surveys in the Lassen Transect will be important for determining whether the

species' range shifts recently documented in the Yosemite Transect are occurring throughout the state. This project will also build upon local species inventory and monitoring efforts by the National Park Service, US Forest Service, California Department of Fish and Game and the Bureau of Land Management, providing important information to assist with the management and conservation of California's rich wildlife heritage.

Summary of 2007 Field Efforts

In 2007, fieldwork was conducted from April through October. Resurvey sites extended from Red Bluff (Tehama Co.) to Pete's Valley (Lassen Co.), covering a much broader area and wider elevational range than in 2006 (Figure 1). Several high-elevation sites resurveyed in 2006 were revisited in 2007 to quantify annual variation in species diversity and trap success. No subsequent mammal surveys are planned for 2008 other than a few targeted surveys for certain species (namely pika, *Ochotona princeps*, and Belding ground squirrel, *Spermophilus beldingi*).

Methodology and Extent

In general, each mammal site was surveyed over a five day period. On the first day, traps were established to sample all the major habitat types in the immediate area. Traps were then checked daily for four subsequent days. On the final morning we retrieved the traps and moved them to the next sampling location. Sites in close proximity were often sampled concurrently.

Given the differences in major habitats across the transect, the diversity of habitats at each site, and the range in food habits of our focal taxa, we did not use a standardized trapping design (such as a fixed grid or parallel lines of traps set at uniform distance intervals utilizing a common bait). Such a rigid spatial design usually fails to adequately sample all the habitat types at a site, and is a poor replication of the Grinnell-era effort. Instead, we established our traplines to explicitly sample each habitat type at a site.

A standard trapline consisted of 40 Sherman live traps and 10 Tomahawk live traps, making a total trap effort of 200 trapnights (50 traps x 4 nights). To maximize the probability of detection for small mammals, we placed individual traps in "likely" spots within each habitat (e.g., along *Microtus* runways or downed logs). Individual traps along the line might be moved among different microsites during the sampling period, depending upon the trap success rate, to maximize the opportunity to document the total mammalian diversity at the site. This flexible and adaptive approach is consistent with the methodology used by Grinnell et al., whereas a more rigid sampling frame would not be.

Traps were baited with a mixture of whole oats, birdseed mixture and peanut butter. The bait in a trap was replenished when it became low, such as after a successful capture. If trap success in any particular habitat was low, or if particular species proved difficult to sample via the Sherman and Tomahawk live traps, we conducted supplemental trapping using Victor rat traps and Museum Special mouse traps. Macabee gopher traps were used if there was fresh gopher sign in the area. Roadkills, sightings of other species (such as tree squirrels) or their calls or sign (e.g, tracks, dens, burrows, etc.) were also noted as indicators of their presence in the area.

In meadow areas we also employed pitfall traps to capture small mammals such as shrews, as well as non-aquatic amphibians and reptiles. The pitfall traps were arranged in a meandering line, usually consisting of 20-25 plastic cups (32 oz., 7" tall by 4" wide), buried to the rim in the ground at approximately 10 m intervals using a 4" soil auger. The pitfall trap lines were run concurrent with the other traps at the site. Pitfall traps were not baited. At the end of the sampling period, we removed the cups and refilled the holes. This approach had no significant impact upon the local habitat. The trapped

To determine the presence of pika, we utilized an area search method developed by Erik Beever, who is now with the US Geological Survey. His protocol relies largely on the detection of diagnostic sign such as haypiles, droppings, and alarm calls. We conducted pika surveys only in sites

1. Sacramento River Corridor (Tehama and Shasta Co.)

Our mammal inventory teams worked at sites along the Sacramento River and its associated floodplain several times in late May and mid-June; see specific localities (below) for details. The team camped at Reading Island (east of Cottonwood) during first trip, and at the Red Bluff Diversion Dam campground (just south of Red Bluff) d

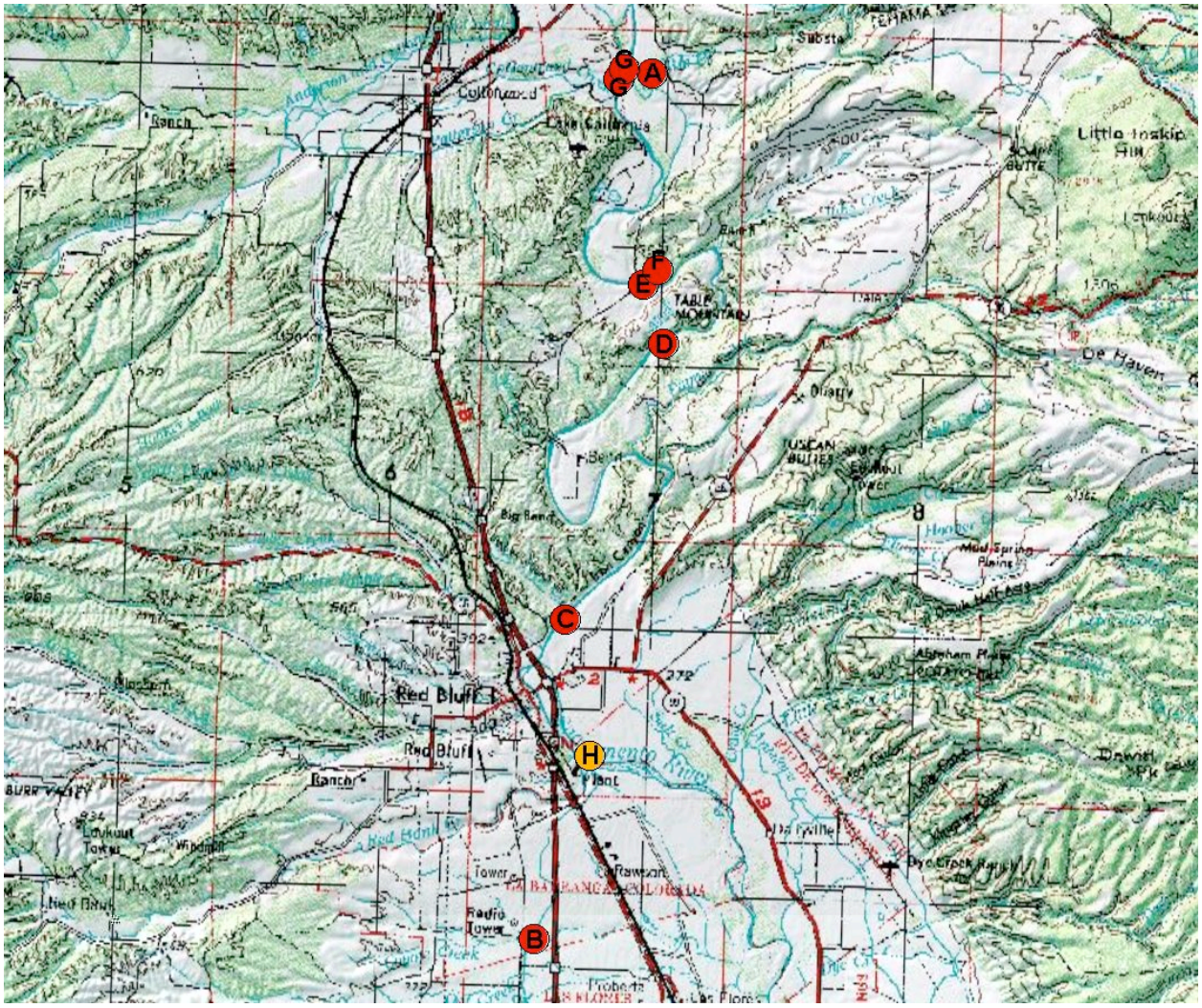


Figure 2: Mammal resurvey sites along the Sacramento River. Red circles denote standard traplines; orange circles denote other sites such as non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

A. Battle Creek Wildlife Area (Tehama Co.)

Sampling dates: 25-29 May
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: California Department of Fish and Game

This trapline meandered along the Sacramento River and the edge of denser vegetation, as well as out into flatter, more open grassland. Much of the taller vegetation was tree of heaven, black walnut, blackberry and thistle.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Microtus californicus*	2	2
Rodentia	Cricetidae	*Neotoma fuscipes*	2	2
Rodentia	Cricetidae	*Reithrodontomys megalotis*	7	7

Additional observations: One *Sciurus griseus* seen at the bridge crossing the Sacramento River the morning of 26 May. One *Neotoma fuscipes* observed standing under dense roadside bush in someone's yard, 0.2 mi S of Battle Creek Bridge, the morning of 28 May. One *Sylvilagus* sp. seen from road, 0.2 mi S of Battle Creek Bridge, on the morning of 28 May.

B. Coyote Creek at Rawson Road (Tehama Co.
Sampling dates: 18-22 June 2007
Sampling effort: 40 Shermans, 10 Tomahawks, 20 Victor rat traps.
Land ownership: private

This trapline was on a small private cattle operation near the junction of Rawson Road and Flores Road, appx. 1 mi W of Interstate 5. Coyote Creek runs along the southern edge of the property. It has a narrow strip of riparian vegetation, primarily cottonwoods, willows, blackberry, calex, etc. In some places the stream banks were up to 1 m deep, signifying some flow, but during our sampling the creek was quiet, virtually stagnant. There was no exposed gravel or cobblestone as in the historic photos (probably taken 1-2 mi E of this property); the landowner reportedly straightened the creekbed several years ago using a backhoe. The creek is fringed by non-irrigated cattle pasture used as winter forage. During our survey no cattle were present, only 3 llamas. The Shermans and Tomahawks were located primarily along the creek's N bank, at the edge of the fringing vegetation and along the bank cutouts. Most were within 2 m of the water's edge; some were immediately adjacent to the water. The last third of this line left the creek and cut across the dry pasture, sampling at spot cover such as downed trees, broken concrete and old pipes, then ran parallel to the creek along the base of a small (2-3 m) hillside edge of a dry pasture, thick with yellow star thistle. We placed the Victor rat traps among abandoned farm equipment appx 40 m from the creek's edge. Some of this equipment had extensive blackberry growth below and alongside it.

Order	Family	Species	Captured	Kept
Didelphimorphia	Didelphidae	*Didelphis virginiana*	1	0
Rodentia	Cricetidae	*Microtus californicus*	6	6
Rodentia	Cricetidae	*Peromyscus maniculatus*	3	3
Rodentia	Cricetidae	*Reithrodontomys megalotis*	13	13
Rodentia1	Muridae	*Mus m*		

Microtus californicus was captured principally along the water's edge.

One juvenile *Didelphis virginianus* was captured in a Tomahawk along the water's edge; it was released.

No *Dipodomys californicus* were captured on this line. However, a live animal was observed at close range on the evening of 18 June along Rawson Rd by M. Albe and others while night-driving for herps, and an old dry roadkill was found on Rawson Rd at the junction with Flores Rd the next day (it was not collected). Both these sites were within several hundred meters of our trapline. The property owner's grandson said they were common on other parts of the ranch. The creek area is probably the wrong microhabitat for this species.

Ondatra zibethicus: We observed what appeared to be muskrat sign along the creek on 18 June, but Tomahawk traps set there yielded no captures. On 22 June we found diagnostic remains (hind legs, feet, spine, and portions of skin; collected) on the creek bank nearby, presumably due to raptor predation.

Spermophilus beecheyi: One individual was observed at the hay barn on 22 June by R. Setsuda.

Lepus californicus were observed along trapline on 19 June by both R. Setsuda and J. Perrine, and on 21 June near the abandoned farm equipment.

A *Canis latrans* was observed in an adjacent pasture on the afternoon of 18 June.

Fresh scats filled with crayfish parts were common at the creek's edge; these were presumably made by *Procyon lotor* but we found no definitive tracks. Scats found on 19 June also contained snake scales.

We collected several pellet from a Barn Owl (*Tyto alba*) that roosted in the rafters of the hay barn, but the pellets had not yet been analyzed at the time of this report.

C. E bank of Sacramento River across from Blue Tent Creek (Tehama Co.)
Sampling dates: 18-22 June 2007
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Bureau of Reclamation

This site is appx 1 mi upstream from downtown Red Bluff, at a small "island" on the E bank of the river, across from the mouth of Blue Tent Creek. This site was meant to replicate the historic "1 mi N Red Bluff" site, which is now in private ownership and has largely been developed. This site is an undeveloped lot adjacent to the Rio Vista Mobile Estates RV / Trailer park and retirement community, whose small rectangular "harbor" and dock can be seen on USGS maps just upstream and across from the mouth of Blue Tent Creek. The first half of this line (20 Shermans, 5 Tomahawks) ran parallel to the river, appx 50-75 m from the water's edge, through the dry, ungrazed field filled with stands of yellow star thistle and clumps of mugwort. The remaining traps were placed along the small cobblestone slough area that connected the "island" to the river's E bank. This area had a few shrubs but was generally open; it was not as densely overgrown as the island itself (which was virtually impassible). Traps were placed at the base of blackberry bushes, shoreline reeds and calex, along a few cobblestone patches and at the edge of small stagnant pools.

On 21 June we placed 2 Macabee gopher traps at what appeared to be gopher diggings in sandy soil in the pasture portion of the trapline. We got no captures and pulled the traps the next morning.

Trap success was surprisingly low here; we got only one capture each of the first two days.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Microtus californicus*	6	6
Rodentia	Cricetidae	*Reithrodontomys megalotis*	2	2
Rodentia	Muridae	*Mus musculus*	1	1
Rodentia	Muridae	*Rattus rattus*	1	1

Reithrodontomys was captured along the edge of the dry pasture. Most of the *Microtus* were captured in the pasture, but one was caught in the cobblestone slough. *Rattus* and *Mus* were caught only in the cobblestone slough.

We saw *Scapanus latimanus* sign (tunnels) along the blackberry bushes at the riverside frontage of the mobile home park.

Sciurus griseus were common on the irrigated lawns at the Mobile Estates park.

We observed one *Odocoileus hemionus* splashing across the slough from the "island" to the mainland on 18 June. We heard them in the bushes on several occasions and also saw their tracks on the dirt road through the meadow.

Several days during our survey we observed one *Lutra canadensis* swimming from the dense blackberry bushes fringing the eastern riverbank, out to a small patch of reeds 10-15 m offshore. This was at the water's edge near the southern driveway and parking area for the mobile home park. The site's operator said he had seen one here "a winter or two ago."

We found *Canis latrans* scat on the cobblestones near the "island", and *Procyon lotor* tracks on the dirt road through the pasture, both on 20 June.

D. E Bank Sacramento River at Perry Riffle (Tehama Co.)
Sampling dates: 25-29 May
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Bureau of Land Management

Half of this line was on the back (non-river) side of the riverfront sand dunes, and the other half was in the oak woodlands paralleling the river. Other than poison oak on the perimeter, there were no shrubs in the Blue Oak cover here, so we placed our traps in the dry grass, at the base of oaks and near woody debris.

This trapline produced no mammal captures. However, there was old *Thomomys* sign along the hiking trail, and one *Odocoileus hemionus* was seen bounding away on 29 May.

E. Jelly's Ferry (Tehama Co.)
Sampling dates: 24-28 May 2007
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Bureau of Land Management

This trapline ran along the E bank of the Sacramento River at the Jelly's Ferry Bridge. (In the vicinity of the bridge, the Sacramento River runs W to E; the traps were on the N bank, and the line headed downstream from the bridge.) The traps paralleled the river, 5 to 20 m from the water's edge. The substrate was primarily sand, and most of the banks were densely vegetated with blackberry, mugwort, calex, cottonwoods and small oaks. No traps were placed in the adjacent pasture by the Yana Trail, as this habitat type was sampled elsewhere. Several large oaks had piles of woody debris on the upstream side of their trunks, deposited by previous high-water flows. These traps were run to accompany the herp surveys that M. Koo et al. conducted here in summer 2006, and to provide explicit sampling of the communities immediately alongside the river.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Microtus californicus*	6	6
Rodentia	Cricetidae	*Reithrodontomys megalotis*	1	1
Rodentia	Muridae	*Mus musculus*	4	3
Rodentia	Muridae	*Rattus rattus*	14	14

As at the Coyote Creek site, *Rattus rattus* was the most commonly detected small mammal, and was strongly associated with the riverfront vegetation. We captured specimens in the dense blackberry at the start of line, in dense mugwort stands, by a woody debris pile we mistook for a woodrat midden, and in rocks at water's edge. One female was lactating and another was likely gravid; the mature males were noticeably testicular.

Microtus californicus were captured tangles of in willow and blackberry atop the riverbank, in the vegetation at water's edge, and in the "rat house" woody debris pile.

Mus musculus were captured in mixed stands of equisetum, blackberry and wild oat.

The *Reithrodontomys megalotis* was caught in a dense stand of mugwort.

We observed *Procyon lotor* fur at several points along the line, presumably blown down from an old roadkill on the Jelly's Ferry Bridge nearby.

F. Oak Slough Trail, 0.5 mi N Jelly's Ferry (Tehama Co.)
Sampling dates: 24-28 May 2007
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Bureau of Land Management

Oak Slough is a BLM reserve appx 1 mi N (via the Jelly's Ferry Road) from the Jelly's Ferry Bridge over the Sacramento River. M. Koo and the herp inventory team conducted timed-area surveys along the trails here in summer 2006. Our trapline started from the SE portion of the trail loop just before it curved N toward Osprey Pond. The trapline sampled oak woodland and rocky outcrops on the SW-facing hillside, then crossed S into an ungrazed pasture, ran E along a dry stream corridor for several hundred yards, then turned N back into the pasture. The pasture

was full of vetch, foxtails, ripgut broam and wild oat. The stream channel had large blackberry bushes along the edges along with carex, mint and plantain; the channel was dry and fully vegetated, but debris in the tree branches 2 m high attested to its potential as a seasonal watercourse. Sherman traps were distributed evenly among these 3 major habitat associations: in the oaks and rocky outcrops (12 Shermans, 3 Tomahawks), in the pasture (14 Shermans, 4 Tomahawks), and in the dry stream channel (14 Shermans, 3 Tomahawks).

There were no captures in the oak woodland traps on any night, and no small mammals were seen there.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Microtus californicus*	8	8
Rodentia	Cricetidae	*Reithrodontomys megalotis*	1	1
Rodentia	Muridae	*Rattus rattus*	1	1

Microtus californicus was the most commonly captured small mammal at this site, but captures were temporally variable: none the first night, 1-2 the next nights, and 5 in the vetch meadow on the last night. *Microtus* were captured in a variety of associations: in blackberry bushes, in calex, in the dry stream channel, and in the vetch meadow.

The *Rattus* was captured in the dry stream channel near a dense blackberry bush. She had been tail-caught and dragged the trap about a meter, then gathered grass and made a tightly woven nest all around her.

The *Reithrodontomys* was captured in a dense blackberry bush in the dry stream channel.

We observed *Odocoileus hemionus* tracks along the trail; old *Thomomys* sign in the pasture along the trail, and *Scapanus latimanus* sign in the dry stream channel.

G. Reading Island (Shasta Co.)
Land ownership: Bureau of Land Management

This area is also known as "Goat Island", but the BLM campground is called the Reading Island Campground. The herp survey team camped here in May 2006. However, this trip the group campground was in use, so the mammal survey team camped in an open field under a large valley oak just inside the access gate. We ran two traplines here: one on the S end and one on the NE end of the island.

1) "south end" trapline
Sampling dates: 24-28 May
Sampling effort: 40 Shermans, 10 Tomahawks, 8 Macabees

This trapline ran through dense vegetation near the causeway waterline and partly in the grassy part of the S end of the island, near the group campground. Some *Microtus* sign was visible, but it was mostly old. At the fringes of the island is a mix of valley oak, blackberry, California buckeye, tree of heaven, aspen (only one seen) and some Ribes. We placed 4 Macabees near the group campground in mole tunnels, and 4 more along the trapline.

Order	Family	Species	Captured	Kept
Carnivora	Mustelidae	*Mephitis mephitis*	1	0
Rodentia	Sciuridae	*Spermophilus beecheyi*	2	2
Rodentia	Cricetidae	*Microtus californicus*	1	1
Rodentia	Cricetidae	*Reithrodontomys megalotis*	6	6

2) "north-east end" trapline
Sampling dates: 25-29 May
Sampling effort: 19 Victor rat traps

This line ran close to shore along the Sacramento River. The vegetation here was primarily grass with vetch, peas, oaks and various shrubs.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Microtus californicus*	2	2
Rodentia	Cricetidae	*Reithrodontomys megalotis*	2	2

On the evening of 28 May, a woman with a local wildlife rescue group released 14 *Didelphis virginianus* (two family groups) on the island. She reported that her group also occasionally releases *Spermophilus beecheyi* on the island.

Mephitis mephitis: Observed the morning of 25 May on the paved road near camp.

One *Spermophilus beecheyi* was observed on 27 May at the locked gate near the boat launch.

There was an *Odocoileus hemionus* carcass at the locked gate near the boat launch; it was scavenged by vultures for several days.

On the evening of 27 May we observed several large brown bats of unidentified species flying over the access bridge and over the mowed grassland near the group campsite.

Conroy observed several *Sylvilagus* sp. as he was driving between Reading Island and the Battle Creek Wildlife Area traplines.

H. Red Bluff Diversion Dam Campground
Sampling dates: 21-22 June
Sampling effort: 4 Tomahawks, opportunistic
Land ownership: Mendocino National Forest

The mammal inventory team camped here from 18-23 June while conducting our surveys around Red Bluff and Dale's Station.

Spermophilus beecheyi were common here and in the adjacent orchard and fields. A Tomahawk placed at burrow entrance under small tree at the next campsite caught a *S. beecheyi* within 15 minutes (21 June). There was a *S. beecheyi* colony just N of the campground access road at its

junction with Sale Lane, and 4 Tomahawks set under shrubs and at burrow entrances for 6 hours yielded 4 captures (3 retained as specimens). We got 1 additional captured there the next day (for a local total of 6 captures, 5 specimens retained).

Sciurus griseus and *Lepus californicus* were also commonly seen in and around the campground, but none were captured. There was *Scapanus latimanus* sign in the campground as well.

Other sites in the area

Perrine scouted Dog Island / Ayer Park in Red Bluff on 29 May. The island was overgrown and densely vegetated, but was laced with trails and appeared heavily used by day hikers, dog walkers, and fishing folk. *Sciurus* (presumably *griseus,* but possibly *carolinensis* given the urban setting) were abundant in and around the cottonwoods. There was sign of *Thomomys bottae* and *Scapanus latimanus* along the trail, and *Odocoileus hemionus* tracks in the mud under the footbridge.

Sciurus griseus: One ran across Jellys Ferry Road on drive to Bend Ferry, 28 May.

Spermophilus beecheyi: Commonly observed on fenceposts along I-5 throughout the section. Also observed alongside Jellys Ferry road and beside road 1 mi N of Bend Ferry bridge.

Neotoma fuscipes: We salvaged a roadkill on 26 May, 2.0 mi N (by road) of the Oak Slough parking area.

Didelphis virginianus: Roadkill observed on 24 May in Cottonwood; in poor condition and not collected.

Lepus californicus: Observed on 25 May in roadside pasture 1 mi N of Oak Slough. Also observed on Adobe Rd before reaching Cottonwood, when leaving the Reading Island campground.

Mephitis mephitis: Roadkill observed on 29 May near the Oak Slough parking area: not collected.

Procyon lotor: Roadkill observed on 24 May on Jellys Ferry Road, 0.1 mi S of entrance to Oak Slough parking area; in poor condition and not collected. On 25 May, a live animal ran across the road in Cottonwood, and another was dead on the Jellys Ferry Bridge.

2. Dale's Station (Tehama Co.)

The mammal inventory team camped at Red Bluff Diversion Dam while sampling the areas around Dale's Station. Specimens from this area are part of Accession 14336.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Dale's Lake	687	40.33059	-122.06284	200
Hog Lake	875	40.28261	-122.12289	200
Ink's Creek Ranch	656	40.33070	-122.08237	200

Paynes Creek, 0.7 mi S, 1.5 mi W Dales Station	507	40.30254	-122.10614	200

A. Dale's Lake
Sampling dates: 19-23 June
Sampling effort: 40 Shermans
Land ownership: California Department of Fish and Game

This area is now an ecological preserve managed by the California Department of Fish and Game. The lake had no standing water but the soil was still moist and muddy, with just a few standing puddles. The low vegetation was swarming with young *Pseudacris* toadlets.

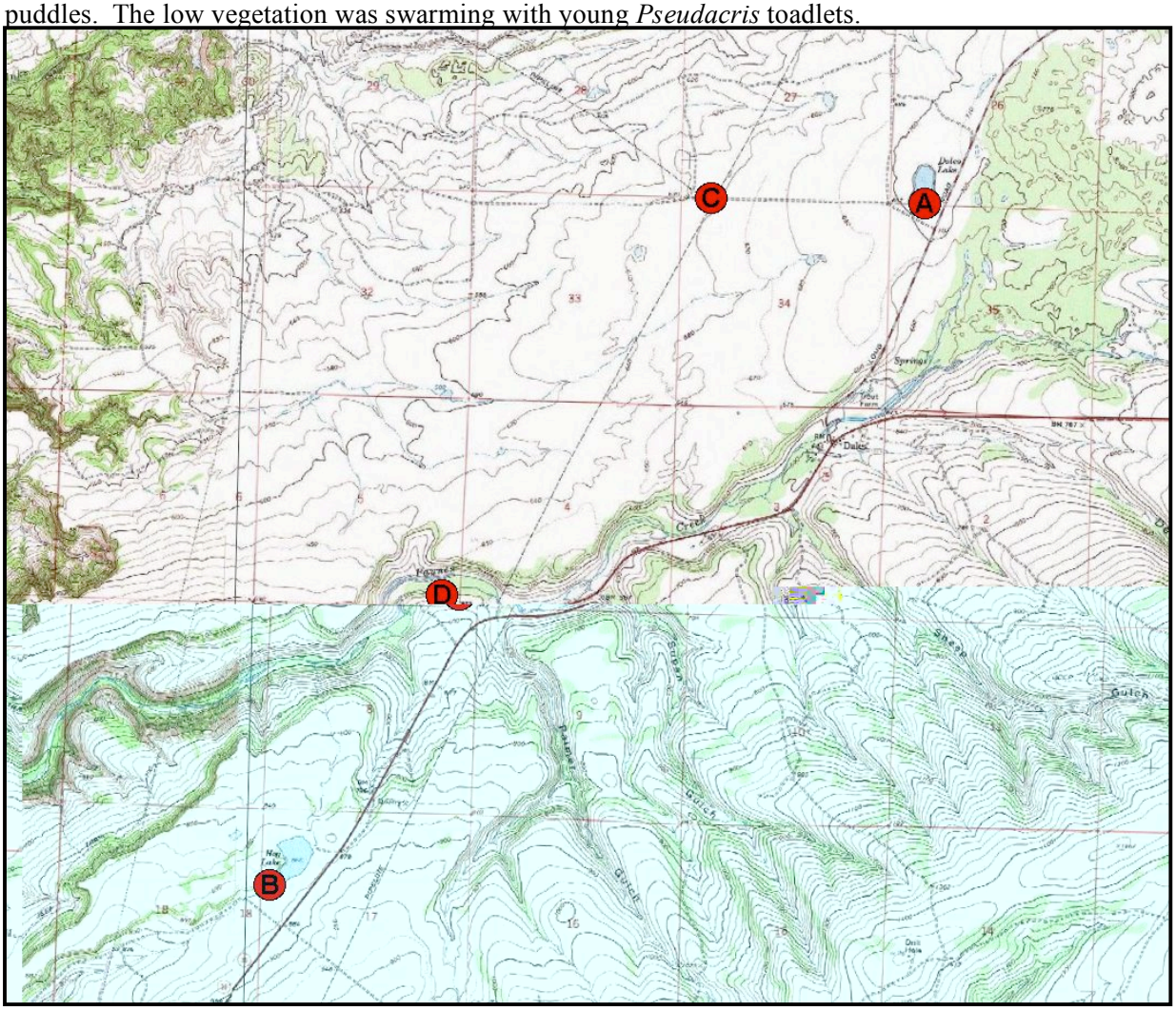


Figure 3: Traplines near Dale's Station (Tehama Co.).

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	Microtus californicus	1	1
Rodentia	Cricetidae	Peromyscus maniculatus	2	2

There was a mummified *Canis latrans* just inside the fence around the preserve.

B. Hog Lake
Sampling dates: 19-23 June
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Bureau of Land Management

We set 30 Shermans and 8 Tomahawks along the rocky bluff that separates the lake from the plateau. Blue Oaks are the dominant tree along the bluff. The lake is now dry but still muddy, similar to Dale's Lake. The remaining 10 Shermans and 2 Tomahawks ran perpendicular to the rocky outcrops, cutting across the damp mud, toward the Highway 36 side of the lake.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Peromyscus boylii*	4	4
Rodentia	Cricetidae	*Reithrodontomys megalotis*	1	1

C. Ink's Creek Ranch
Sampling dates: 19-23 June.
Sampling effort: 40 Shermans, 10 Tomahawks, 15 Macabees (set 20 June)
Land ownership: Private

This area is a working cattle ranch, although no cattle were present during our surveys. Our traps were in a barren, dry, treeless plain, with a linear rock outcropping but no other cover, near what appears to be an irrigation pumping station. There were *Dipodomys* tracks in the loose, sandy soil. We set our traps in a "V" formation, with 20 Shermans and 5 Tomahawks per arm, and the Macabees set in the open dry grassland between the arms. Set 1 Tomahawk in shade below salt station for cattle.

Order	Family	Species	Captured	Kept
Rodentia	Geomyidae	*Thomomys bottae*	2	2
Rodentia	Heteromyidae	*Dipodomys californicus*	5	5
Rodentia	Cricetidae	*Peromyscus maniculatus*	21	17

This is the first site with a significant number of *Peromyscus maniculatus* captures. Here they were large and orange, like at Dodge Reservoir (Lassen Co.) last summer.

D. Paynes Creek, 0.7 mi S, 1.5 mi W of Dale's Station
Sampling dates: 19-23 June
Sampling effort: 40 Shermans, 10 Tomahawks, 1 Macabee
Land ownership: Bureau of Land Management

This trapline ran along the outer edge of the riparian habitat along the S bank of Paynes Creek, paralleling Hwy 36 about 1.5 mi W of Dale's Station. The trapline ran down the dry, grassy slope toward the creek, past blue oaks and junipers. The riparian edge was fringed with live oak, valley oak and poison oak. Wild grape was common on and around the trees, with occasional

blackberry. There was some star thistle in the dry grass. We placed traps near several woodrat nests.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Neotoma fuscipes*	23	11
Rodentia	Cricetidae	*Peromyscus boylii*	21	10
Rodentia	Cricetidae	*Reithrodontomys megalotis*	1	1

Gopher sign was rare here and not fresh.

Other: A *Mephitis mephitis* roadkill was observed on Hwy 36, 0.5 mi from its junction with Hwy 99; we did not salvage the specimen.

3. Manton (Tehama Co.)

Our team worked in the Manton area from 25-30 April, and the specimens collected from this trip were cataloged under Accession 14329. We camped at the KOA Campground on Hwy 44, 4 mi E of Shingletown, which is at higher elevation and in different habitat associations (mixed conifer) than Manton. (Species observed near Shingletown are summarized under "Other" below). Extensive areas near downtown Manton burned two years ago when a beekeeper's truck ignited a grass fire. The town area is small, and most of the surrounding area is small farms and ranches, primarily pasture for cattle and horses, and irrigated hay fields. The dominant plant community is oak woodlands dotted with gray pine.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Canal crossing on Volta Powerhouse access road, 0.6 mi N junction with Wilson Hill Road	2213	40.45431	-121.86630	200
Digger Creek at Cross Country Ditch, 0.5 mi NE Manton	2046	40.43911	-121.86558	250
Vasquez Ranch, 0.8 mi SW of Manton (grazed pasture by houses)	1928	40.43056	-121.87949	200
Vasquez Ranch, 0.8 mi SW of Manton (ungrazed pasture along Digger Creek)	1865	40.43052	-121.88535	200
Vasquez Ranch, 0.8 mi SW of Manton (junkpile)	1896	40.42814	-121.88050	50

A. Canal Crossing on Volta Powerhouse access road, 0.6 mi N junction with Wilson Hill Road

Sampling dates: 25-29 April
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Pacific Gas and Electric

This trapline was located where Volta Powerhouse Road intersects the PG&E canal, 1 km N of Wilson Hill Road. Traps were set on both sides of the canal north of Volta Road: half of the line was set atop the west bank of the canal amidst dense growth of sweet pea; the other half was on the east side under Gray Pines, Valley Oak and shrubs (poison oak, buckeye, manzanita, ceanothus) up to 20 m from the waterway. The watercourse itself is lined with riprap and provides little in the way of aquatic habitat, although fishing lines and lures nearby attest to some inhabitants.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Microtus californicus*	6	6
Rodentia	Cricetidae	*Neotoma fuscipes*	1	0
Rodentia	Cricetidae	*Peromyscus boylii*	10	10
Rodentia	Cricetidae	*Peromyscus maniculatus*	2	2

Microtus californicus were common in the sweet pea tangles adjacent to the canal. The E bank of canal had extensive vole runways but we had no traps there (our canal-bank traps were all on the W side).

Scapanus latimanus sign was observed on the E bank close to Volta road.

We observed one *Spermophilus. beecheyi* on the dirt road flanking the canal south of Volta road on 27 April. We observed a small squirrel, probably a juvenile *S. beecheyi*, darting among the boulders and brambles at the gate on Volta Road on 25 April.

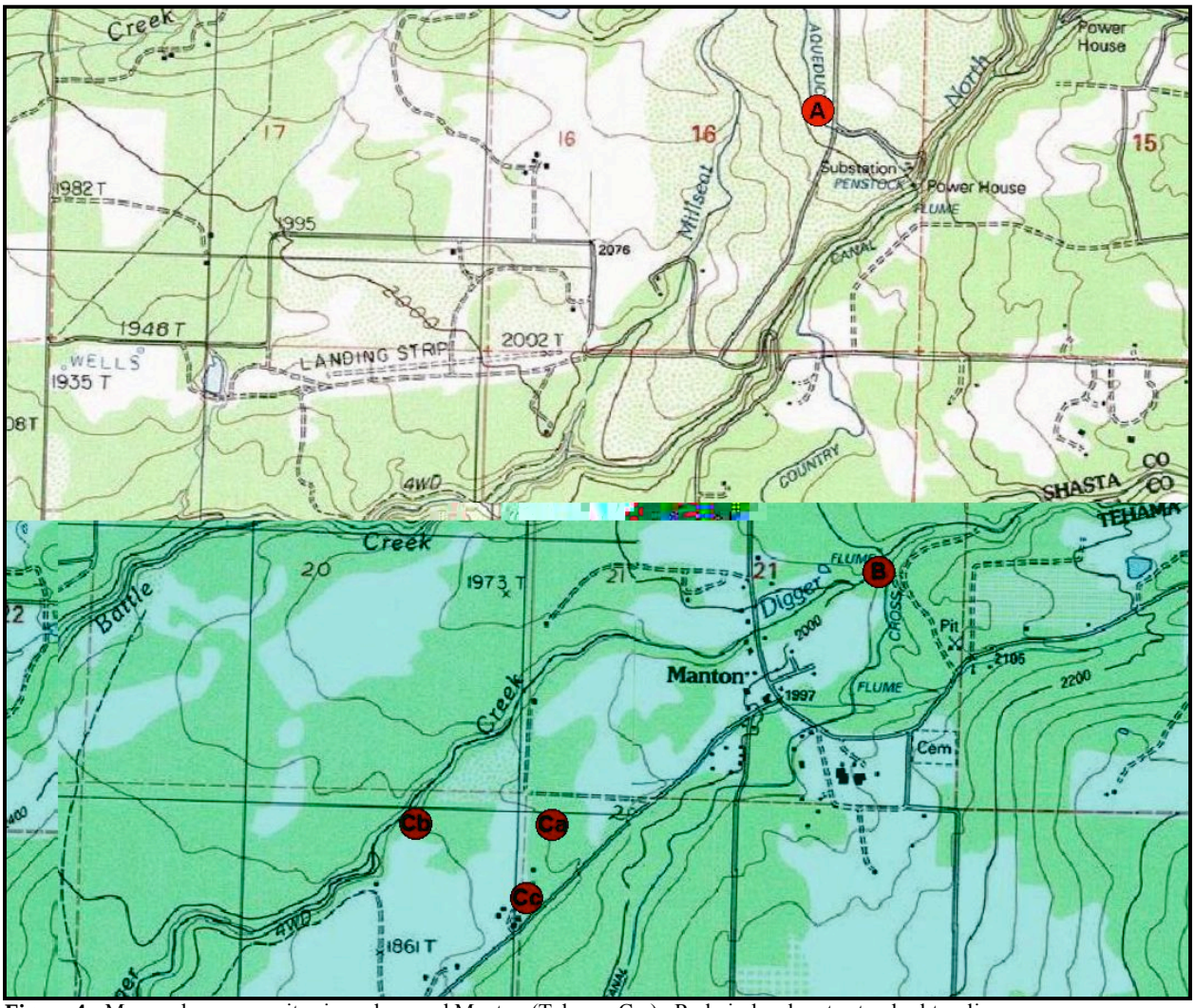


Figure 4: Mammal resurvey sites in and around Manton (Tehama Co.). Red circles denote standard traplines; orange circles denote other sites such as non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

B. Digger Creek at Cross Country Ditch, 0.5 mi NE Manton
Sampling dates: 26-30 April
Sampling effort: 40 Shermans, 10 Tomahawks, 25 pitfalls (added 27 April; pulled 30 April)
Land ownership: Pacific Gas and Electric

We selected this site to sample the riparian associations that were not present or not sampled at the other sites in Manton. We place our traps were placed on the S bank of Digger Creek, passing around and under the Cross Country Ditch flume over the creek. The trapline began at the dirt access road, ran downslope to the creek edge on the E side of the flume, circled under the flume, and back up on the E side of the flume. The creek banks were thick with blackberry, poison oak, and California bay shrubs.

On 27 April, we set 25 pitfall cups in a rough line along tall grassy patches and meadows in damp soil upslope from the creek, heading approximately W (toward "downtown" Manton) on the W side of the flume. This area transitions to a large, open meadow. None of this area had burned, although some area nearby (within 100 m) did. We did not sample in the burned areas.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex palustris*	1	1
Rodentia	Sciuridae	*Spermophilus beecheyi*	1	1
Rodentia	Cricetidae	*Microtus californicus*	5	5
Rodentia	Cricetidae	*Peromyscus maniculatus*	5	5
Rodentia	Cricetidae	*Reithrodontomys megalotis*	5	5

We caught the *Sorex palustris* near the edge of canal, adjacent to the dirt access road for flume, under a large rock and shrub (29 April). Photographs of the specific trap placement are on file at MVZ.

We observed *Scapanus latimanus* sign immediately adjacent to upper canal, just a few meters from where the *S. palustris* was caught (30 April).

The sole *Spermophilus beecheyi* was caught in a Tomahawk at this rocky outcrop. The trap had been knocked downslope into the creek. Our Tomahawks and Sherman traps on the E side of flume were tumbled daily, especially in the vicinity of the rocky outcrop. It was unclear

orchards are now gone. The current owners usually run about 50 head of cattle on the property's 200 acres, but during our visit there were only 18 cattle on site. The pastures are lined with ceanothus, blackberry, currant, poison oak, gray pine, and live and blue oaks. *Neotoma* nests were evident in the dense brambles lining the small irrigation canals, similar to those noted by Linsdale. We set three traplines at the ranch, focusing our effort on the grazed and ungrazed pastures and associated brambles and the junkpile near the barn; we did not trap in the steep, rocky banks of the creek itself.

1) "grazed pasture by house" trapline (40 Shermans, 10 Tomahawks)

This actively-grazed cattle pasture had a few rocky outcrops and was dotted with shrubs. The dirt access road on the W side of the pasture paralleled a small irrigation canal and was densely vegetated with white alder, California redbud, Oregon grape, blackberry, poison oak, interior live oak and California bay.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Spermophilus beecheyi*	2	2
Rodentia	Cricetidae	*Peromyscus boylii*	3	3
Rodentia	Cricetidae	*Peromyscus truei*	1	1
Rodentia	Cricetidae	*Reithrodontomys megalotis*	6	6

P. boylii was captured predominantly in the blackberry brambles near the dirt access road and the small irrigation canal. *Reithrodontomys megalotis* was common in this association too.

We observed *Scapanus latimanus* sign near the blackberry bushes.

Spermophilus beecheyi were observed atop the rock outcrop in the center of pasture.

Although we saw several *Neotoma* nests in the dense vegetation along the dirt road, we did not capture any on this line.

2) "ungrazed pasture by Digger Creek" (40 Shermans, 10 Tomahawks)

This trapline sampled ungrazed pasture with taller grass near Digger Creek. There were more rocky outcrops along this line, along with Yerba Santa, poison oak, and ceanothus.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Neotoma fuscipes*	1	1
Rodentia	Cricetidae	*Peromyscus boylii*	4	4

Most captures here, including the sole *N. fuscipes* (a lactating female), were associated with the rocky outcrops.

We observed *Scapanus latimanus* sign here.

3) "junkpile" (12 Victor rat traps)

Just a few hundred meters from the grazed pasture trapline and houses, flanking the dirt access road, was a small grassy clearing littered with scrap metal, wood debris, old appliances and piles of the usual farm detritus. Emergent plants here included gray pine, poison oak, brushy oaks, walnut, and California bay. We placed our rat traps under and within the junk on both sides of the road.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Neotoma fuscipes*	1	1
Rodentia	Cricetidae	*Peromyscus boylii*	5	5
Rodentia	Cricetidae	*Peromyscus truei*	1	1

Other notes from Vasquez Ranch:

The pastures were dotted with fresh gopher diggings, and Macabee traps yielded 4 *Thomomys bottae* specimens.

We caught one additional *S. beecheyi* in a lone Tomahawk trap just behind the main house.

We observed several feral cats, mostly near barn and house.

We found a fresh scat likely from *Urocyon cinereoargenteus* on a rock near Digger Creek. The property owner said that she liked these animals.

We observed *Canis latrans* scat seen near the barn on 26 April. The property owner said she occasionally saw one in the yard, and it displeased her when they got near the house.

We had an opportunity to talk with the property owner's son-in-law later at the local diner. He said that there were few lagomorphs around nowadays; cottontails were scarce and jackrabbits were in low abundance but seen occasionally (he recalled seeing a group of five in his pasture last March). Jackrabbits are more numerous at lower elevation and closer to Dale's. He thought hares had probably been declining since he was a kid (40 years ago). As a kid, he recalled collecting bounties of 10-15 cents per pair of jackrabbit ears, 5 cents for Jay, $35-40 for coyote, $50-90 for bobcat, and $100 for mountain lion. He said bears are around but are rarely seen. Wild boar are not abundant now; they were common several years ago but then crashed, and now the population seems to be coming back somewhat. (We saw no pig sign on the ranch during our surveys.) He saw kangaroo rats only occasionally on the main road (unclear if alive or roadkill; we saw none and caught none here). "There's not as many as there used to be," he reported. (Note that Linsdale got only 1 here in 1926). He had not seen any *Erethizon dorsatum* in the area "for 20 years." He said that *Bassariscus astutus* occurred "farther down Battle Creek."

The property owner noted that spotted skunks (*Spilogale putorius*), which she called "civet cats", were around the area; one got into her house and "smelled worse than a skunk," but she hasn't seen one for many years. She was surprised that Linsdale had seen a mink (*Lutra canadensis*) here, as she has never seen one.

Other: KOA Campground on Hwy 44, 4 mi E of Shingletown

We set no traps at camp but we made several observations:

Sciurus griseus were commonly seen around camp. We also observed them along the roadside halfway between the KOA Campground and the Manzanita Lake access road to Lassen Volcanic National Park. We collected two roadkills from Hwy 44 as specimens; one was collected 28 April at Richards Lane, 1.9 mi W Battle Creek); the other roadkill was collected 29 April between Shingletown and the KOA campground (1.7 mi E of jxn with Wilson Hill Road, which leads to Manton).

One *Urocyon cinereoargenteus* was observed in camp the evening of 25 April.

Tamiasciurus douglasii were commonly seen and heard at camp, but not in Manton.

A *Lepus californicus* ran through camp the evening of 26 April.

We saw no chipmunks (*Tamias* sp.) at camp, but observed several along Hwy 44 farther E toward Lassen Volcanic National Park.

Interestingly, the KOA Campground does not have bear-proof trashcans, so bears are probably not a problem in camp.

4. Lyonsville vicinity (Tehama Co.)

Specimens from this area are included in Accession 14341. The team camped in the US Forest Service's Battle Creek Campground in Mineral while surveying these sites.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
300m N Lyman Springs	3465	40.31092	-121.76334	200
Lyman Springs	3473	40.30804	-121.76366	200
Plum Creek, 500m N, 500m W Lyman Springs	3394	40.31300	-121.76505	200

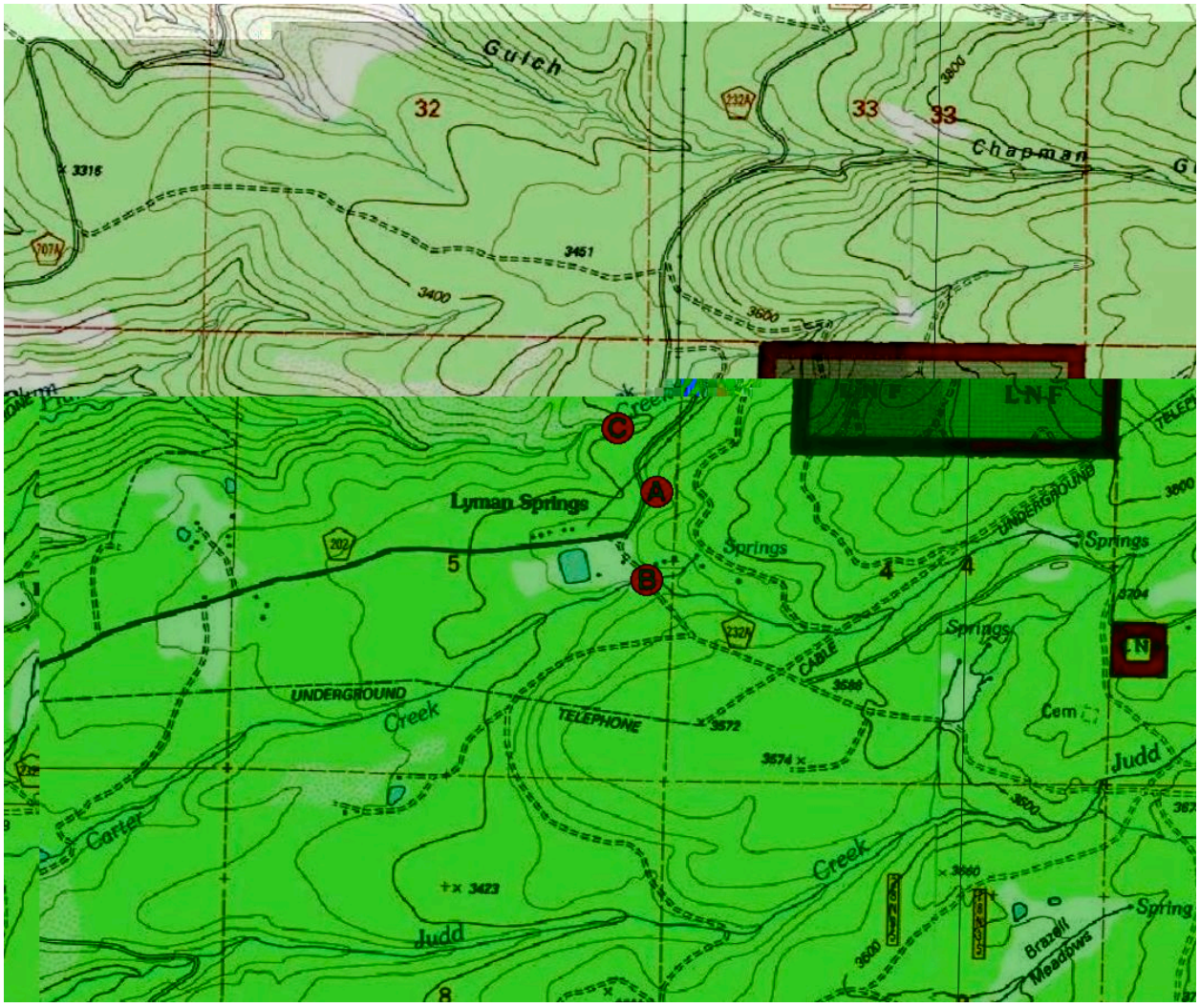


Figure 5: Mammal resurvey sites in and around Lyman Springs (Tehama Co.). Red circles denote standard traplines; orange circles denote other sites such as non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

A. 300 m N Lyman Springs

Sampling dates: 1

Rodentia	Cricetidae	*Peromyscus* sp.	1	0
Rodentia	Cricetidae	*Peromyscus truei*	6	6

We observed *Sciurus griseus* here, along with chewed yellow pine cones, but got no captures.

B. Lyman Springs
Sampling dates: 10-14 July
Sampling effort: 40 Shermans, 10 Tomahawks, 1 Macabee
Land ownership: private

This trapline covered both a portion of the springs themselves and the upper most portion of Carter Creek. The spring is densely vegetated with water moving below. Water collects at the road and is diverted through a channel to become Carter Creek. At the spring are Equisetum, corn lilies, willows, tiger lilies, and monkey flower. By the road and along Carter Creek are yellow pine, incense cedar and blackberries. There is an open, dry, grassy area adjacent to the creek that has an old apple orchard. Some wild rose are among the blackberries.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex vagrans*	1	1
Rodentia	Cricetidae	*Microtus californicu*		

a

5. Mineral vicinity (Tehama Co.)

Specimens from this area are included in Accession 14341.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Battle Creek Meadows	4835	40.33970	-121.61018	200
Bluff Falls (creek trapline)	6460	40.41389	-121.53029	250
Bluff Falls (manzanita trapline)	6630	40.41093	-121.53283	250

A. Battle Creek Meadows

Sampling dates: 11-15 July
Sampling effort: 40 Shermans, 10 Tomahawks, 5 Macabees, 10 pitfalls
Land ownership: private

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex vagrans*	3	3
Carnivora	Mustelidae	*Mustela erminea*	1	1
Rodentia	Sciuridae	*Tamias senex*	7	7
Rodentia	Geomyidae	*Thomomys bottae*	2	2
Rodentia	Cricetidae	*Microtus longicaudus*	2	2
Rodentia	Cricetidae	*Microtus montanus*	1	1
Rodentia	Cricetidae	*Microtus* sp.	1	0
Rodentia	Cricetidae	*Peromyscus maniculatus*	63	12

All shrews were captured in pitfalls, and were the only captures in the pitfalls.

B. Bluff Falls

Land ownership: Lassen National Forest

The mammal team surveyed the Bluff Falls area in summer 2006 (12 to 17 July). Trapping success was poor and few species were detected. To assess annual variability, we repeated the same traplines in 2007.
As much as possible, traps were placed in the same associations, and often within a few meters, of their 2006 locations by one of the 2006 survey team members.

The 2007 survey detected more species and had much higher trap success than the 2006 survey here.
For example, shrews were not detected here in 2006. In the original survey in the 1920s, water shrews were somewhat common at this site.

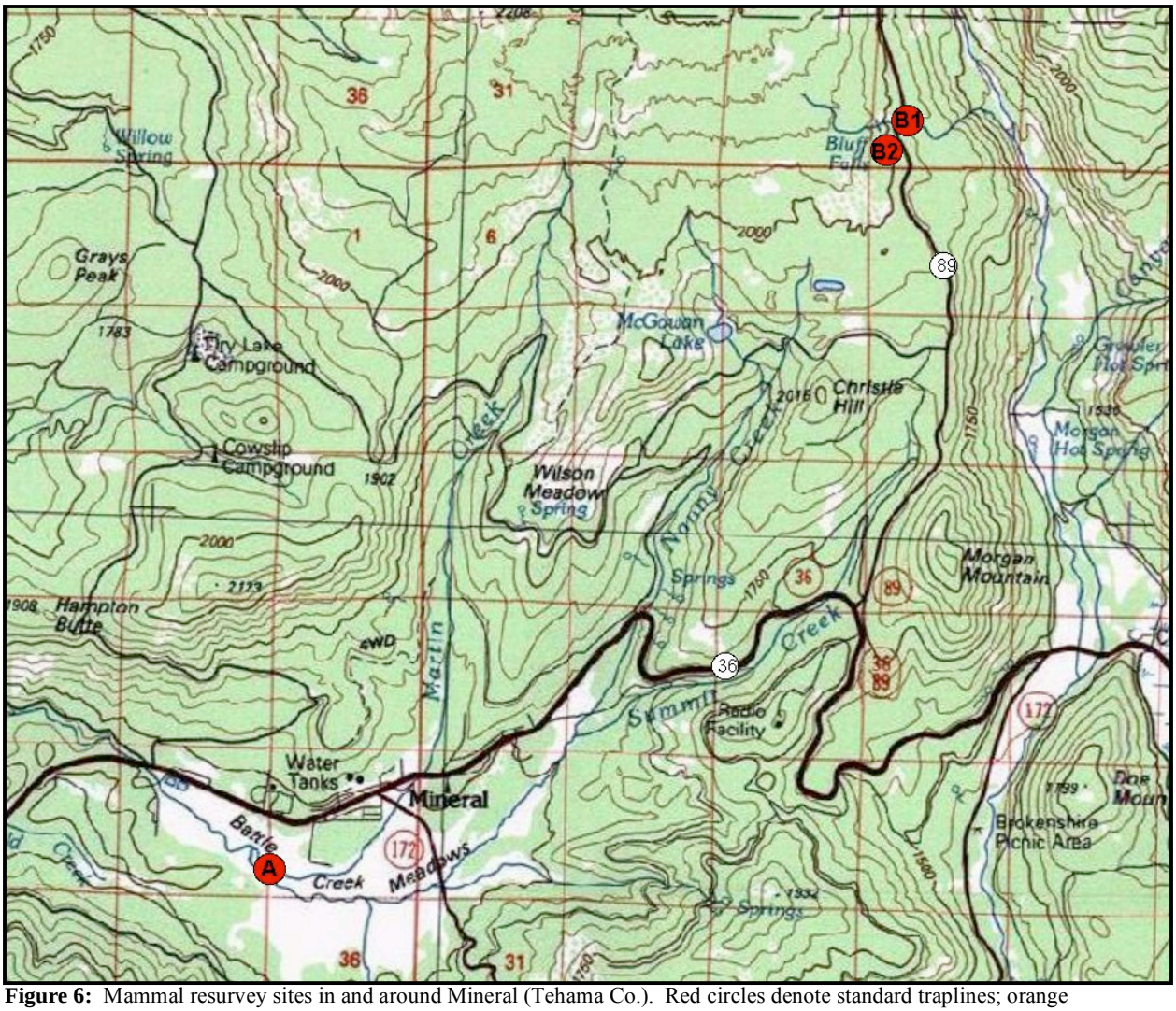


Figure 6: Mammal resurvey sites in and around Mineral (Tehama Co.). Red circles denote standard traplines; orange circles denote other sites such as non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

1) "creek" line
Sampling dates: 10-14 July
Sampling effort: 40 Shermans, 10 Tomahawks

This trapline was on the downhill side of the road from the falls. The traps were dispersed amongst brushy vegetation and where possible set near water. This site changed greatly from the original survey, in that the creek was much more exposed. The vegetation at the site has obviously grown up greatly.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex* sp.	1	1
Insectivora	Soricidae	*Sorex trowbridgii*	2	2
Rodentia	Cricetidae	*Microtus longicaudus*	3	3
Rodentia	Cricetidae	*Peromyscus maniculatus*	26	10
Rodentia	Dipodidae	*Zapus princeps*	6	5

2) "manzanita" line
Sampling dates: 10-14 July
Sampling effort: 40 Shermans, 10 Tomahawks

This line was primarily through a manzanita covered hillside just south of the falls.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex trowbridgii*	2	2
Rodentia	Sciuridae	*Tamias senex*	2	2
Rodentia	Cricetidae	*Peromyscus maniculatus*	72	10

6. Butte Lake and Pole Spring (Lassen Co.)

Specimens from this sampling trip comprise Accession 14346.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
0.4mi N, 0.9mi W Pole Spring	5803	40.58950	-121.29406	250
Butte Creek, 0.3mi N, 0.8mi W Pole Spring	5844	40.58719	-121.29036	250
Butte Lake	6051	40.56289	-121.30013	250
Butte Lake (in lava rocks)	6077	40.56192	-121.29919	100
Pole Spring, Lassen Co., Calif.	5944	40.58491	-121.27663	250

A. 0.4 mi W, 0.9 mi N Pole Spring
Sampling dates: 2-6 August
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Lassen National Forest

This line ran through very dry, flat forest typical of the area. It crossed Butte Creek at one point, which here was not an extensive riparian habitat. Canopy cover was nearly 100% in some parts.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex trowbridgii*	1	1
Rodentia	Sciuridae	*Spermophilus lateralis*	3	1
Rodentia	Sciuridae	*Tamias amoenus*	3	3
Rodentia	Sciuridae	*Tamias amoenus / speciosus*	8	0
Rodentia	Sciuridae	*Tamias senex*	31	4
Rodentia	Sciuridae	*Tamias* sp.	2	0
Rodentia	Sciuridae	*Tamias speciosus*	4	4
Rodentia	Cricetidae	*Peromyscus maniculatus*	27	6

Black bear (*Ursus americanus*) was detected here via damage to some traps.

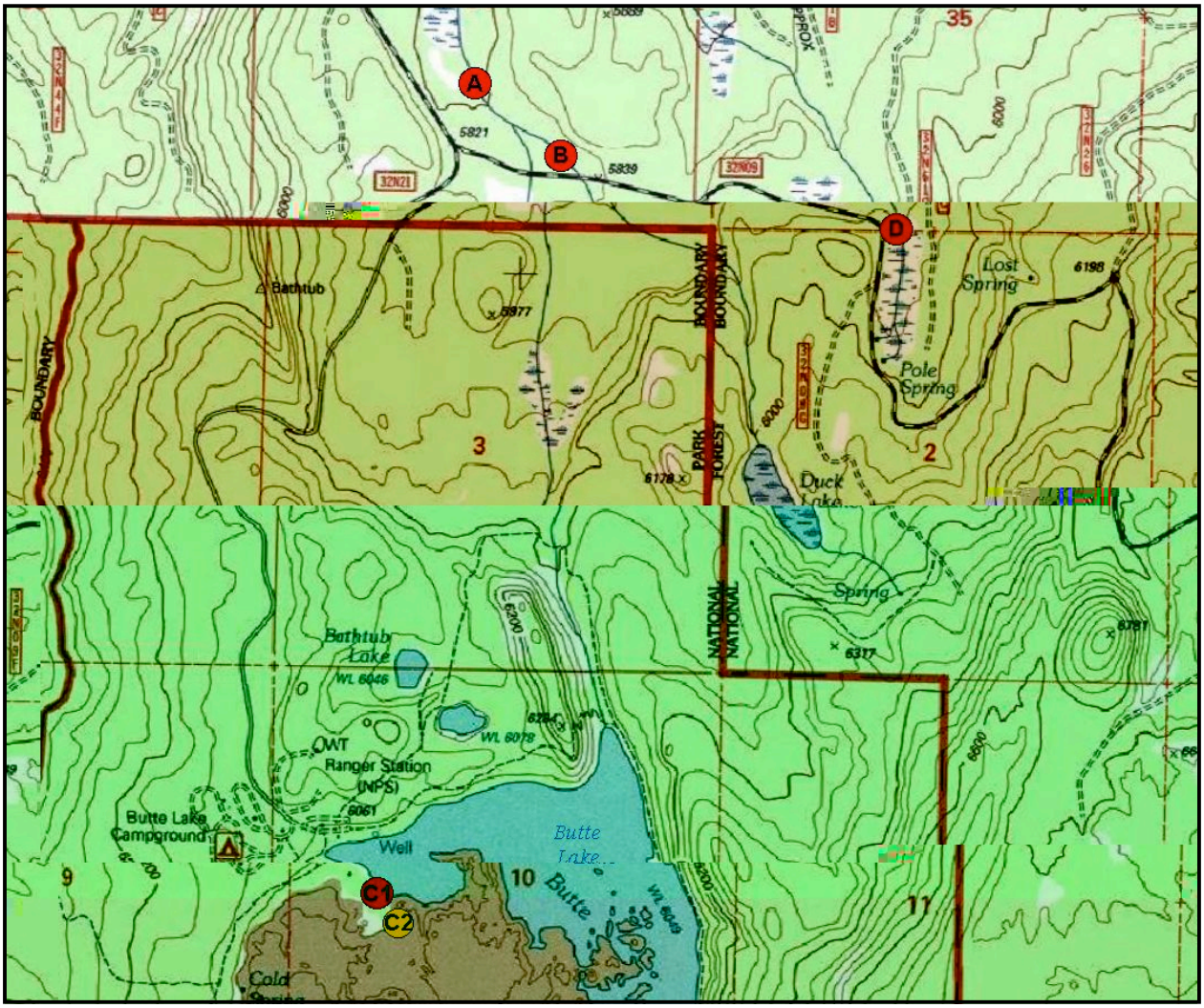


Figure 7: Mammal resurvey sites in and around Butte Lake and Pole Spring (Lassen Co.). Red circles denote standard traplines; orange circles denote non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

B. Butte Creek, 0.3 mi N, 0.8 mi W Pole Spring
Sampling dates: 2-6 August
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Lassen National Forest

This trapline began where the E fork of Butte Creek crosses Forest Service road 32N09 and continued past the W fork, from Butte Lake. The site was very grassy along the edge, with many snags. Most of the area had open canopy with much sunlight.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex trowbridgii*	1	1
Rodentia	Sciuridae	*Tamias amoenus*	3	3

Rodentia	Sciuridae	*Tamias amoenus / speciosus*	6	0
Rodentia	Sciuridae	*Tamias senex*	12	5
Rodentia	Sciuridae	*Tamiasciurus douglasii*	1	1
Rodentia	Cricetidae	*Microtus longicaudus*	6	6
Rodentia	Cricetidae	*Peromyscus maniculatus*	11	6

C. Butte Lake
Sampling dates: 2-6 August
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Lassen Volcanic National Park

This line ran along the lakeshore near the Butte Lake campground, but was hidden from visitors. The local vegetation was a dense jumble of willows, downed trees and saplings, Ribes, yellow pine, and lodgepole pine. There were sporadic patches of grass. The line ended line at piles of lava.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex vagrans*	3	3
Rodentia	Sciuridae	*Tamias amoenus*	44	8
Rodentia	Sciuridae	*Tamias senex*	1	0
Rodentia	Cricetidae	*Microtus montanus*	2	2
Rodentia	Cricetidae	*Peromyscus maniculatus*	27	5

In addition, the team set 14 Victor rat traps (3-5 August) in shady places amidst the lava field. There was no vegetation among the lava.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Tamias amoenus*	10	10
Rodentia	Cricetidae	*Peromyscus maniculatus*	2	2
Lagomorpha	Ochotonidae	*Ochotona princeps*	1	1

We heard pika (*Ochotona princeps*) heard calling, but did not see any. However, their sign (pellets and urine stains) were relatively common. We collected some dry pellets.

D. Pole Spring
Sampling dates: 2-6 August
Sampling effort: 40 Shermans, 10 Tomahawks, 14 pitfalls (3 nights effort)
Land ownership: Lassen National Forest

This site was a moist meadow with forest edge composed of mixed species, which was typical for the area. We focused on the more open grassy areas; there were aspen along the creek flowing out from this meadow. The end of the trapline veered into manzanita.

Order	Family	Species	Captured	Kept
Insectivora	Talpidae	*Scapanus latimanus*	1	1
Insectivora	Soricidae	*Sorex vagrans*	6	6
Rodentia	Sciuridae	*Spermophilus beecheyi*	1	1
Rodentia	Sciuridae	*Tamias amoenus*	2	2
Rodentia	Sciuridae	*Tamias amoenus / speciosus*	20	0
Rodentia	Sciuridae	*Tamias senex*	24	5
Rodentia	Sciuridae	*Tamias* sp.	4	0
Rodentia	Sciuridae	*Tamias speciosus*	3	3
Rodentia	Geomyidae	*Thomomys monticola*	3	3
Rodentia	Cricetidae	*Microtus longicaudus*	2	2
Rodentia	Cricetidae	*Peromyscus maniculatus*	15	2

Thomomys sign was patchily distributed near the creek.

7. Drakesbad and Willow Lake (Plumas Co.)

These specimens comprise Accession 14382.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Drakesbad (creek trapline)	5715	40.44300	-121.40800	300
Drakesbad (hillside trapline)	6000	40.44631	-121.40900	200
Willow Lake (hillside trapline)	5575	40.40637	-121.36086	250
Willow Lake (lakeshore trapline)	5451	40.40535	-121.36491	250

A. Drakesbad, Warner Valley
Sampling dates: 22-26 August
Land ownership: Lassen Volcanic National Park

1) "creek" trapline
Sampling effort: 40 Shermans, 10 Tomahawks, 6 Macabees (set evening of Aug 23)

This trapline ran through shrubs and forest along Hot Springs Creek. The habitat was a mix of willows, Ribes, alders, and the dominant trees were lodgepole pine. The Macabee traps were set in open grassy places between the riparian zone and the open wet meadows that make up much of the valley.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex vagrans*	1	1
Rodentia	Sciuridae	*Tamias amoenus*	1	1
Rodentia	Sciuridae	*Tamias senex*	3	3
Rodentia	Sciuridae	*Tamias* sp.	2	0
Rodentia	Geomyidae	*Thomomys monticola*	3	3
Rodentia	Cricetidae	*Microtus longicaudus*	7	6
Rodentia	Cricetidae	*Peromyscus maniculatus*	40	12
Rodentia	Dipodidae	*Zapus princeps*	2	1

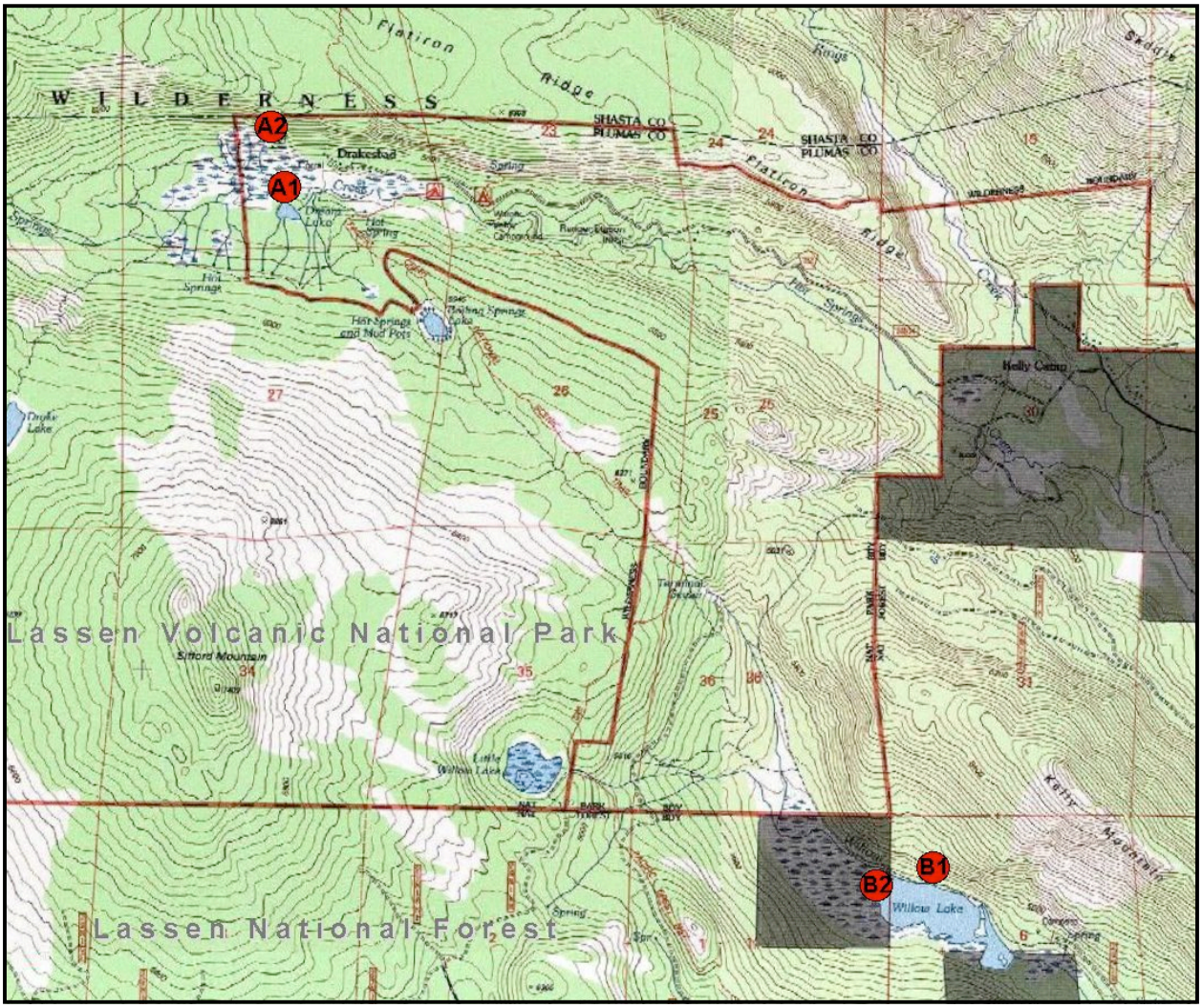


Figure 8: Mammal resurvey sites in and around Drakesbad and Wilson Lake (Plumas Co.). Red circles denote standard traplines; orange circles denote non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

2) "hillside" trapline
Sampling effort: 40 Shermans, 10 Tomahawks

This trapline skirted the upper edge of the alder-coated N side of the valley. Many seeps flowed from the hillside, producing luxuriant growth of dense alders. Above this layer, typical forest for the area (White fir, incense cedar, sugar pine, lodgepole pine and some *Ribes*) extended up to the top of the ridge. This was relatively open forest, lacking an understory.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	Spermophilus beecheyi	1	1
Rodentia	Sciuridae	Tamias senex	32	10

Rodentia	Cricetidae	Neotoma cinerea	1	1
Rodentia	Cricetidae	Peromyscus maniculatus	39	11

Conroy asked the resort staff about local wildlife. One person noted that a weasel, possibly a long-tailed weasel (*Mustela frenata*), had lived amongst some rocks near the buildings in a previous year. He also noted that there had been marmots about, but had left for the year. We also found bear scat. We lost one tomahawk on this line, and many others were moved several feet each night, suggesting some medium sized carnivores had been moving them about. In previous years, raccoons (*Procyon lotor*) have been common near the visitor cabins.

B. Willow Lake
Sampling dates: 21-25 August
Land ownership: Lassen National Forest

1) "hillside" trapline
Sampling effort: 40 Shermans, 10 Tomahawks

This trapline began about 30 m uphill from the lakeshore in clumps of low vegetation (*Ceanothus* sp.) within the forest. The forest here was composed of sugar pine, yellow pine, incense cedar, patches of Ribes and much *Ceanothus*. The understory was sparse. Some traps were set near a seep within the forest that was surrounded by tall grass and willows.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Spermophilus beecheyi*	2	2
Rodentia	Sciuridae	*Spermophilus lateralis*	3	3
Rodentia	Sciuridae	*Tamias amoenus*	2	2
Rodentia	Sciuridae	*Tamias senex*	72	12
Rodentia	Sciuridae	*Tamias* sp.	1	0
Rodentia	Cricetidae	*Neotoma cinerea*	2	2
Rodentia	Cricetidae	*Peromyscus maniculatus*	52	10

Vole sign was present here, but no *Microtus* were caught.

The "*Tamias* sp." here is likely *T. senex*. It was only the front half of the specimen; the back half was caught in the door to the tomahawk trap and eaten by a predator. Owl feathers were found at the trap.

2) "lake shore" trapline
Sampling effort: 40 Shermans, 10 Tomahawks

Most of the traps were set on a sphagnum moss layer that is partially floating on the lake. This was noted by Borell and Hunt in 1924. They also noted that cows walked on it, but we did not observe that. Cows did move through the area. Near the edge, the moss layer was very spongy and sank under our weight; one student fell through up to her knee. Blueberry and willows grow on and around it.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex* sp.	1	1
Insectivora	Soricidae	*Sorex vagrans*	13	13
Rodentia	Cricetidae	*Microtus montanus*	2	2
Rodentia	Cricetidae	*Peromyscus maniculatus*	29	10

Sciurus griseus was rare here, but we collected a roadkill during the commute between the trapping areas.

8. Lake Helen and Emerald Lake, Lassen Volcanic National Park (Shasta Co.)

Our team conducted small mammal surveys at Lake Helen and Emerald Lake in September 2006, and in 2007 we re-visited the same traplines to assess annual variation. The traplines were repeated as closely as possible, with traps in the same habitat associations and frequently within a few meters of their placement in 2006. Unlike in 2006, we camped in the Park's Summit Lake North campground. In 2007 there was much less snow remaining on Lassen Peak and the other high-elevation areas than the previous year. It is tempting to conclude that the increased trap success (in terms of both abundance and species diversity) in 2007 is directly related to the comparatively mild winter, specifically the reduction in spring snowpack. Specimens from this trip comprise Accession 14383.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Emerald Lake (main trapline)	8155	40.46889	-121.51704	250
Emerald Lake (in road dogleg)	8085	40.46732	-121.51736	50
Lake Helen	8180	40.47050	-121.51053	250
Kings Creek Falls (pika survey; no traps in 2007)	7015	40.45950	-121.44691	150

A. Emerald Lake

Sampling dates: 4-8 September
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Lassen Volcanic National Park

We placed 8 Shermans in the vegetation along W shore of the lake, 5 in the rocks at the base of the talus slope, and 6 along the SE side of the talus slope, heading upslope. The remaining 21 traps were under hemlocks and in patches of lupine, running from the talus slope to the bowl halfway between Emerald Lake and Lake Helen. We placed Tomahawks in association with every other pair of Shermans.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex vagrans*	1	1
Rodentia	Sciuridae	*Spermophilus lateralis*	17	3
Rodentia	Sciuridae	*Tamias senex*	1	1
Rodentia	Sciuridae	*Tamias speciosus*	24	9
Rodentia	Cricetidae	*Microtus montanus*	1	1
Rodentia	Cricetidae	*Peromyscus maniculatus*	54	12

The sole specimen of *Microtus montanus* was captured under a hemlock at the edge of a lupine meadow.

Peromyscus maniculatus was caught throughout the line (among hemlocks and lupine, in talus slope, and in lakeside heather) but seemed especially abundant in the talus slope.

Spermophilus lateralis was caught primarily near boulders and rocky outcrops. It was particularly common in the talus slope.

Tamias speciosus was caught throughout the line.

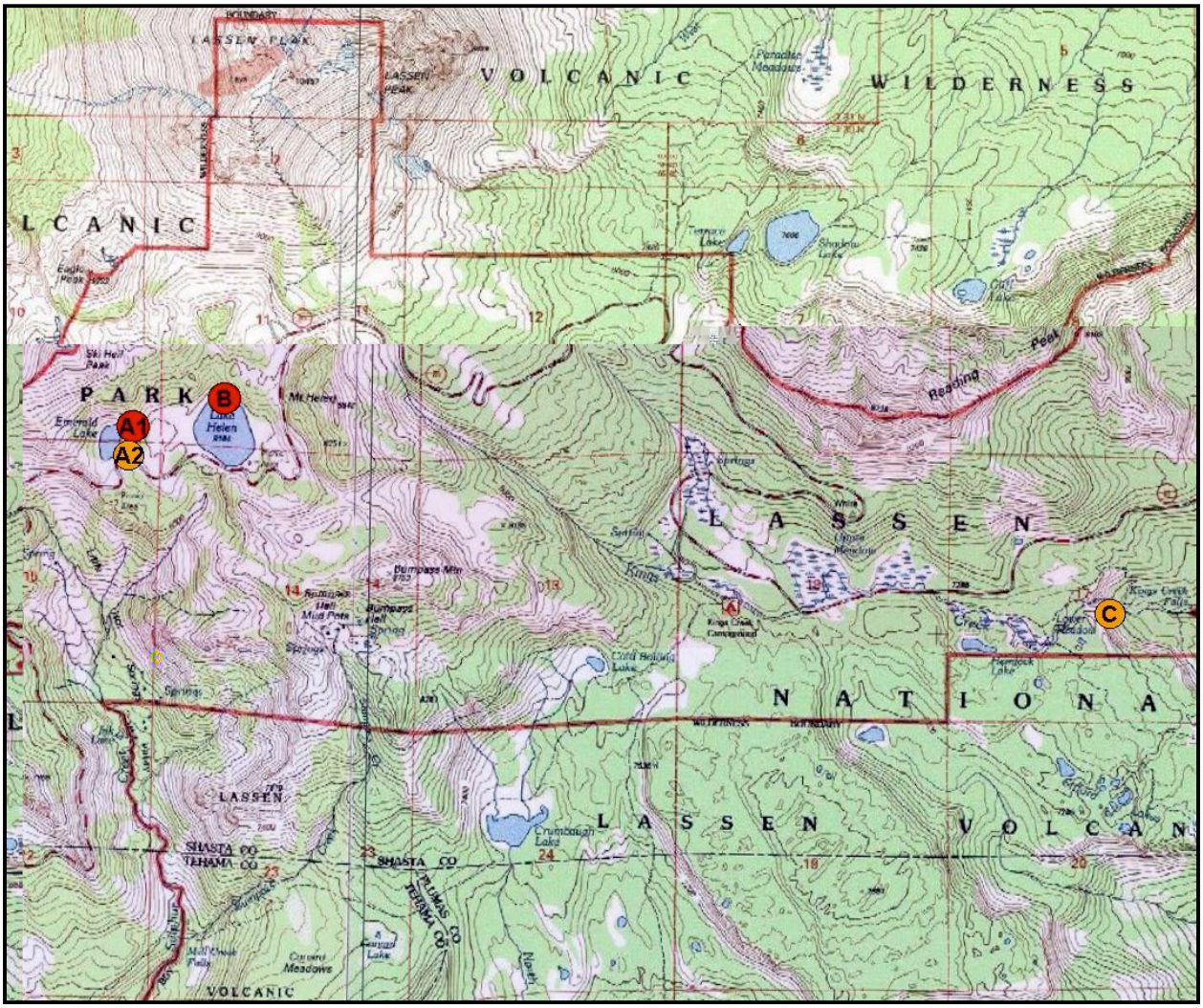


Figure 9: Mammal resurvey sites in Lassen Volcanic National Park (Shasta Co.). Red circles denote standard traplines; orange circles denote non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

Sorex vagrans was caught in heather along the lakeshore, under a hemlock.

Tamias senex: A single individual was caught on the last survey day in the last trap at the end of the line closest to Lake Helen.

We heard calls of *Tamiasciurus douglasii* while walking the trapline, and may have seen one darting among hemlocks, but had no captures.

We did not conduct formal search here for *Ochotona princeps* this year, but we found a single scat pellet in the rocks near the base of the talus slope. We saw no individuals, heard no calls, and saw no haypiles.

We observed one *Marmota flaviventris* briefly in the talus slope, and we saw a fresh scat latrine there.

We saw no whitewash or other sign of *Neotoma cinerea* in the talus here.
Emerald Lake "dogleg" in highway:
There is a small meadow inside the road dogleg at Emerald Lake, and here we set 14 Macabees at fresh gopher sign, and 3 Tomahawks in the roadside rocks where we had seen a pair of marmots. One of the marmots had a prominent white blaze on its snout.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Spermophilus lateralis*	5	0
Rodentia	Sciuridae	*Tamias speciosus*	3	0
Rodentia	Geomyidae	*Thomomys monticola*	5	5

We captured no *Marmota flaviventris* here, and never saw them after we set the traps for them. The traps captured only *Spermophilus lateralis* and *Tamias speciosus*, all of which we released.

We observed fresh *Scapanus latimanus* sign in the meadow among the gopher mounds.

We also observed a doe *Odocoileus hemionus* with spotted fawn.

Bowl between Emerald Lake and Lake Helen:
On 5 September we set 19 Macabees in the shallow depression between Lake Helen and Emerald Lake. This area probably retains meltwater in early spring; it is a sparsely vegetated lupine meadow fringed with young hemlocks. The lupine here were in flower with many seed pods still intact. The manzanita along the slopes had unripe berries, half green and half burgundy. The volcanic soils were very loose; the gopher tunnels, only 1-2 inches below the surface, collapsed beneath our feet as we walked. We acquired a total of 3 *Thomomys monticola* specimens here.

B. Lake Helen
Sampling dates: 3-7 September
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Lassen Volcanic National Park

As in 2006, this trapline ran along the slopes on the N shore of Lake Helen, from near the road pullout overlooking the lake, down to the water's edge, and then back upslope into a boulder

field. Many small mammal holes showed sign of recent activity. The only trees here are hemlocks, and the slopes have patches of pine-mat manzanita (*Arctostaphylos nevadensis*). Traps were placed in the same associations as in 2006: Under rock overhangs, among hemlocks and manzanita brush, aside fallen logs at the lake shore, and in grassy patches near large boulders.

Order	Family	Species	Captured	Kept
Insectivora	Soricidae	*Sorex trowbridgii*	1	1
Insectivora	Soricidae	*Sorex vagrans*	1	1
Rodentia	Sciuridae	*Spermophilus lateralis*	6	2
Rodentia	Sciuridae	*Tamias senex*	6	4
Rodentia	Sciuridae	*Tamias* sp.	1	0
Rodentia	Sciuridae	*Tamias speciosus*	17	9
Rodentia	Cricetidae	*Clethrionomys californicus*	1	1
Rodentia	Cricetidae	*Peromyscus maniculatus*	25	6

The first day's captures (10 captures, 3 species) exceeded the productivity of last year's total sample from this line. The cool, rainy weather early in the trapping session caused several trap mortalities.

The *Clethrionomys californicus* was originally identified in the field as a juvenile montane vole, but we revised this based on its reddish pelage, small eyes, unfurred ears and small size. It was captured in a Sherman trap under a hemlock among large rocks upslope (NW) from Lake Helen, near the end of our trapline.

Odocoileus hemionus sign (tracks and fecal pellets) was abundant.

We observed a *Marmota flaviventris* roadkill on the park road between the Lake Helen picnic area and the pullout overlooking the lake the evening of 3 September; it was gone the next day.

C. King's Creek Falls

On 7 September, Perrine and volunteer Carla Ebeling conducted a survey for *Ochotona princeps* at the talus slope across from the Upper Kings Creek Falls, from 1640-1740 h. This site corresponds to the "Warner Creek, 6600 feet" historic locality sampled by Joseph Dixon and Leo Wilson in 1923. Their field notes make it clear that they were observing and collecting pika at this talus slope across from what is now known as Upper Kings Creek Falls. For reasons that are unclear, the specimens they collected during these dates were ascribed the same locality as the specimens they collected while at their previous camp at Upper Kings Creek Meadows (which they called "Warner Creek, 8000 ft."). The capture dates make it clear that they were no longer working the same site.

Perrine and Ebeling found pika fecal pellets within 5 minutes. They also heard alarm calls and observed at least 1 individual. They found very large latrine piles and an old haypile of dried twigs. They took photographs of fecal pellets at the latrines and collected a few pellets as voucher specimens. Several of the fecal pellets were stuck to the rocks, as with a sticky transparent resin. They surveyed only 25% of the slope closest to the creek. Clearly, this site is currently occupied by pika. They also saw several *Spermophilus lateralis* among the rocks.

Other: Summit Lake North Campground

At camp, *Tamiasciurus douglasii* was commonly heard around the campground. They tended to start vocalizing around dawn and were active all day, cutting cones from the nearby conifers. We also observed them running across the road between camp and the Lake Helen pullout.

We also saw several small chipmunks (*T. speciosus*? We did not capture any to confirm) and occasional *Spermophilus lateralis* around camp.

Note that no Gray Jays seen at this campground, but a pair visited us daily at the Lost Creek Campground in 2006.

On 7 September, we awoke to what sounded like a pair of *Canis latrans* yipping and howling at 0550 h. The vocalizations lasted only about 30 seconds. The vocalizations were simultaneous; one a wail, the other a staccato "yipping." Both seemed to be coming from the bowl across the park road from the Summit Lake campgrounds. This is the first suspected coyote vocalizations Perrine has heard in the park (although he did night telemetry, he was not camping in the park during this work, and so would not have heard vocalizations from 3-7 AM.)

9. Slate Creek and Bailey Reservoir (Lassen Co.)

These two sites were surveyed from 10-15 September, and the specimens from this trip are Accession 14384.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Bailey Reservoir (creek trapline)	5550	40.80633	-120.61257	200
Bailey Reservoir (Patton-1 trapline)	5600	40.80526	-120.61539	200
Bailey Reservoir (Patton-2 trapline)	5588	40.79976	-120.61145	200
Bailey Reservoir (rocks trapline)	5700	40.80376	-120.60949	200
Bailey Creek (camp trapline)	5495	40.81350	-120.60123	100
Slate Creek (juniper trapline)	5383	40.84426	-120.77229	200
Slate Creek (mtn mohogany / cliff trapline)	5348	40.84853	-120.76834	200
Slate Creek (sagebrush trapline)	5344	40.85129	-120.76727	100
Slate Creek (yellow pine trapline)	5503	40.84819	-120.77441	200
1.5 mi S, 1 mi E Heath Dam Reservoir	5682	40.82071	-120.76741	200

A. Bailey Reservoir
Land ownership: Bureau of Land Management

1. "Reservoir" traplines (4 traplines, sampling slightly different habitat associations)
Sampling dates: 10-15 September
Sampling effort: 4 traplines (each of 40 Shermans and 10 Tomahawks), + 7 Macabees

This site corresponds to the historic "5 mi N Fredonyer Peak" locality sampled by Joseph Dixon and Adrey Borell in September 1924. According to their field notes, they camped along Bailey Creek near a "pond" which is presumably where the current reservoir is today. Thanks to several volunteers, our team was able to sample this area heavily, setting four traplines radiating out from the reservoir, each sampling a different habitat association. One line ran along the basalt hillside among the juniper and yellow pine to the immediate east of the reservoir. Another line sampled the habitats along the outflow from the reservoir. A third line ran along the juniper and basalt

outcrops to the northwest of the reservoir. The final line was set at the southern end of the reservoir, among the lakeside willows and the sagebrush flat at the edge of the juniper woodland. The area is mostly open juniper woodland with occasional yellow pine, and an understory mostly of sagebrush, bitterbrush and Ribes. Traps were checked both morning and evening, due to the presence of *Tamias*. In addition to the four traplines, the team placed 7 Macabees in the meadow around the southern end of the reservoir.

The habitats here all seemed heavily impacted by cattle, which are free-ranging here. According to locals, many of these cattle are simply wild, without brands or tags.

In his field notes, Borell described the stick nests of woodrats in the branches of juniper, and concluded that these belonged to *N. cinerea* because he saw one exiting a nest when disturbed. Neither Borell nor Dixon trapped or mentioned *N. fuscipes*, but our team found their large stick houses at the base of junipers as well as in the branches at several places along Bailey Creek between camp and the reservoir. Jim Patton, who ran most of the lines at this site, suspects that the stick house nests described by Borell were actually made by *N. fuscipes*, even if one had been occupied at the time of his visit by a *N. cinerea* (or Borell was mistaken in his identification as he watched the rat disappear).

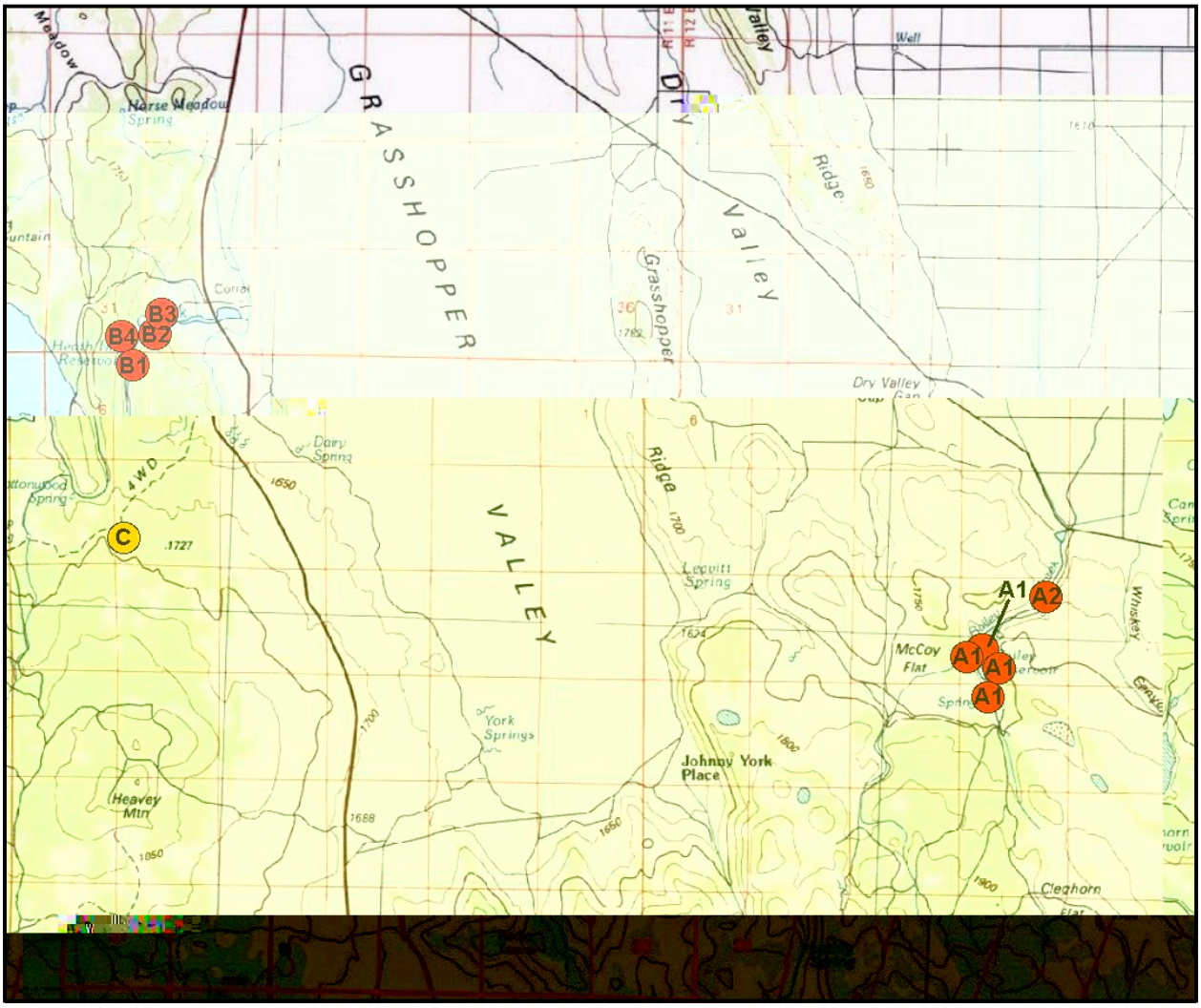


Figure 9: Mammal resurvey sites at Bai[redacted]sen Co.). Red circles denote standard traplines; orange circles denote non-stand[redacted]rs correspond to section headers in text below.

Order	Family	[redacted]	Captured	Kept
Insectivora	Soricidae		1	1
Insectivora	Soricidae			

were run here and the area likely had a similar vegetation profile. However, the original surveyors did note more creekside vegetation where they found *Microtus*. The flat areas adjacent to the creek are sagebrush dominated with some junipers. Gopher sign is evident, and 5 traps were set in their burrows. Farther up the creek is more yellow pine, but with practically no understory.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Spermophilus lateralis*	5	2
Rodentia	Sciuridae	*Tamias amoenus*	43	4
Rodentia	Geomyidae	*Thomomys talpoides*	1	1
Rodentia	Cricetidae	*Neotoma fuscipes*	1	0
Rodentia	Cricetidae	*Peromyscus maniculatus*	37	7
Rodentia	Cricetidae	*Peromyscus truei*	1	1

2) "mountain mahogany / cliff" trapline
Sampling dates: 11-15 September
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Private

This line was intended to sample a unique cluster of vegetation and rocky bluff on the east side of the creek. We noted aspen, mountain mahogany, flowering rabbit brush, and *Ribes* spp., as well as juniper. The rock crevices had abundant woodrat sign.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Spermophilus lateralis*	1	0
Rodentia	Sciuridae	*Tamias amoenus*	56	2
Rodentia	Heteromyidae	*Perognathus parvus*	1	1
Rodentia	Cricetidae	*Neotoma cinerea*	3	2
Rodentia	Cricetidae	*Neotoma fuscipes*	8	3
Rodentia	Cricetidae	*Peromyscus maniculatus*	34	3
Rodentia	Cricetidae	*Peromyscus truei*	7	4

3) "sagebrush" trapline
Sampling dates: 10-14 September
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Private

This line ran through a flat, sagebrush-dominated area with only a few junipers.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Tamias minimus*	26	10
Rodentia	Heteromyidae	*Dipodomys californicus*	1	1
Rodentia	Heteromyidae	*Perognathus parvus*	1	1
Rodentia	Cricetidae	*Peromyscus maniculatus*	20	5

4) "yellow pine" trapline
Sampling dates: 11-115 September
Sampling effort: 40 Shermans, 10 Tomahawks
Land ownership: Private

This line ran along

10. Pete's Valley (Lassen Co.)

Sampling dates: 19-23 October
Land ownership: private

Pete's Valley is approximately 12 mi (by air) northeast of Susanville. The historic "Pete's Valley" locality is now part of the privately-owned Pete's Valley Ranch, although portions of the adjacent property are managed by BLM. This ranch is the same property sampled by Linsdale and Lamb in 1928. Our team camped just outside the southern extent of the ranch, where a metal gate blocks the dirt access road. The specimens from this trip comprise Accession 14388. The dirt here is loose and powdery and the road reportedly becomes impassible after even minor rains. The floor of the valley is covered with scattered lava rocks and outcrops, and the loose puffy dirt around the rocks gives the general impression of extensive gopher activity.

The southern part of the valley has juniper on the hillsides and sage on the lower slopes. The private lands on the valley floor along the access road from Susanville are primarily irrigated fields and pasture for cattle and the occasional domestic bison; passing onto BLM land it becomes a sparsely vegetated rocky plain dotted with sporadic shrubs and trees.

According to the landowner, the road through Pete's Valley was the main route from Alturas to Reno in the 1880s, and there was a stage stop near the current cabin. After the stage was discontinued, there was a "colony" here (homesteaders?) but it failed and the bank owned the property until the Depression, when the landowner's family bought it for extra pasture. They converted the property to grazing from high desert. The landowner now runs 150-200 head of cattle on this property and the adjacent BLM land. This year, he pulled the cattle off the property about 2-3 weeks earlier than usual. The current cabin is the old cookhouse, the main 2-story house burned down (unclear when), and the cottonwood grove dates to before Grinnell's time.

Locality	Elev (ft)	Latitude	Longitude	Extent (m)
Pete's Valley (pond trapline)	4539	40.53100	-120.45715	200
Pete's Valley (rabbitbrush pasture / rocky outcrop)	4530	40.52303	-120.47273	200
Pete's Valley (camp trapline)	4524	40.52438	-120.46666	200
Pete's Valley (between cabin and camp)	4539	40.52497	-120.46986	10
Pete's Valley (between pond and cabin)	4525	40.52895	-120.46551	50

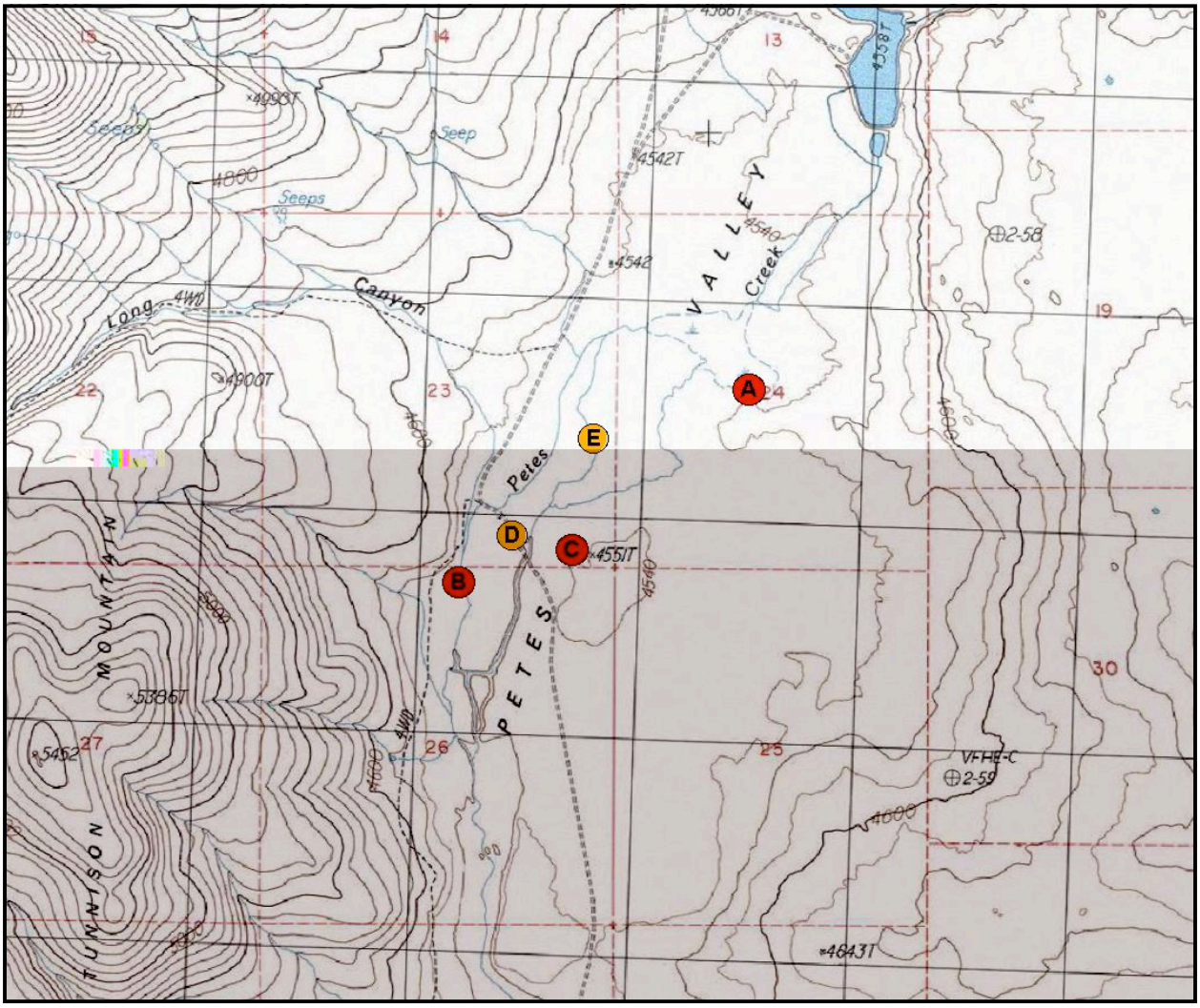


Figure 10: Mammal resurvey sites at Pete's Valley (Lassen Co.). Red circles denote standard traplines; orange circles denote non-standard traplines, campsites, etc. Letters correspond to section headers in text below.

During our survey, overnight temperatures were below freezing, producing occasional trap mortality. There were light rains the first days of the survey. The property owner had just removed the cattle from the ranch 4 days prior to our arrival. Most of the pastures contained extensive cattle sign and little standing grass or forbs >4 cm tall. Water was present but highly localized: in a few standing pools in the otherwise dry creek, in the narrow irrigation canals, and in a few small ponds northeast of the ranchers' cabin and the cottonwood grove.

A. "pond" trapline
Sampling effort: 40 Tomahawks, 10 Shermans

There was no cover along the edge of the pond but there was a rocky outcrop just to the south, dotted with junipers. We placed about half of the trapline in an arc following the outcrop and the other half in the heavily grazed pasture along the edge of the pond. Not surprisingly, virtually all

of the captures were from the rocky outcrop; only the occasional *Peromyscus maniculatus* was captured by the pond edge.

Order	Family	Species	Captured	Kept
Rodentia	Sciuridae	*Ammospermophilus leucurus*	2	2
Rodentia	Cricetidae	*Neotoma lepida*	1	1
Rodentia				

Neither team member (Perrine and Wilcox) had previously caught *Peromyscus crinitus*, and so these were originally mis-identified in the field as the large desert subspecies of *P. maniculatus.* This mistake was realized upon closer inspection of several of the specimens collected the first day. It is possible that several of the *P. maniculatus* that were captured and released alive were actually *P. crinitus.*

The *Dipodomys californicus* and *Reithrodontomys megalotis* were captured almost exclusively in the pasture beneath rabbitbrush and sage shrubs. One *R.. megalotis* was captured under a sage bush adjacent to the rocky outcrop.

The *Neotoma lepida* and *Peromyscus truei* were captured at the rocky outcrop. *Neotoma* captures were comparatively high because we moved the traps to a new spot in the rocks after each successful capture.

We found a scat that was likely from a *Mustela* sp. on the rocky outcrop.

C. "camp" trapline
Sampling effort: 40 Shermans

This trapline ran across the rocky plain where we camped (by the south gate to the ranch), westward toward a low rocky outcrop. The dominant vegetation on the plain was dry grass and medusahead.

Order	Family	Species	Captured	Kept
Rodentia	Cricetidae	*Neotoma lepida*	2	2
Rodentia	Cricetidae	*Peromyscus crinitus*	1	1
Rodentia	Cricetidae	*Peromyscus maniculatus*	43	10
Rodentia	Cricetidae	*Peromyscus truei*	7	4
Rodentia	Cricetidae	*Reithrodontomys megalotis*	1	1

As with the other lines, some of the *P. crinitus* may have been mis-identified in the field as *P. maniculatus*.

The *Neotoma lepida* and *P. truei* were captured in the rocky outcrop. The *Neotoma* had a large bot in its inner foreleg that emerged before we prepped the specimen.

We found a *Sylvilagus* mandible beside a juniper stump atop the rocky outcrop. As with the *Erethizon* mandible noted on the "pond" line, it may have been moved here by a *Neotoma*. However, there was a lot of lagomorph scat nearby.

We heard *Canis latrans* yipping and howling at dawn on 21 Oct.

Gopher lines:
The gopher sign here was highly localized. We ran two Macabee traplines from 20-23 October. The first line consisted of 15 Macabees located "halfway between the pond and cabin." This line was on a low hillock with very little vegetation, and yielded 5 *Thomomys talpoides* (all kept as specimens). The second line consisted of 5 Macabees located "between cabin and camp." This line was on either side of the road shoulder just S of the cabin and cottonwood grove, and yielded 1 *Thomomys talpoides* (kept as specimen).

Other:

We found both halves of the mandible of a *Puma concolor* on the plain when walking from the cabin to the pond trapline on 21 Oct.

We noted *Ondatra zibethicus* sign (a burrow entrance) in a new irrigation canal a few hundred meters N of the cabin. The property owner confirmed that Muskrats are here on the ranch; he says there are more in the creek confluence at the N end of valley.

In the dry creek channel were holes that were likely from *Spermophilus beecheyi*, but we never saw or captured any individuals. However, we did observe one S of the valley as we were heading back to Susanville; it was standing on the shoulder of Belfast Road, 2.5 mi N of junction with A-27 / Center Road, on 23 Oct, around 1745 h.

There was gopher activity in the irrigated hayfields on Belfast Road south of Pete's Valley. The mounds were quite large, conical and symmetrical, like little volcanoes, not the hemisphere- or crescent-shaped mounds we saw with *Thomomys talpoides* near the cabin. Perhaps these burrows in the irrigated hayfields were made by a different species?

Acknowledgements

We extend our deepest thanks to the private landowners who allowed us access to their properties. We also thank the land managers who allowed us to work on their lands, including Chip Stalicia with PG&E in Manton, Cajun James of Sierra Pacific Industries, Michael Magnuson of Lassen Volcanic National Park, Richard Callas with the California Department of Fish and Game, Tom Frolli and the staff of the Lassen National Forest, the staff of the Red Bluff office of the Bureau of Reclamation, and the staff of the Susanville office of the Bureau of Land Management.

This project would not have been possible without our field technicians Rika Setsuda and Ashley Lipps, field volunteers Jeff Wilcox, Carla Ebeling, Jim Patton, Cyndy Chiao, Monica Albe, and Felix Radcliff, and the support staff of the Museum of Vertebrate Zoology in Berkeley. We particularly thank Monica Albe, who manages the MVZ's specimen prep lab, and Michelle Koo who heads the GIS team; Michelle made the maps for this report.

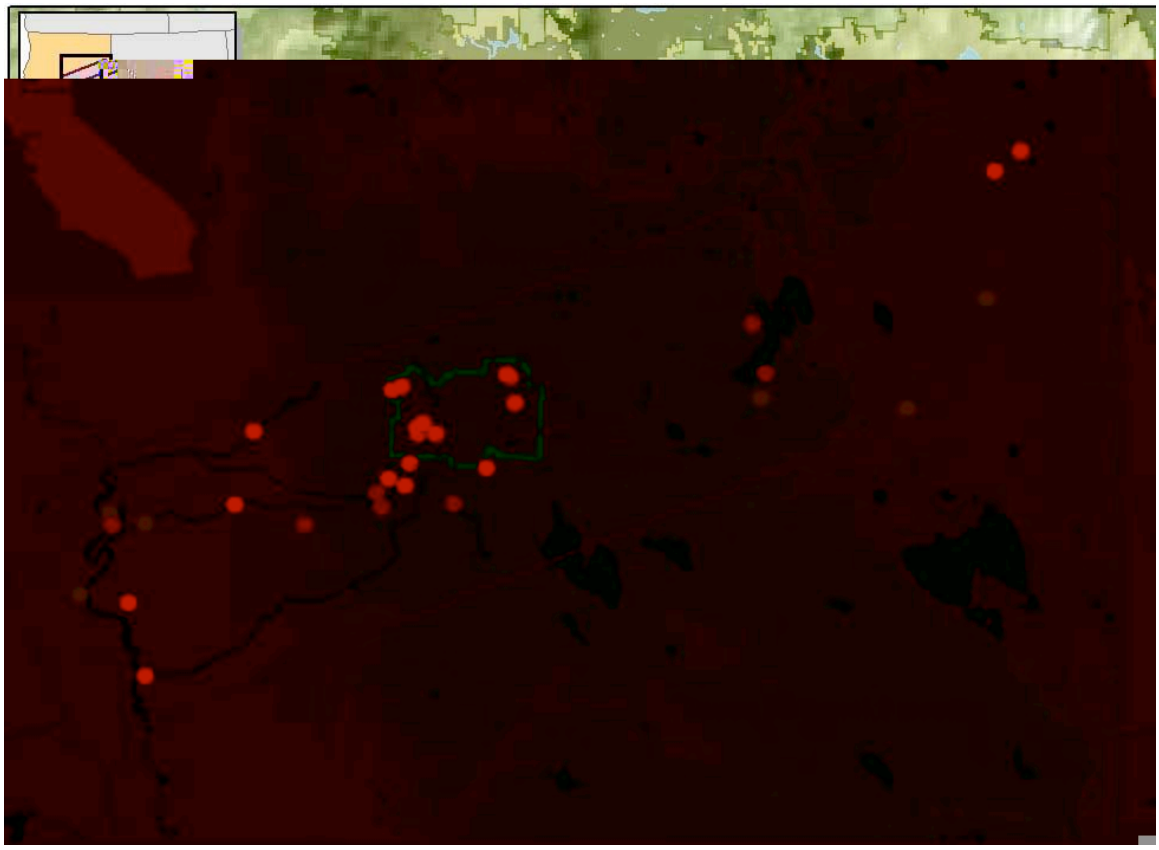
B. Bird Point Counts

Morgan Tingley

Introduction

Joseph Grinnell, as part of his daily life and his collecting trips, conducted a large number of bird surveys, all of which are documented in the 13,000 pages of field notes written over the course of his life. The Museum of Vertebrate Zoology is interested in exploring how bird communities have changed between Grinnell's time and the present by conducting bird surveys in the regions where Grinnell and colleagues spent the most time working and documenting birds. This work began in 2003, with a systematic census of the birds of Yosemite National Park and surrounding areas which lasted for two years. In 2006, led by U.C. Berkeley doctoral student Morgan Tingley, the Museum began resurveying bird observations recorded by Grinnell and his colleagues in the Lassen Transect. In 2007, the effort in Lassen continued and surveys were conducted throughout the rest of the transect. For more detailed information on survey methodology, site selection, and background information on resurveying birds as part of the Grinnell Project, please see the Lassen Transect Resurvey 2006 Annual Report.

Figure 1. Map of Lassen region showing locations of bird survey transects. Yellow points were surveyed only in 2006, red points were surveyed only in 2007, and orange points were surveyed in both years.



Methods

From May through July 2007, we surveyed birds at 26 Grinnellian sites throughout the Lassen transect. Seven of the sites were sites also visited in 2006 while 19 of the sites were new to the resurvey (Figure 1). Consequently, over the two years of surveying in the Lassen Transect, bird surveys were conducted at 32 unique and independent sites. Generally, sites that were only surveyed in one year were pseudo-randomly mixed throughout the transect. One exception is that all of the sites located in Lassen Volcanic National Park were surveyed only 2007, as they could not be accessed in 2006 due to heavy snow cover that remained at high elevations until the breeding season was over.

At the 32 sites throughout the Lassen Transect, a total of 300 point count stations were established, representative of the survey routes used by Grinnell and his colleagues. Most line-transects contained 10 point count stations, although the exact number varied depending on the availability of habitat and accessible land, and the historic extent of the transect survey. The minimum number of points per station was 3 (Lassen Peak; LH03), the maximum was 13 (Red Bluff; RB03), and the average was 9.375 (standard deviation = 1.77).

In 2006, Morgan Tingley led all but 4 surveys as the primary observer. In 2007, two teams of two people each conducted surveys independently. Morgan Tingley was the primary observer for one team (35 surveys) and Allison Shultz (the secondary from 2006) was the primary observer for the second team (33 surveys). In general (21/26 sites), both teams surveyed each site.

Results

In 2007, we conducted 68 surveys at 26 sites for a total of 639 point counts (4,473 survey minutes). All new sites were surveyed 3 times in 2007 (Table 1), with the exception of Lassen Peak, which was only surveyed twice due to very low numbers of birds and very high detection probabilities. Additionally, at four of the sites surveyed only once in 2006, we surveyed an additional 2 times in 2007 for a total of 3 times over the two years. Lastly, we revisited three sites surveyed 3 times in 2006 and took one additional survey in 2007 to help look at interannual differences in survey results.

Over the 68 surveys of 2007, we recorded a total of 8,239 bird observations, comprising 170 species and over 13,940 individuals. Summed over the two years of surveys in Lassen, we had 11,771 bird observations, 175 species, and 18,273 total individuals. A brief summary of all 2007 transect surveys is given in Table 2. A full list of all species seen over both years is presented in Table 3. The total number of individuals (of all species) seen during a transect survey varied widely (from 28 to 682). The most individuals were seen in the lowland riparian areas of the Sacramento River Valley and areas near large bodies of water, while the least individuals were seen at the high elevation sites in Lassen Volcanic National Park. Per point, the highest average number of individuals seen was 61 birds per point at Jones's (JO01), the site of a large reservoir in the Great Basin.

Differences in species richness followed similar patterns: lowland riparian areas and areas with water held the most species and high elevation sites held the fewest species. The greatest number of species detected during a survey was 54 species, during a single survey along the south shore of Eagle Lake (EL02). The fewest species detected during a survey was 12 species during a survey at Lassen Peak (LH03).

Sites were also compared using species diversity indices (Simpson's Inverse and Shannon-Weaver indices; Table 2) that incorporate the relative abundance of each species. The highest Simpson's diversity (26.7) was observed at Battle Creek Meadows (BC01), even though fewer species (41) were observed there than at several other surveys, including the EL02 survey (which had a richness of 54 but an Inverse Simpson's of 23.2). The lowest diversity scores (2.0 on all three surveys) were observed at Snag Lake (BL02) where large concentrations of Canada Geese created highly uneven species assemblies even though relatively large numbers of species (31-36) were observed there. Consequently, taking abundance into account is important when comparing the diversity of different localities in the Lassen transect.

Of the 170 species seen at the 26 sites, most were seen at more than one site (Table 3), yet 38 species were uniquely detected at only one site. This is a lower percentage of species (22% vs. 28%) than in 2006, which is expected given the larger number of sites visited. For both years, of the 175 species seen at 32 sites, only 26 species (15%) were found at one site, and most of these species were water birds.

Table 3 also provides the number of sites each species was seen by Grinnell and colleagues during the historic bird surveys (for the 30 sites that have historic data – neither EL01 (Spaulding) or PM01 have comparable historic surveys). This allows preliminary comparisons of historic data to present data for the 30 resurvey sites in the Lassen transect. As this comparison demonstrates, 33 species were seen in the present surveys that were not seen in the historic surveys at those same sites. This is in comparison to 24 species that were found in the historic surveys yet were not found in the present surveys. Some of the species new to the modern surveys have shown drastic expansions or colonizations in the past century, such as Brown-headed Cowbirds, European Starlings, and Wild Turkeys. Others can possibly be associated with increased human presence in the landscape: Northern Mockingbird, Ring-billed Gull, and Barn Swallow. Of the species that disappeared, some show evidence of real range retractions over the last 100 years (Bell's Vireo, Ruby-crowned Kinglet), yet many others are probably examples of rare species and/or low detectability during surveys (e.g. Poorwill and Greater Sage-Grouse). Indeed, many of the species that appear to have "disappeared" were observed at or near survey transects during non-survey times (e.g. Poorwill, Sage-Grouse, Burrowing Owl, Black-billed Magpie, White-crowned Sparrow).

The bird survey results of the Lassen Transect are being used as part of research to understand long-term changes in the distributions of Sierra Nevada birds. If you are interested in learning more about these results, please look for publications from the Grinnell Resurvey Project and/or contact Morgan Tingley at mtingley@nature.berkeley.edu.

Table 1. All sites in Lassen Transect surveyed for birds. The mean elevation for each site is listed, along with the number of point count stations per site, and the times each site was surveyed in each year.

Transect	County	Elevation (m)	Dominant Habitat	No. of Points	No. Surveys 2006	No. Surveys 2007
BB01	Tehama	1971	Transition mixed conifer	8	0	3
BC01	Tehama	1500	Transition mixed conifer	10	3	1
BL01	Lassen	1884	Canadian mixed conifer	9	0	3
BL02	Lassen	1862	Yellow Pine - mixed conifer	10	0	3
BL03	Lassen	2043	Canadian mixed conifer	10	0	3
CO01	Tehama	87	Lowlnad riparian	10	0	3
DA01	Tehama	175	Oak woodland	10	3	0
EL01	Lassen	1567	Yellow Pine - mixed conifer	10	1	2
EL02	Lassen	1631	Yellow Pine - mixed conifer	10	1	2
JO01	Lassen	1637	Sagebrush-juniper	10	0	3
LH01	Shasta	2489	Hudsonian mixed conifer	7	0	3
LH02	Shasta	2516	Hudsonian mixed conifer	7	0	3
LH03	Shasta	2689	Alpine conifer - treeline	3	0	2
LY01	Tehama	1110	Transition mixed conifer	10	1	2
MA02	Shasta	657	Oak woodland	10	0	3
MC01	Tehama	81	Lowlnad riparian	10	0	3
MI01	Tehama	1630	Transition mixed conifer	10	3	1
MI02	Tehama	1868	Transition mixed conifer	10	0	3
MZ01	Shasta	1749	Yellow Pine - mixed conifer	10	0	3
MZ02	Shasta	1855	Yellow Pine - mixed conifer	10	0	3
PC01	Tehama	554	Oak woodland	10	0	3
PM01	Lassen	1625	Yellow Pine - mixed conifer	8	1	0
PV01	Lassen	1349	Sagebrush-juniper	5	3	0
RA01	Lassen	1642	Sagebrush-juniper	10	3	0
RB01	Tehama	111	Oak woodland	10	1	0
RB02	Tehama	107	Lowlnad riparian	10	1	2
RB03	Tehama	80	Lowlnad riparian	13	3	0
RR01	Lassen	1623	Sagebrush-juniper	10	0	3
SC01	Tehama	1754	Transition mixed conifer	10	0	3
WC01	Shasta	2253	Canadian mixed conifer	10	0	3
WI01	Plumas	1651	Transition mixed conifer	10	0	4
WL01	Tehama	1651	Transition mixed conifer	10	3	1

Table 2. Sites surveyed in 2007 with abundance and diversity metrics of the species observed during each survey (cont. on next page).

Transect	Date	Number of Individuals	Individuals per point	Number of Species	Average Species per point	Inverse Simpson's	Shannon-Weaver
BB01	7/3/07	74	9.3	23	7.6	15.0	2.88
-	7/4/07	89	11.1	25	8.6	16.8	3.01
-	7/6/07	68	8.5	24	7.0	14.8	2.92
BC01	6/5/07	160	16.0	41	11.5	26.7	3.48
BL01	6/19/07	159	17.7	22	8.3	10.5	2.62
-	6/21/07	215	23.9	23	8.8	6.9	2.34
-	6/22/07	363	40.3	22	8.0	5.7	2.10
BL02	6/19/07	345	34.5	36	8.3	2.0	1.58
-	6/20/07	349	34.9	31	8.7	2.0	1.55
-	6/20/07	310	31.0	35	8.0	2.0	1.55
BL03	6/20/07	96	9.6	19	6.4	8.6	2.45
-	6/21/07	127	12.7	20	7.3	11.0	2.61
-	6/22/07	142	14.2	23	9.3	11.6	2.70
CO01	5/24/07	411	41.1	47	14.8	11.2	3.02
-	5/25/07	345	34.5	45	15.0	13.5	3.08
-	5/26/07	328	32.8	45	14.8	17.2	3.24
EL01	6/26/07	129	12.9	30	8.2	10.2	2.82
-	6/27/07	150	15.0	29	10.0	18.2	3.10
EL02	6/26/07	235	23.5	54	13.8	23.2	3.51
-	6/27/07	197	19.7	50	12.2	21.0	3.40
JO01	6/23/07	682	68.2	43	11.2	11.3	2.81
-	6/24/07	561	56.1	49	10.9	12.0	2.96
-	6/25/07	574	57.4	48	12.6	13.7	3.05
LH01	7/5/07	86	12.3	21	7.6	8.9	2.57
-	7/6/07	79	11.3	22	8.6	13.1	2.79
-	7/9/07	218	31.1	18	9.0	2.7	1.68
LH02	7/3/07	69	9.9	20	5.6	6.6	2.41
-	7/4/07	62	8.9	16	6.6	10.5	2.52
-	7/5/07	73	10.4	18	5.6	4.8	2.13
LH03	7/7/07	28	9.3	12	5.7	6.1	2.13
-	7/8/07	60	20.0	14	7.7	6.6	2.17
LY01	5/27/07	161	16.1	32	11.5	16.0	3.05
-	5/30/07	155	15.5	30	11.7	15.2	2.99
MA02	5/28/07	112	11.2	40	9.5	19.7	3.30
-	5/29/07	144	14.4	32	9.9	18.1	3.12
-	5/30/07	156	15.6	32	9.6	17.2	3.09
MC01	5/23/07	576	57.6	41	12.6	3.8	2.12
-	5/24/07	297	29.7	40	13.0	10.8	2.92
-	5/26/07	512	51.2	47	14.3	9.7	2.87
MI01	6/5/07	93	9.3	26	7.3	13.6	2.88
MI02	6/7/07	124	12.4	29	9.3	15.0	2.95
-	6/8/07	140	14.0	31	9.3	13.3	2.93
-	6/9/07	124	12.4	26	9.0	13.0	2.84
MZ01	6/12/07	250	25.0	40	13.0	10.2	2.93
-	6/13/07	159	15.9	37	10.4	18.6	3.22
-	6/14/07	151	15.1	40	10.1	20.1	3.31

Table 2 cont. Additional surveys and diversity measures.

Transect	Date	Number of Individuals	Individuals per point	Number of Species	Average Species per point	Inverse Simpson's	Shannon-Weaver
MZ02	6/12/07	123	12.3	31	9.5	15.5	3.02
-	6/13/07	117	11.7	27	9.6	15.3	2.97
-	6/14/07	95	9.5	28	7.2	14.7	2.94
PC01	5/27/07	293	29.3	35	12.9	11.5	2.93
-	5/28/07	338	33.8	41	12.7	8.0	2.77
-	5/29/07	287	28.7	30	12.4	10.9	2.87
RB02	5/22/07	136	13.6	41	10.3	25.2	3.44
-	5/25/07	185	18.5	41	13.2	18.6	3.27
RR01	6/23/07	125	12.5	19	6.2	8.0	2.41
-	6/24/07	128	12.8	21	7.3	10.0	2.58
-	6/25/07	141	14.1	21	6.7	9.5	2.53
SC01	6/6/07	154	15.4	33	12.1	21.0	3.23
-	6/7/07	165	16.5	35	13.4	21.8	3.28
-	6/8/07	156	15.6	34	13.3	21.8	3.26
WC01	7/7/07	124	12.4	23	8.2	13.5	2.84
-	7/8/07	149	14.9	27	8.4	14.1	2.92
-	7/9/07	110	11.0	27	7.3	13.9	2.90
WI01	6/10/07	237	23.7	39	12.6	10.3	2.99
-	6/10/07	253	25.3	37	12.7	7.5	2.80
-	6/11/07	236	23.6	37	12.2	11.3	3.01
-	6/11/07	263	26.3	40	14.4	9.4	2.93
WL01	6/6/07	187	18.7	33	9.7	6.1	2.63

Table 3. List of species seen during resurvey of 32 sites in the Lassen Transect, including species seen historically but not refound. For each species, the number of sites where it was observed (in 2006, in 2007, historically, and currently).is given.

Species Name	2006 Sites	2007 Sites	Historic (%)	Modern (%)
Acorn Woodpecker (Melanerpes formicivorus)	4	5	8 (27)	8 (27)
American Avocet (Recurvirostra americana)	0	0	2 (7)	0 (0)
American Bittern (Botaurus lentiginosus)	0	1	0 (0)	1 (3)
American Coot (Fulica americana)	1	2	1 (3)	3 (10)
American Crow (Corvus brachyrhynchos)	1	1	6 (20)	2 (7)
American Dipper (Cinclus mexicanus)	1	2	4 (13)	3 (10)
American Goldfinch (Carduelis tristis)	3	3	5 (17)	6 (20)
American Kestrel (Falco sparverius)	2	4	13 (43)	6 (20)
American Pipit (Anthus rubescens)	0	2	1 (3)	2 (7)
American Robin (Turdus migratorius)	11	23	19 (63)	27 (90)
American White Pelican (Pelecanus erythrorhynchos)	1	2	1 (3)	2 (7)
Anna's Hummingbird (Calypte anna)	3	7	1 (3)	9 (30)
Ash-throated Flycatcher (Myiarchus cinerascens)	5	6	9 (30)	10 (33)
Bald Eagle (Haliaeetus leucocephalus)	2	6	0 (0)	6 (20)
Band-tailed Pigeon (Patagioenas fasciata)	0	4	0 (0)	4 (13)
Barn Swallow (Hirundo rustica)	1	3	1 (3)	3 (10)
Bell's Vireo (Vireo bellii)	0	0	4 (13)	0 (0)
Belted Kingfisher (Ceryle alcyon)	4	1	5 (17)	4 (13)
Bewick's Wren (Thryomanes bewickii)	4	5	6 (20)	8 (27)
Black Phoebe (Sayornis nigricans)	3	4	4 (13)	7 (23)
Black Tern (Chlidonias niger)	0	0	2 (7)	0 (0)
Black-backed Woodpecker (Picoides arcticus)	0	2	5 (17)	2 (7)
Black-billed Magpie (Pica hudsonia)	0	0	2 (7)	0 (0)
Black-chinned Hummingbird (Archilochus alexandri)	1	1	1 (3)	2 (7)
Black-crowned Night-Heron (Nycticorax nycticorax)	0	1	1 (3)	1 (3)
Black-headed Grosbeak (Pheucticus melanocephalus)	8	9	8 (27)	12 (40)
Black-throated Gray Warbler (Dendroica nigrescens)	1	3	6 (20)	4 (13)
Black-throated Sparrow (Amphispiza bilineata)	1	2	2 (7)	3 (10)
Blue Grosbeak (Passerina caerulea)	2	0	1 (3)	2 (7)
Blue-gray Gnatcatcher (Polioptila caerulea)	1	0	6 (20)	1 (3)
Blue-winged Teal (Anas discors)	0	0	1 (3)	0 (0)
Brewer's Blackbird (Euphagus cyanocephalus)	8	13	11 (37)	18 (60)
Brewer's Sparrow (Spizella breweri)	1	2	4 (13)	3 (10)
Brown Creeper (Certhia americana)	5	16	11 (37)	15 (50)
Brown-headed Cowbird (Molothrus ater)	10	15	0 (0)	19 (63)
Bufflehead (Bucephala albeola)	0	1	2 (7)	1 (3)
Bullock's Oriole (Icterus bullockii)	6	6	7 (23)	11 (37)
Burrowing Owl (Athene cunicularia)	0	0	2 (7)	0 (0)
Bushtit (Psaltriparus minimus)	5	5	10 (33)	10 (33)
California Quail (Callipepla californica)	7	6	9 (30)	10 (33)
California Thrasher (Toxostoma redivivum)	0	1	1 (3)	1 (3)
California Towhee (Pipilo crissalis)	3	5	7 (23)	7 (23)
Calliope Hummingbird (Stellula calliope)	3	6	5 (17)	7 (23)
Canada Goose (Branta canadensis)	4	10	3 (10)	12 (40)
Canyon Wren (Catherpes mexicanus)	1	1	2 (7)	2 (7)
Caspian Tern (Sterna caspia)	0	1	0 (0)	1 (3)
Cassin's Finch (Carpodacus cassinii)	3	14	12 (40)	14 (47)
Cassin's Vireo (Vireo cassinii)	4	11	11 (37)	11 (37)
Cedar Waxwing (Bombycilla cedrorum)	3	3	2 (7)	6 (20)

Table 3. Continued.

Species Name	2006 Sites	2007 Sites	Historic (%)	Modern (%)
Chipping Sparrow (Spizella passerina)	7	13	19 (63)	16 (53)
Cinnamon Teal (Anas cyanoptera)	1	1	0 (0)	1 (3)
Clark's Grebe (Aechmophorus clarkii)	0	1	0 (0)	1 (3)
Clark's Nutcracker (Nucifraga columbiana)	1	8	10 (33)	8 (27)
Cliff Swallow (Petrochelidon pyrrhonota)	4	5	8 (27)	8 (27)
Common Merganser (Mergus merganser)	4	2	1 (3)	5 (17)
Common Moorhen (Gallinula chloropus)	0	1	0 (0)	1 (3)
Common Nighthawk (Chordeiles minor)	2	9	8 (27)	9 (30)
Common Poorwill (Phalaenoptilus nuttallii)	0	0	1 (3)	0 (0)
Common Raven (Corvus corax)	7	23	3 (10)	23 (77)
Common Yellowthroat (Geothlypis trichas)	2	1	4 (13)	3 (10)
Cooper's Hawk (Accipiter cooperii)	2	2	3 (10)	4 (13)
Dark-Eyed Junco (Junco hyemalis)	6	19	17 (57)	18 (60)
Double-crested Cormorant (Phalacrocorax auritus)	1	2	2 (7)	2 (7)
Downy Woodpecker (Picoides pubescens)	2	7	3 (10)	9 (30)
Dusky Flycatcher (Empidonax oberholseri)	5	11	8 (27)	14 (47)
Eared Grebe (Podiceps nigricollis)	1	1	2 (7)	2 (7)
Eurasian Collared-Dove (Streptopelia decaocto)	0	1	0 (0)	1 (3)
European Starling (Sturnus vulgaris)	6	8	0 (0)	11 (37)
Evening Grosbeak (Coccothraustes vespertinus)	3	15	5 (17)	15 (50)
Ferruginous Hawk (Buteo regalis)	0	1	0 (0)	1 (3)
Forster's Tern (Sterna forsteri)	0	1	1 (3)	1 (3)
Fox Sparrow (Passerella iliaca)	4	9	10 (33)	11 (37)
Gadwall (Anas strepera)	0	1	0 (0)	1 (3)
Golden Eagle (Aquila chrysaetos)	0	1	3 (10)	1 (3)
Golden-crowned Kinglet (Regulus satrapa)	3	11	7 (23)	12 (40)
Golden-crowned Sparrow (Zonotrichia atricapilla)	0	0	4 (13)	0 (0)
Gray Flycatcher (Empidonax wrightii)	3	4	2 (7)	5 (17)
Gray Jay (Perisoreus canadensis)	1	1	0 (0)	2 (7)
Great Blue Heron (Ardea herodias)	3	6	8 (27)	9 (30)
Great Egret (Ardea alba)	1	4	0 (0)	5 (17)
Great Horned Owl (Bubo virginianus)	0	0	5 (17)	0 (0)
Greater Sage-Grouse (Centrocercus urophasianus)	0	0	4 (13)	0 (0)
Great-tailed Grackle (Quiscalus mexicanus)	0	1	0 (0)	1 (3)
Green Heron (Butorides virescens)	1	2	1 (3)	3 (10)
Green-tailed Towhee (Pipilo chlorurus)	3	7	10 (33)	7 (23)
Hairy Woodpecker (Picoides villosus)	7	13	8 (27)	13 (43)
Hammond's Flycatcher (Empidonax hammondii)	4	8	6 (20)	8 (27)
Hermit Thrush (Catharus guttatus)	3	6	9 (30)	8 (27)
Hermit Warbler (Dendroica occidentalis)	2	11	5 (17)	11 (37)
Herring Gull (Larus argentatus)	0	1	0 (0)	1 (3)
Horned Lark (Eremophila alpestris)	1	2	6 (20)	2 (7)
House Finch (Carpodacus mexicanus)	7	6	9 (30)	12 (40)
House Sparrow (Passer domesticus)	0	3	2 (7)	3 (10)
House Wren (Troglodytes aedon)	9	8	7 (23)	14 (47)
Juniper Titmouse (Baeolophus ridgwayi)	2	0	1 (3)	2 (7)
Killdeer (Charadrius vociferus)	3	8	13 (43)	10 (33)
Lark Sparrow (Chondestes grammacus)	4	4	9 (30)	6 (20)
Lawrence's Goldfinch (Carduelis lawrencei)	2	2	0 (0)	4 (13)
Lazuli Bunting (Passerina amoena)	6	3	5 (17)	8 (27)

Table 3. Continued.

Species Name	2006 Sites	2007 Sites	Historic (%)	Modern (%)
Least Sandpiper (Calidris minutilla)	0	0	4 (13)	0 (0)
Lesser Goldfinch (Carduelis psaltria)	8	8	11 (37)	13 (43)
Lewis's Woodpecker (Melanerpes lewis)	1	1	4 (13)	1 (3)
Lincoln's Sparrow (Melospiza lincolnii)	1	6	6 (20)	7 (23)
Loggerhead Shrike (Lanius ludovicianus)	0	0	3 (10)	0 (0)
Long-billed Curlew (Numenius americanus)	0	1	0 (0)	1 (3)
MacGillivray's Warbler (Oporornis tolmiei)	3	12	9 (30)	13 (43)
Mallard (Anas platyrhynchos)	5	7	4 (13)	12 (40)
Marsh Wren (Cistothorus palustris)	1	1	1 (3)	2 (7)
Mountain Bluebird (Sialia currucoides)	2	4	4 (13)	5 (17)
Mountain Chickadee (Poecile gambeli)	8	19	16 (53)	19 (63)
Mountain Quail (Oreortyx pictus)	4	8	6 (20)	9 (30)
Mourning Dove (Zenaida macroura)	10	15	11 (37)	20 (67)
Nashville Warbler (Vermivora ruficapilla)	3	12	8 (27)	13 (43)
Northern Flicker (Colaptes auratus)	9	16	24 (80)	20 (67)
Northern Goshawk (Accipiter gentilis)	1	2	0 (0)	2 (7)
Northern Harrier (Circus cyaneus)	2	2	3 (10)	4 (13)
Northern Mockingbird (Mimus polyglottos)	1	5	0 (0)	6 (20)
Nor. Rough-winged Swallow (Stelgidopteryx serripennis)	3	4	2 (7)	7 (23)
Nuttall's Woodpecker (Picoides nuttallii)	2	5	6 (20)	7 (23)
Oak Titmouse (Baeolophus inornatus)	3	5	7 (23)	7 (23)
Olive-sided Flycatcher (Contopus cooperi)	5	12	10 (33)	14 (47)
Orange-crowned Warbler (Vermivora celata)	2	4	7 (23)	6 (20)
Osprey (Pandion haliaetus)	4	7	5 (17)	10 (33)
Pacific-slope Flycatcher (Empidonax difficilis)	0	1	0 (0)	1 (3)
Phainopepla (Phainopepla nitens)	2	1	1 (3)	2 (7)
Pied-billed Grebe (Podilymbus podiceps)	1	2	0 (0)	3 (10)
Pileated Woodpecker (Dryocopus pileatus)	4	8	4 (13)	9 (30)
Pine Siskin (Carduelis pinus)	1	14	7 (23)	14 (47)
Prairie Falcon (Falco mexicanus)	0	1	1 (3)	1 (3)
Purple Finch (Carpodacus purpureus)	2	12	7 (23)	13 (43)
Pygmy Nuthatch (Sitta pygmaea)	2	5	2 (7)	4 (13)
Red Crossbill (Loxia curvirostra)	1	7	3 (10)	7 (23)
Red-breasted Nuthatch (Sitta canadensis)	5	19	9 (30)	19 (63)
Red-breasted Sapsucker (Sphyrapicus ruber)	4	12	6 (20)	12 (40)
Redhead (Aythya americana)	0	1	1 (3)	1 (3)
Red-necked Phalarope (Phalaropus lobatus)	0	0	1 (3)	0 (0)
Red-shouldered Hawk (Buteo lineatus)	2	5	0 (0)	7 (23)
Red-tailed Hawk (Buteo jamaicensis)	8	8	13 (43)	13 (43)
Red-winged Blackbird (Agelaius phoeniceus)	6	9	9 (30)	13 (43)
Ring-billed Gull (Larus delawarensis)	1	1	0 (0)	2 (7)
Ring-necked Duck (Aythya collaris)	0	3	0 (0)	3 (10)
Ring-necked Pheasant (Phasianus colchicus)	0	1	0 (0)	1 (3)
Rock Pigeon (Columba livia)	0	1	0 (0)	1 (3)
Rock Wren (Salpinctes obsoletus)	4	4	14 (47)	7 (23)
Ruby-crowned Kinglet (Regulus calendula)	0	0	13 (43)	0 (0)
Ruddy Duck (Oxyura jamaicensis)	0	1	1 (3)	1 (3)
Rufous Hummingbird (Selasphorus rufus)	0	4	3 (10)	4 (13)
Rufous-crowned Sparrow (Aimophila ruficeps)	1	0	0 (0)	1 (3)
Sage Sparrow (Amphispiza belli)	0	0	3 (10)	0 (0)

Table 3. Continued.

Species Name	2006 Sites	2007 Sites	Historic (%)	Modern (%)
Sage Thrasher (Oreoscoptes montanus)	1	2	3 (10)	3 (10)
Sandhill Crane (Grus canadensis)	1	4	0 (0)	3 (10)
Savannah Sparrow (Passerculus sandwichensis)	3	3	5 (17)	4 (13)
Sharp-shinned Hawk (Accipiter striatus)	1	1	3 (10)	2 (7)
Solitary Sandpiper (Tringa solitaria)	0	0	2 (7)	0 (0)
Song Sparrow (Melospiza melodia)	3	8	12 (40)	10 (33)
Sooty Grouse (Dendragapus fuliginosus)	0	1	3 (10)	1 (3)
Sora (Porzana carolina)	1	3	0 (0)	3 (10)
Spotted Owl (Strix occidentalis)	0	0	1 (3)	0 (0)
Spotted Sandpiper (Actitis macularius)	1	8	12 (40)	8 (27)
Spotted Towhee (Pipilo maculatus)	8	8	5 (17)	11 (37)
Steller's Jay (Cyanocitta stelleri)	7	19	13 (43)	18 (60)
Swainson's Hawk (Buteo swainsoni)	0	0	3 (10)	0 (0)
Swainson's Thrush (Catharus ustulatus)	0	0	5 (17)	0 (0)
Townsend's Solitaire (Myadestes townsendi)	3	16	12 (40)	15 (50)
Tree Swallow (Tachycineta bicolor)	6	13	6 (20)	15 (50)
Turkey Vulture (Cathartes aura)	7	10	13 (43)	14 (47)
Vaux's Swift (Chaetura vauxi)	0	2	1 (3)	2 (7)
Vesper Sparrow (Pooecetes gramineus)	0	2	3 (10)	2 (7)
Violet-green Swallow (Tachycineta thalassina)	5	8	4 (13)	10 (33)
Virginia Rail (Rallus limicola)	0	0	2 (7)	0 (0)
Warbling Vireo (Vireo gilvus)	4	14	17 (57)	15 (50)
Western Bluebird (Sialia mexicana)	5	6	10 (33)	8 (27)
Western Grebe (Aechmophorus occidentalis)	1	2	2 (7)	2 (7)
Western Kingbird (Tyrannus verticalis)	5	6	8 (27)	11 (37)
Western Meadowlark (Sturnella neglecta)	8	7	13 (43)	12 (40)
Western Screech-Owl (Megascops kennicottii)	0	0	1 (3)	0 (0)
Western Scrub-Jay (Aphelocoma californica)	5	6	11 (37)	10 (33)
Western Tanager (Piranga ludoviciana)	9	21	16 (53)	22 (73)
Western Wood-Pewee (Contopus sordidulus)	12	19	18 (60)	24 (80)
White-breasted Nuthatch (Sitta carolinensis)	8	11	13 (43)	14 (47)
White-crowned Sparrow (Zonotrichia leucophrys)	0	0	3 (10)	0 (0)
White-faced Ibis (Plegadis chihi)	0	1	0 (0)	1 (3)
White-headed Woodpecker (Picoides albolarvatus)	4	12	7 (23)	12 (40)
White-throated Swift (Aeronautes saxatalis)	0	0	1 (3)	0 (0)
Wild Turkey (Meleagris gallopavo)	2	2	0 (0)	4 (13)
Willet (Catoptrophorus semipalmatus)	0	0	3 (10)	0 (0)
Williamson's Sapsucker (Sphyrapicus thyroideus)	1	2	2 (7)	3 (10)
Willow Flycatcher (Empidonax traillii)	2	2	3 (10)	4 (13)
Wilson's Phalarope (Phalaropus tricolor)	1	1	2 (7)	1 (3)
Wilson's Snipe (Gallinago delicata)	3	5	4 (13)	6 (20)
Wilson's Warbler (Wilsonia pusilla)	5	11	8 (27)	14 (47)
Winter Wren (Troglodytes troglodytes)	0	2	0 (0)	2 (7)
Wood Duck (Aix sponsa)	0	4	1 (3)	4 (13)
Wrentit (Chamaea fasciata)	0	2	3 (10)	2 (7)
Yellow Warbler (Dendroica petechia)	6	12	13 (43)	15 (50)
Yellow-billed Magpie (Pica nuttalli)	1	0	1 (3)	1 (3)
Yellow-breasted Chat (Icteria virens)	1	2	6 (20)	3 (10)
Yellow-headed Blackbird (X. xanthocephalus)	1	1	1 (3)	1 (3)
Yellow-rumped Warbler (Dendroica coronata)	7	19	17 (57)	19 (63)

C. Bird Collections

Carla Cicero & Rauri Bowie

Introduction

In 1908, Joseph Grinnell began his career as the founding Director of the Museum of Vertebrate Zoology (MVZ) with this vision: "…That the student of the future will have access to the original record of faunal conditions in California and the west, wherever we now work." To realize that vision, he and his colleagues documented and collected birds, mammals, amphibians, and reptiles from over 700 locations across California, resulting in a remarkable snapshot of 20th century biodiversity.

The Grinnell Resurvey Project is an effort by the Museum to resurvey vertebrate diversity at many of the sites that Grinnell and colleagues visited early in the last century. Specifically, the goal is to document historical changes in vertebrate communities across geographic and elevational transects, associate these patterns with changes in climate, vegetation, and/or land use, and develop predictive models of how vertebrate diversity will respond to continuing change in the face of global warming. Ultimately, this research will lead to an increased understanding of the long-term dynamics of vertebrate distribution in California, and will provide critical data for managing and protecting vertebrate species throughout the state.

Study Area

The Grinnell Resurvey Project is a statewide, collaborative effort by the MVZ and other institutions in California. This is an ongoing project with at least 7 transects targeted for re-survey (Shasta-Trinity, Warner Mts., Lassen, Lake Tahoe Basin, Yosemite, White Mts., Southern Sierras).

Fieldwork during 2006-2007 has focused on the "Lassen Transect" – a 3,000 square mile swath in northern California that runs from the Central Valley northeast to the Nevada border (Fig. 1). Within the transect are a wide variety of habitats that fall into seven major ecological or transition zones: Sacramento River riparian, foothills oak woodland, west slope mixed conifer forest, montane high elevation forest, eastside yellow pine forest, Eagle Lake, and Great Basin juniper-sagebrush.

The Lassen Transect was originally surveyed from 1924 through 1929 by Joseph Grinnell and his colleagues Joseph Dixon and Jean Linsdale. They visited more than 50 sites throughout the region (Figure 1), documented the distributions of more than 350 species of birds, mammals, reptiles and amphibians, recorded meticulous fieldnotes, and collected ca. 4,500 specimens and 600 photographs. Their results are summarized in the 1930 monograph "Vertebrate Natural History of a Section of Northern California through the Lassen Peak Region" (Grinnell et al. 1930). For many areas in the transect, their survey remains the most comprehensive vertebrate inventory yet conducted. The collections of specimens, fieldnotes, and photographs housed at the MVZ are still being used for wide variety of scientific research projects.

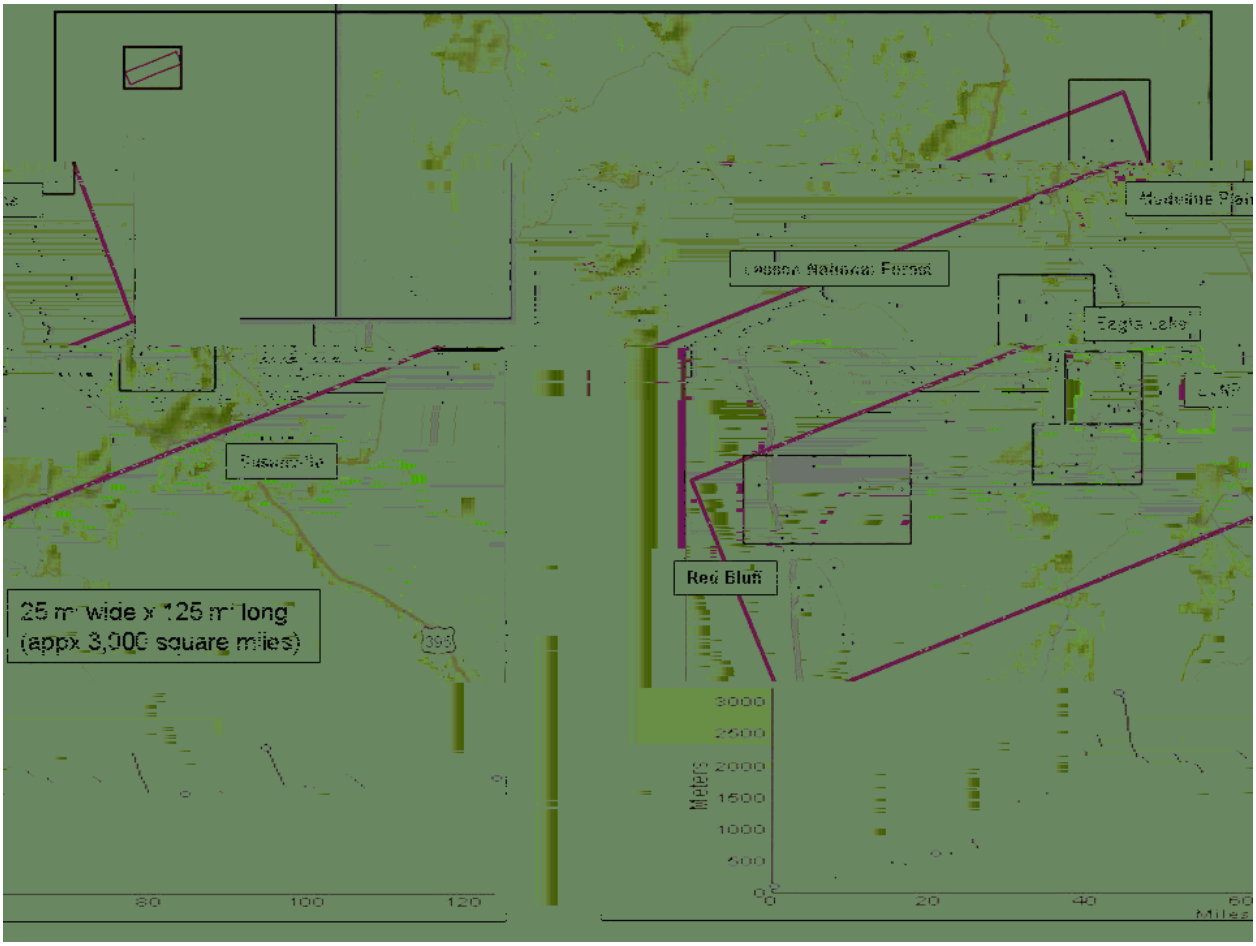


Figure 1: The Lassen Transect, bounded by the purple rectangle. White circles denote historic sampling locations (n=45) described in Grinnell et al. 1930. "LVNP" = Lassen Volcanic National Park. Elevations range from <200 m near the Sacramento River to >3200 m at Lassen Peak to 1800 m at Eagle Lake and the Madeline Plains. Blue open circles on the elevation profile indicate waypoints used to generate the profile and do not represent survey sites.

Figure 2 shows resurvey sites where birds were collected in 2006 and 2007. Specific localities for the 2006 field season are available in the project report for that year: http://mvz.berkeley.edu/Grinnell/lassen/Lassen_2006_Report.html

In 2007, we (Carla Cicero, Rauri Bowie, and assistants) worked at seven historic sites over 4 trips:

- Red Bluff (Sacramento River riparian, oak woodland)
- Hog Lake (foothills oak woodland)
- Manton (transitional between foothills oak woodland and west slope mixed conifer forest)
- Lassen Park West - Manzanita Lake (west slope mixed conifer forest)
- Lassen Park West – Upper Kings Creek Meadow (montane high elevation forest)
- Lassen Pa

We also briefly revisited two sites surveyed in 2006 in the vicinity of Mineral: Bluff Falls (transition between west slope mixed conifer and montane high elevation forest), and Summit Creek (west slope mixed conifer forest). Sites visited in 2006 included the vicinity of Mineral (west slope mixed conifer forest, transition to montane high elevation forest) and Eagle Lake (transitional between east side yellow pine and Great Basin juniper-sagebrush).

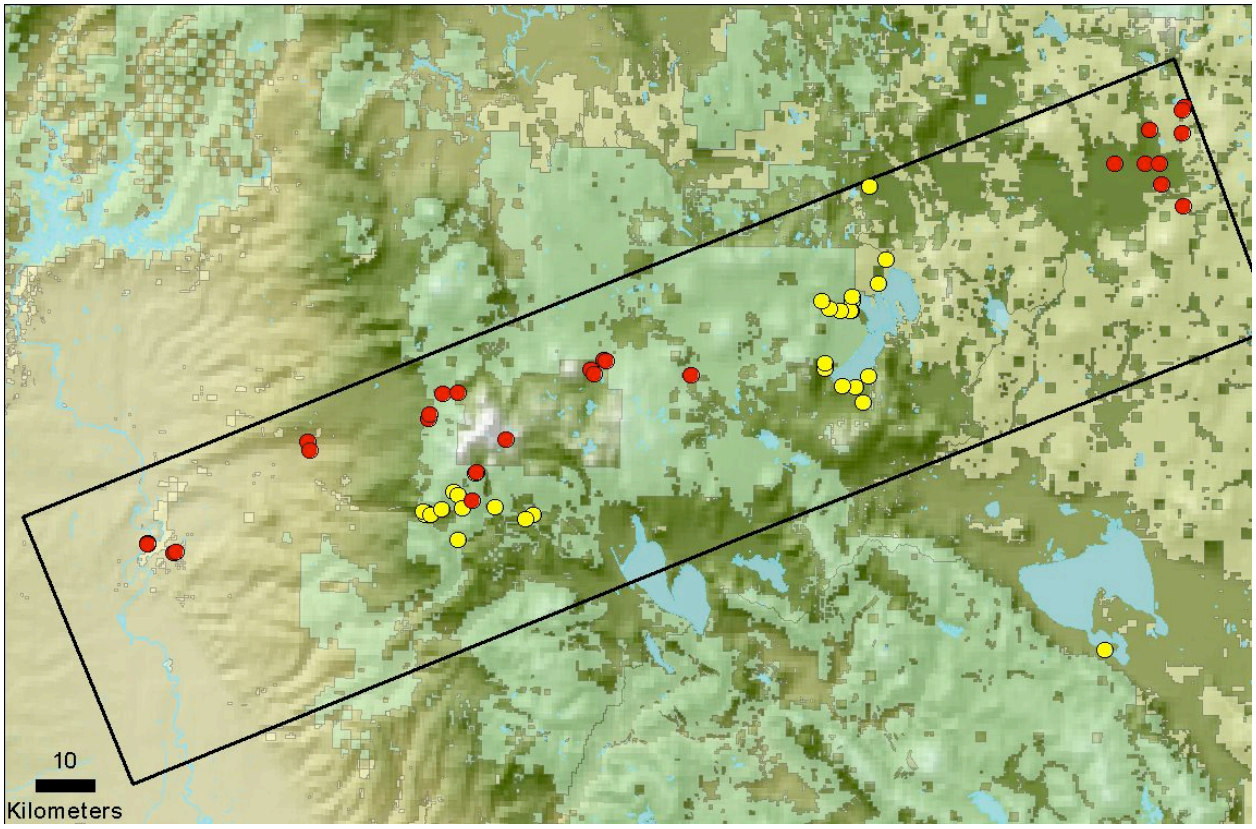


Figure 2: Resurvey sites in the Lassen Transect where birds were collected by mistnet, shotgun, or salvage in 2006 (yellow dots) and 2007 (red dots).

2007 project participants:
Lead investigators: Carla Cicero, Rauri Bowie
Paid assistants: Beth Wommack, Joanna Wu
Volunteers: Monica Albe, Verna Bowie, Jessica Castillo, Zach Hanna, Knud Jonsson, Sampath Lokugalappatti, Felix Ratcliff, Andrew Rush, Allison Shultz, Anand Varma, Jeff Wilcox, Jessica Winters

Methods

Birds were collected using one of three methods: mistnet, shotgun, and salvage (i.e., found dead). In general, mistnet surveys were the most systematic of the three methods. Mistnets were run at all of the 2007 sites except Hog Lake. Each site consisted of 1-2 sets of nets placed in different habitats, with 10 nets per set in pairs or triplets. Nets were monitored for four consecutive days, with two additional days for setting them up and taking them down; occasionally birds were captured during the set up. Nets were

opened early in the morning and were monitored regularly until closing – typically mid-day or earlier. Captured birds either were retained as vouchers or released after marking (tip of outer two tail rectrices clipped to identify recaptures). Although we made every effort to minimize mortality by regularly checking nets and closing them in unfavorable conditions, we occasionally exceeded authorized numbers due to salvaged birds found after the limit was reached.

Collecting by shotgun was supplemental to mistnetting, both in terms of targeted species/numbers and geographic coverage. Mistnetting is a more general survey method but is less effective at capturing certain groups of species. Shotgun collecting is far more precise, allowing specific taxa and even sexes or life stages to be targeted and the number of specimens collected to be tightly controlled. Because mistnet locations were limited in number, collecting by shotgun also expanded the scope of areas sampled.

Salvaged birds were collected opportunistically. There were no concerted efforts to sample at night, and thus nocturnal bird species (e.g., owls) are not well-represented.

In addition to collecting, we also recorded incidental bird observations in fieldnotes. These data supplement standardized bird point count surveys conducted by another team of workers in 2006-2007. The specimen collections also supplement the point count data by providing a permanent record of avian communities in the transect, and by serving as vouchers for taxonomic identifications and molecular work. Although bird records obtained by collecting and point count surveys overlapped in species, each method also yielded unique species not recorded by the other. Thus, the combination of collecting and point count surveys provides a more comprehensive and permanent record of the avifauna than either method alone.

Photographs also were taken at all collecting sites using a Nikon or Canon digital camera. Subjects of photographs ranged from personnel and camp life to habitats, landscapes, and birds. Four photographs were taken at each net pair or triplet, one in each cardinal direction, and GPS coordinates recorded. Our goal was to document photographically the existing conditions for comparison with historical photographs, and to set a baseline for future comparisons.

All specimens, photographs, and data are archived in the MVZ. Cataloguing is still in process, but the data will be accessible through our database, http://mvzarctos.berkeley.edu. Photos also will be viewable through our database and CalPhotos (http://calphotos.berkeley.edu/).

Results

Each collecting trip resulted in a separate accession of material to be deposited in the MVZ. A summary of all MVZ bird accessions (2006-2007) for the Grinnell Resurvey Project, Lassen Transect, is presented in the following table:

Year	Accession	Collecting Sites	# Specimens	# Releases	# Photos
2006	14177	Eagle Lake	185	27	104
2006	14183	Mineral vicinity	225	144	95
2007	14330	Red Bluff	141	29	86
2007	14331	Manton, Hog Lake	141	7	62
2007	14339	Madeline Plains	165	15	76
2007	14345	Lassen Park West Lassen Park East Mineral vicinity	368	217	362
TOTALS			1225	439	785

The majority of bird specimens were prepared as standard study skins with frozen tissues. A few specimens (those in poorer condition) were prepared as skeletons, Additional parts (e.g., stomach contents, parasites, syrinx) were saved from some birds.

Results for the 2006 field season are available at
http://mvz.berkeley.edu/Grinnell/lassen/Lassen_2006_Report.html

Results for the 2007 field season are given below. We have not yet analyzed the data, and are still preparing specimens. Thus, some identifications are tentative and may change upon further examination of specimens. Although comparisons with historical surveys are premature, a few obvious changes are noted. An itemized list of specimens is attached to this report.

In the tables and maps below, letters refer to specific localities in each accession. Method of take is indicated by a symbol: mistnets- yellow circle; shotgun- red circle; salvage- cross. Some sites may include more than one method, see table for details.

1. Red Bluff – Accession 14330

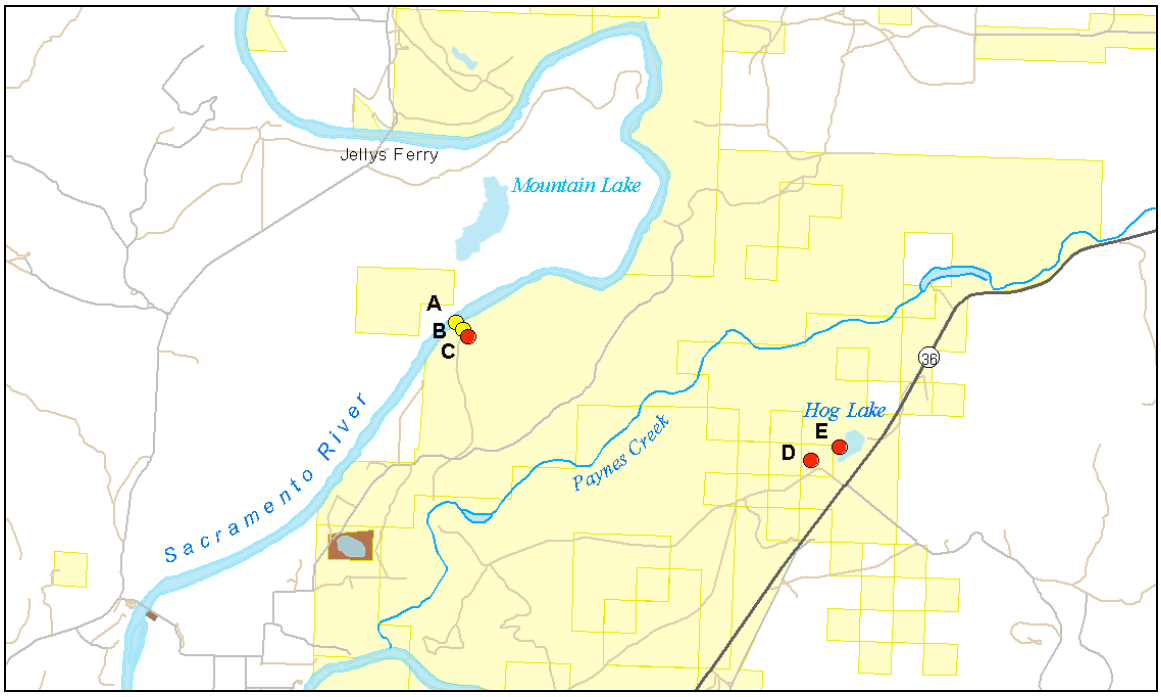
Our team operated out of the Sycamore Grove Campground in Red Bluff from 4-8 May 2007. We monitored two sets of nets in different habitats on the Sacramento River, and collected in the same general area by shotgun. European Starlings (*Sturnus vulgaris*), which were not recorded historically, were abundant in both habitats. We also recorded Wild Turkeys (*Meleagris gallopavo*) on several occasions.

Specific locations are shown in the table and map below (locations in Tehama Co., California).

Specific Locality	Latitude	Longitude	Method

A	Sacramento River at Perry Riffle Trailhead, 300 ft, 3 mi N and 1.75 mi E Bend	40.296521	-122.17799	mistnet, shotgun, salvage
B	Perry Riffle Trail, 350 ft, 3 mi N and 1.75 mi E Bend	40.295767	-122.176954	mistnet, shotgun
C	Yana Trail, 350 ft, 2.75 mi N and 1.75 mi E Bend	40.29487	-122.17620	shotgun

Latitude and longitude for mistnet locations represent the centroid of the nets.



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Sacramento River at Perry Riffle Trailhead, 300 ft, 3 mi N and 1.75 mi E Bend:
Sampling dates: 4-8 May 2007
Sampling effort: 10 nets – 2 pairs, 2 triplets; shotgun
Land ownership: Bureau of Land Management
Habitat: Riparian with sycamores, tree and shrub willows, elderberry, grape; gravel river bank

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Salvaged Specimen	Shot Specimen	Total
Apodiformes - Trochilidae						
Archilochus alexandri	Black-chinned Hummingbird				1	1
Calypte anna	Anna's Hummingbird	1			1	2
Piciformes-Picidae						
Melanerpes formicivorus	Acorn Woodpecker	1			2	3
Passeriformes-Cardinalidae						
Passerina amoena	Lazuli Bunting	1				1
Passerina caerulea	Blue Grosbeak	1				1
Passeriformes-Corvidae						

Aphelocoma californica	Western Scrub-Jay	1			2	3
Passeriformes-Emberizidae						
Melospiza lincolnii	Lincoln's Sparrow	1				1
Passerculus sandwichensis	Savannah Sparrow				1	1
Pipilo crissalis	California Towhee	1	1			2
Zonotrichia atricapilla	Golden-crowned Sparrow	5				5
Zonotrichia leucophrys	White-crowned Sparrow	5				5
Passeriformes-Fringillidae						
Carduelis psaltria	Lesser Goldfinch				1	1
Passeriformes-Hirundinidae						
Tachycineta bicolor	Tree Swallow	2			1	3
Passeriformes-Icteridae						
Icterus bullockii	Bullock's Oriole				1	1
Molothrus ater	Brown-headed Cowbird	3			1	4
Passeriformes-Paridae						
Baeolophus inornatus	Oak Titmouse	1			2	3
Passeriformes-Parulidae						
Dendroica petechia	Yellow Warbler	2				2
Icteria virens	Yellow-breasted Chat	2				2
Oporornis tolmiei	MacGillivray's Warbler	2				2
Wilsonia pusilla	Wilson's Warbler	10	25[a]	1		36
Passeriformes-Sittidae						
Sitta carolinensis	White-breasted Nuthatch	2				2
Passseriformes-Sturnidae						
Sturnus vulgaris	European Starling	2			1	3
Passeriformes-Troglodytidae						
Thryomanes bewickii	Bewick's Wren	2				2
Troglodytes aedon	House Wren	1			1	2
Passeriformes-Vireonidae						
Vireo gilvus	Warbling Vireo				1	1
Passeriformes-Tyrannidae						
Empidonax difficilis	Pacific-slope Flycatcher	2				2
Myiarchus cinerascens	Ash-throated Flycatcher	3			1	4
Total		51	26	1	17	95

[a] Includes 4 recaptures.

Perry Riffle Trail, 350 ft, 3 mi N and 1.75 mi E Bend:
Sampling dates: 5-8 May 2007
Sampling effort: 10 nets – 2 pairs, 2 triplets; shotgun
Land ownership: Bureau of Land Management
Habitat: Blue and valley oak woodland, poison oak, grass

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Shot Specimen	Total
Apodiformes - Trochilidae					
Calypte anna	Anna's Hummingbird	1			1
Selasphorus rufus	Rufous Hummingbird	1			1
Galliformes-Odontophoridae					
Callipepla californica	California Quail	1	1	2	4
Piciformes-Picidae					
Melanerpes formicivorus	Acorn Woodpecker			1	1
Picoides nuttallii	Nuttall's Woodpecker	1			1
Passeriformes-Aegithalidae					
Psaltriparus minimus	Common Bushtit	1		2	3
Passeriformes-Cardinalidae					
Passerina amoena	Lazuli Bunting	3		1	4
Pheucticus melanocephalus	Black-headed Grosbeak	1			1
Passeriformes-Corvidae					
Aphelocoma californica	Western Scrub-jay			1	1
Passeriformes-Emberizidae					
Pipilo maculatus	Spotted Towhee	1			1
Zonotrichia atricapilla	Golden-crowned Sparrow	1			1
Zonotrichia leucophrys	White-crowned Sparrow			1	1
Passeriformes-Fringillidae					
Carduelis psaltria	Lesser Goldfinch			2	2
Passeriformes-Hirundinidae					
Tachycineta bicolor	Tree Swallow	1		5	6
Tachycineta thalassina	Violet-green Swallow			1	1
Passeriformes-Icteridae					
Euphagus cyanocephalus	Brewer's Blackbird			1	1
Passeriformes-Paridae					
Baeolophus inornatus	Oak Titmouse	2		3	5
Passeriformes-Parulidae					
Oporornis tolmiei	MacGillivray's Warbler	1			1
Passeriformes-Sittidae					
Sitta carolinensis	White-breasted Nuthatch	2		1	3
Passseriformes-Sturnidae					
Sturnus vulgaris	European Starling	1		1	2
Passeriformes-Thraupidae					
Piranga ludoviciana	Western Tanager	1			1

Passeriformes-Troglodytidae					
Thryomanes bewickii	Bewick's Wren		1[a]	1	2
Troglodytes aedon	House Wren	1	1		2
Passeriformes-Turdidae					
Sialia mexicana	Western Bluebird			3	3
Passeriformes-Tyrannidae					
Empidonax difficilis	Pacific-slope Flycatcher	1			1
Myiarchus cinerascens	Ash-Throated Flycatcher	2		4	6
Sayornis nigricans	Black Phoebe			1	1
Total		23	3	31	57

[a] Banded.

Yana Trail, 350 ft, 2.75 mi N and 1.75 mi E Bend:
Sampling date: 8 May 2007
Sampling effort: shotgun
Land ownership: Bureau of Land Management
Habitat: Open oak woodland, grass, lava rock outcrops, intermittent stream

Scientific Name	Common Name	Shot Specimen
Piciformes-Picidae		
Melanerpes formicivorus	Acorn Woodpecker	4
Passeriformes-Aegithalidae		
Psaltriparus minimus	Common Bushtit	1
Passeriformes-Emberizidae		
Aimophila ruficeps	Rufous-crowned Sparrow	1
Passerculus sandwichensis	Savannah Sparrow	1
Passeriformes-Hirundinidae		
Tachycineta bicolor	Tree Swallow	1
Passeriformes-Paridae		
Baeolophus inornatus	Oak Titmouse	1
Passeriformes-Fringillidae		
Carduelis lawrencei	Lawrence's Goldfinch	3
Carpodacus mexicanus	House Finch	2
Passeriformes-Sittidae		
Sitta carolinensis	White-breasted Nuthatch	3
Passeriformes-Turdidae		
Sialia mexicana	Western Bluebird	1
Total		18

2. Manton and Hog Lake – Accession 14331

Our team operated out of the KOA Campground in Shingletown from 17-21 May 2007. We monitored two sets of nets in different habitats near Manton, on land owned by Pacific Gas and Electric Co. (per authorization). We collected at the same sites by

ng at the Hog Lake Plateau BLM Recreational

nown in the table below, and the preceding map

	Latitude	Longitude	Method
teau BLM	40.28194	-122.12572	shotgun
M	40.28350	-122.12150	shotgun

BLM Recreational Area:

nagement
ic plateau with oak woodland

Common Name	Shot Specimen
Killdeer	5
Red-winged Blackbird	1
	6

Plateau BLM Recreational Area:

nagement
d live oak woodland, rocky outcrops, short grass

Common Name	Shot Specimen
Common Nighthawk	1
Nuttall's Woodpecker	1
Lark Sparrow	2
Vesper Sparrow	1
Lesser Goldfinch	1
Brewer's Blackbird	3

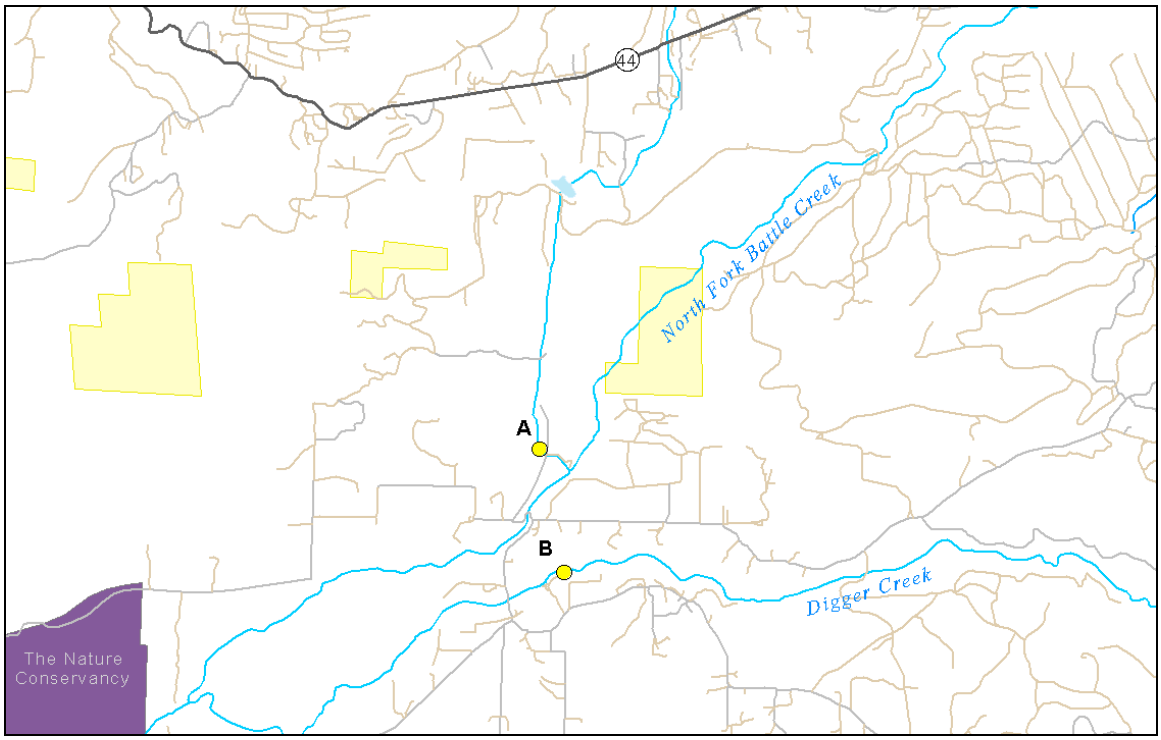
e

Passeriformes-Ptilogonatidae		
Phainopepla nitens	Phainopepla	1
Passeriformes-Sturnidae		
Sturnus vulgaris	European Starling	1
Passeriformes-Troglodytidae		
Salpinctes obsoletus	Rock Wren	1
Passeriformes-Tyrannidae		
Myiarchus cinerascens	Ash-throated Flycatcher	1
Tyrannus verticalis	Western Kingbird	4
Total		24

Specific locations for Manton are shown in the table and map below:

	Specific Locality	**Latitude**	**Longitude**	**Method**
A	Volta Powerhouse Access Rd., 2200 ft., 0.6 mi N of Jcn. Wilson Hill Rd., Shasta Co.	40.4544	-121.86514	mistnet, shotgun, salvage
B	Digger Creek at Cross Country Canal, 2100 ft, 0.5 mi N and 0.5 mi E Manton, Shasta/Tehama co. line	40.440679	-121.861142	mistnet, shotgun

Latitude and longitude for mistnet locations represent the centroid of the nets.



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Volta Powerhouse Access Rd., 2200 ft., 0.6 mi N of Jcn. Wilson Hill Rd.:
Sampling dates: 18-21 May 2007
Sampling effort: 11 nets – 2 pairs, 2 triplets, 1 single; shotgun
Land ownership: Pacific Gas and Electric Company
Habitat: Oak woodland, scrub oak, gray pine, poison oak, manzanita, other shrubs; PG&E canal; burned woodland

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Salvaged Specimen	Shot Specimen	Total
Galliformes-Odontophoridae						
Ca						

Passerina amoena	Lazuli Bunting				1	1
Pheucticus melanocephalus	Black-headed Grosbeak				1	1
Passeriformes-Emberizidae						
Pipilo crissalis	California Towhee	3				3
Pipilo maculatus	Spotted Towhee	1			1	2
Passeriformes-Fringillidae						
Carduelis psaltria	Lesser Goldfinch	1				1
Passeriformes-Mimidae						
Toxostoma redivivum	California Thrasher				1	1
Passeriformes-Paridae						
Baeolophus inornatus	Oak Titmouse	2	4		3	9
Passeriformes-Parulidae						
Dendroica petechia	Yellow Warbler	1				1
Oporornis tolmiei	MacGillivray's Warbler	3				3
Wilsonia pusilla	Wilson's Warbler	8		3	1	12
Passeriformes-Sylviidae						
Polioptila caerulea	Blue-gray Gnatcatcher				1	1
Passeriformes-Timaliidae						
Chamaea fasciata	Wrentit	4				4
Passeriformes-Thraupidae						
Piranga ludoviciana	Western Tanager				2	2
Passeriformes-Troglodytidae						
Thryomanes bewickii	Bewick's Wren	3	1[a]			4
Passeriformes-Turdidae						
Catharus ustulatus	Swainson's Thrush	2				2
Passeriformes-Tyrannidae						
Empidonax (oberholseri?)	Dusky? Flycatcher	1				1
Empidonax difficilis	Pacific-slope Flycatcher	1				1
Myiarchus cinerascens	Ash-throated Flycatcher				1	1
Sayornis nigricans	Black Phoebe				1	1
Passeriformes-Vireonidae						
Vireo gilvus	Warbling Vireo	3				3
Total		47	6	3	21	77

[a] Escaped from net.

Digger Creek at Cross Country Canal, 2100 ft, 0.5 mi N and 0.5 mi E Manton:
Sampling dates: 17-21 May 2007
Sampling effort: 11 nets – 2 pairs, 2 triplets; shotgun
Land ownership: Pacific Gas and Electric Company

Habitat: Oak-bay woodland along creek, open oak or burned woodland above creek; PG&E canal

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Shot Specimen	Total
Galliformes-Odontophoridae					
Callipepla californica	California Quail			3	3
Apodiformes-Trochilidae					
Calypte anna	Anna's Hummingbird	1		1	2
Piciformes-Picidae					
Colaptes auratus	Northern Flicker			1	1
Picoides pubescens	Downy Woodpecker	3			3
Picoides villosus	Hairy Woodpecker	1			1
Passeriformes-Cardinalidae					
Passerina amoena	Lazuli Bunting	1		3	4
Pheucticus melanocephalus	Black-headed Grosbeak			1	1
Passeriformes-Emberizidae					
Pipilo crissalis	California Towhee		1[a]		1
Pipilo maculatus	Spotted Towhee	3			3
Passeriformes-Fringillidae					
Carduelis psaltria	Lesser Goldfinch	3		2	5
Passeriformes-Hirundinidae					
Tachycineta thalassina	Violet-green Swallow			1	1
Passeriformes-Parulidae					
Wilsonia pusilla	Wilson's Warbler			1	1
Passeriformes-Thraupidae					
Piranga ludoviciana	Western Tanager			1	1
Passeriformes-Troglodytidae					
Thryomanes bewickii	Bewick's Wren	4		1	5
Troglodytes aedon	House Wren	1		1	2
Passeriformes-Tyrannidae					
Myiarchus cinerascens	Ash-throated Flycatcher			5	5
Passeriformes-Vireonidae					
Vireo huttoni	Hutton's Vireo			2	2
Total		17	1	23	41

[a] Escaped from net.

3. Madeline Plains – Accession 14331

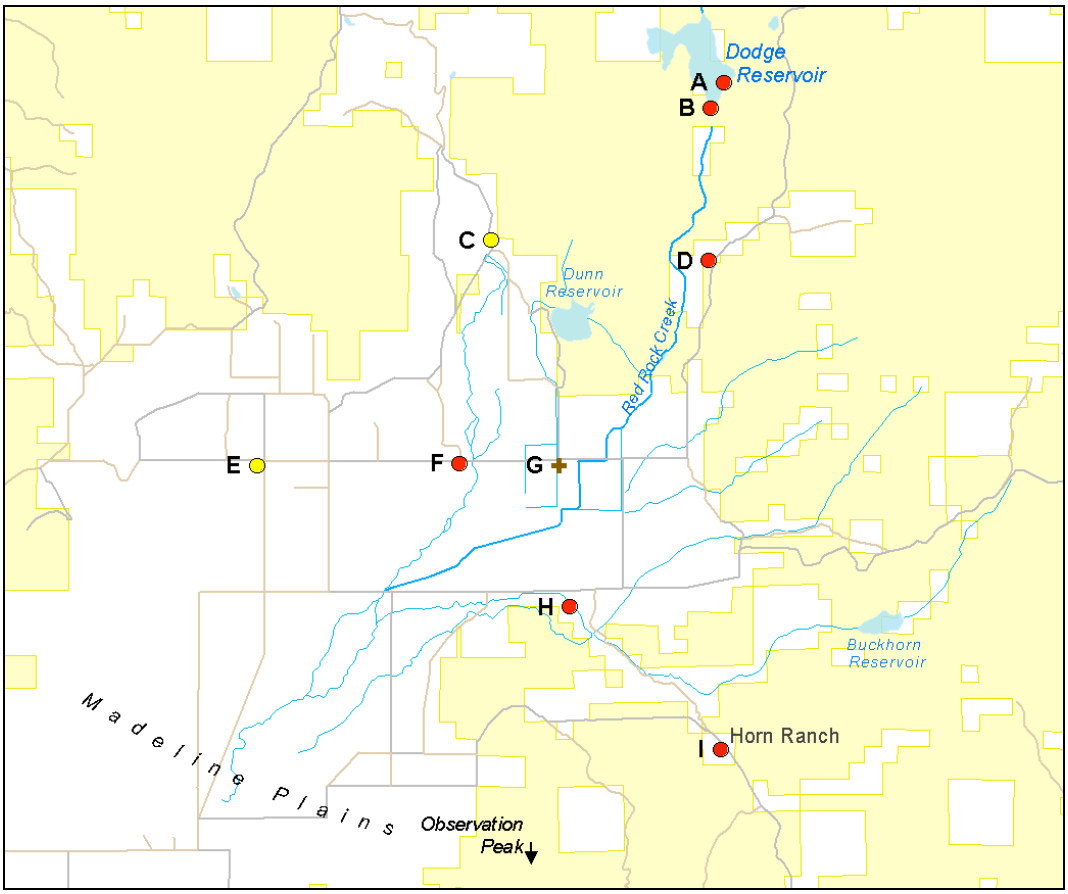
Our team operated out of the Dodge Reservoir Campground from 25-30 June 2007. We monitored two sets of nets in different habitats on the Madeline Plains, and collected at the same sites by shotgun. We also collected by shotgun at several other historic

localities, and stopped en route at a few additional locations. One of the biggest surprises was the breeding presence of Steller's Jays (*Cyanocitta stellerii*) in arid juniper woodland along Red Rock Creek between the Dodge Reservoir dam and Evans Ranch. This species was more common (15 observed) than Western Scrub-Jays (4 seen), although the habitat was more appropriate for the latter species.

Specific locations are shown in the table and map below (locations in Lassen Co., California).

	Specific Locality	**Latitude**	**Longitude**	**Method**
A	Dodge Reservoir, 5700 ft, 13.5 mi N and 2 mi E Observation Peak	40.97362	-120.13301	shotgun
B	Red Rock Creek (Dodge Reservoir to Evans Ranch), 5500-5700 ft	40.96796	-120.13680	shotgun
C	Robert's Reservoir, 5300-5500 ft, 11 mi N and 2 mi W Observation Peak	40.938283	-120.201602	mistnet, shotgun, salvage
D	Evans Ranch, 5600 ft, 11 mi N and 2 mi E Observation Peak	40.93376	-120.13732	shotgun
E	Coyote Flat, 5300 ft, 8 mi N and 5 mi W Observation Peak	40.887763	-120.270302	mistnet, shotgun, salvage
F	Dodge Ranch Hay Barn on Tuledad Rd, 5300 ft, 8 mi N and 2 mi E Observation Peak	40.88821	-120.21072	shotgun
G	Dodge Ranch Headquarters, 5300 ft, 8 mi N and 1 mi W Observation Peak	40.88795	-120.18115	salvage
H	Madeline Plains, 5300 ft, 5.5 mi N Observation Peak	40.85623	-120.17797	shotgun
I	Horne Ranch, 5600 ft, 4 mi N and 2 mi E Observation Peak	40.82436	-120.1335	shotgun, salvage

Latitude and longitude for mistnet locations represent the centroid of the nets.



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Dodge Reservoir, 5700 ft, 13.5 mi N and 2 mi E Observation Peak:
Sampling dates: 26 and 29 June 2007
Sampling effort: shotgun
Land ownership: Dodge Ranch, Bureau of Land Management
Habitat: Juniper-sage woodland, lava rock outcrops, large reservoir

Scientific Name	Common Name	Shot Specimen
Passeriformes-Aegithalidae		
Psaltriparus minimus	Common Bushtit	1
Passeriformes-Corvidae		
Aphelocoma californica	Western Scrub-jay	1
Passeriformes-Emberizidae		
Pipilo chlorurus	Green-tailed Towhee	1
Pipilo maculatus	Spotted Towhee	1
Spizella passerina	Chipping Sparrow	3
Passeriformes-Paridae		
Baeolophus ridgwayi	Juniper Titmouse	1
Poecile gambeli	Mountain Chickadee	3
Passeriformes-Parulidae		
Dendroica coronata	Yellow-rumped Warbler	2
Passeriformes-Troglodytidae		

Salpinctes obsoletus	Rock Wren	3
Total		16

Red Rock Creek (Dodge Reservoir to Evans Ranch), 5500-5700 ft:
Sampling dates: 29 June 2007
Sampling effort: shotgun
Land ownership: Dodge Ranch
Habitat: Juniper-sage woodland, lava rock outcrops, grassy banks with wild rose and serviceberry along creek

Scientific Name	Common Name	Shot Specimen

	Common Name	Specimen	Released	Specimen	Specimen	
Charadriiformes-Charadriidae						
Charadrius vociferous	Killdeer				5	5
Charadriiformes-Scolopacidae						
Phalaropus tricolor	Wilson's Phalarope				2	2
Tringa semipalmata	Willet				1	1
Passeriformes-Aegithalidae						
Psaltriparus minimus	Common Bushtit	2				2
Passeriformes-Alaudidae						
Eremophila alpestris	Horned Lark				2	2
Passeriformes-Corvidae						
Aphelocoma californica	Western Scrub-Jay				1	1
Passeriformes-Emberizidae						
Amphispiza bilineata	Black-throated Sparrow				1	1
Melospiza melodia	Song Sparrow	1			1	2
Passerculus sandwichensis	Savannah Sparrow	5			4	9
Spizella breweri	Brewer's Sparrow	4	4	1		9
Passeriformes-Fringillidae						
Carpodacus mexicanus	House Finch		1[a]			1
Passeriformes-Hirundinidae						
Hirundo rustica	Barn Swallow	2			1	3
Petrochelidon pyrrhonota						

Evans Ranch, 5600 ft, 11 mi N and 2 mi E Observation Peak:
Sampling dates: 27 June 2007
Sampling effort: shotgun
Land ownership: Dodge Ranch
Habitat: Juniper-sage woodland, lava rock outcrops

Scientific Name	Common Name	Shot Specimen
Charadriiformes-Charadriidae		
Charadrius vociferous	Killdeer	1
Passeriformes-Corvidae		
Aphelocoma californica	Western Scrub-jay	1
Passeriformes-Emberizidae		
Chondestes grammacus	Lark Sparrow	2
Spizella breweri	Brewer's Sparrow	1
Passeriformes-Icteridae		
Euphagus cyanocephalus	Brewer's Blackbird	3
Passeriformes-Paridae		
Poecile gambeli	Mountain Chickdaee	1
Passeriformes-Turdidae		
Sialia currucoides	Mountain Bluebird	1
Total		10

Coyote Flat, 5300 ft, 8 mi N and 5 mi W Observation Peak:
Sampling dates: 27-30 June 2007
Sampling effort: 10 nets – 3 pairs, 1 triplet; shotgun
Land ownership: Dodge Ranch
Habitat: Sagebrush flat (2-5 ft tall), sparse annuals, dried grass, bare sandy soil

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Salvaged Specimen	Shot Specimen	Total
Passeriformes-Alaudidae						
Eremophila alpestris	Horned Lark				3	3
Passeriformes-Emberizidae						
Amphispiza belli	Sage Sparrow	1				1
Pooecetes gramineus	Vesper Sparrow	1				1
Spizella breweri	Brewer's Sparrow	2	1	1		4
Passeriformes-Fringillidae						
Carpodacus mexicanus	House Finch				1	1
Passeriformes-Icteridae						
Sturnella neglecta	Western Meadowlark				1	1
Passeriformes-Laniidae						
Lanius ludovicianus	Loggerhead Shrike				1	1
Passeriformes-Mimidae						

Oreoscoptes montanus	Sage Thrasher				7	7
Passeriformes-Tyrannidae						
Empidonax wrightii	Gray Flycatcher	3	3		7	13
Total		7	4	1	20	32

Dodge Ranch Hay Barn on Tuledad Rd, 5300 ft, 8 mi N and 2 mi E Observation Peak:
Sampling dates: 27 June 2007
Sampling effort: shotgun
Land ownership: Dodge Ranch
Habitat: Hay barn structure

Scientific Name	Common Name	Shot Specimen
Passeriformes-Hirundinidae		
Petrochelidon pyrrhonota	Cliff Swallow	10

Dodge Ranch Headquarters, 5300 ft, 8 mi N and 1 mi W Observation Peak:
Sampling dates: 26 June 2007
Sampling effort: salvage
Land ownership: Dodge Ranch
Habitat: Ranch buildings

Scientific Name	Common Name	Salvaged Specimen
Passeriformes-Alaudidae		
Eremophila alpestris	Horned Lark	1

Madeline Plains, 5300 ft, 5.5 mi N Observation Peak:
Sampling dates: 28 June 2007
Sampling effort: shotgun
Land ownership: Dodge Ranch
Habitat: Sagebrush

Scientific Name	Common Name	Shot Specimen
Passeriformes-Alaudidae		
Eremophila alpestris	Horned Lark	1
Passeriformes-Emberizidae		
Spizella breweri	Brewer's Sparrow	2
Total		3

Horne Ranch, 5600 ft, 4 mi N and 2 mi E Observation Peak:
Sampling dates: 28 June 2007
Sampling effort: shotgun
Land ownership: Dodge Ranch
Habitat: Juniper-sage, willow thickets along creek, stock pond

Scientific Name	Common Name	Salvaged Specimen	Shot Specimen
Podicipediformes-Podicipedidae			
Aechmophorus occidentalis	Western Grebe		1
Charadriiformes-Charadriidae			
Charadrius vociferous	Killdeer		1
Columbiformes-Columbidae			
Zenaida macroura	Mourning Dove		2
Passseriformes-Corvidae			
Aphelocoma californica	Western Scrub-jay		2
Passseriformes-Emberizidae			
Spizella passerina	Chipping Sparrow		1
Passseriformes-Fringillidae			
Carpodacus mexicanus	House Finch		1
Passseriformes-Icteridae			
Agelaius phoeniceus	Red-winged Blackbird		1
Euphagus cyanocephalus	Brewer's Blackbird		2
Icterus bullockii	Bullock's Oriole		4
Passseriformes-Hirundinidae			
Petrochelidon pyrrhonota	Cliff Swallow	1	
Passseriformes-Mimidae			
Oreoscoptes montanus	Sage Thrasher		1
Passseriformes-Troglodytidae			
Salpinctes obsoletus	Rock Wren		3
Passseriformes-Turdidae			
Sialia currucoides	Mountain Bluebird		1
Turdus migratorius	American Robin		1
Passseriformes-Tyrannidae			
Tyrannus verticalis	Western Kingbird		2
Total		1	23

4. Lassen Volcanic National Park East, Lassen Volcanic National Park West, Mineral Vicinity – Accession 14331

Our team worked in Lassen Volcanic National Park and vicinity from 9-19 July 2008. We worked out of Crags Campground in the northwestern section of the park, and Butte Lake Campground in the northeastern section. We monitored mistnets at three sites in different ecological zones: Manzanita Lake (west slope mixed conifer), Upper Kings Creek Meadow (montane high elevation forest), and Butte Lake (east side yellow pine). Because we could not hunt within the park boundaries, we collected by shotgun in national forest land near the northwestern and northeastern entrances. We also revisited two sites in the vicinity of Mineral (Bluff Falls, Summit Creek) that were surveyed in 2006 by mistnet and shotgun. The most exciting find was the occurrence of Gray Jays (*Perisoreus canadensis*) at Crags Campground and Butte Lake; this species was not found by Grinnell et al., who discredited earlier anecdotal records. Although the species has been found in the park prior to our resurveym, and subsequent to the work by

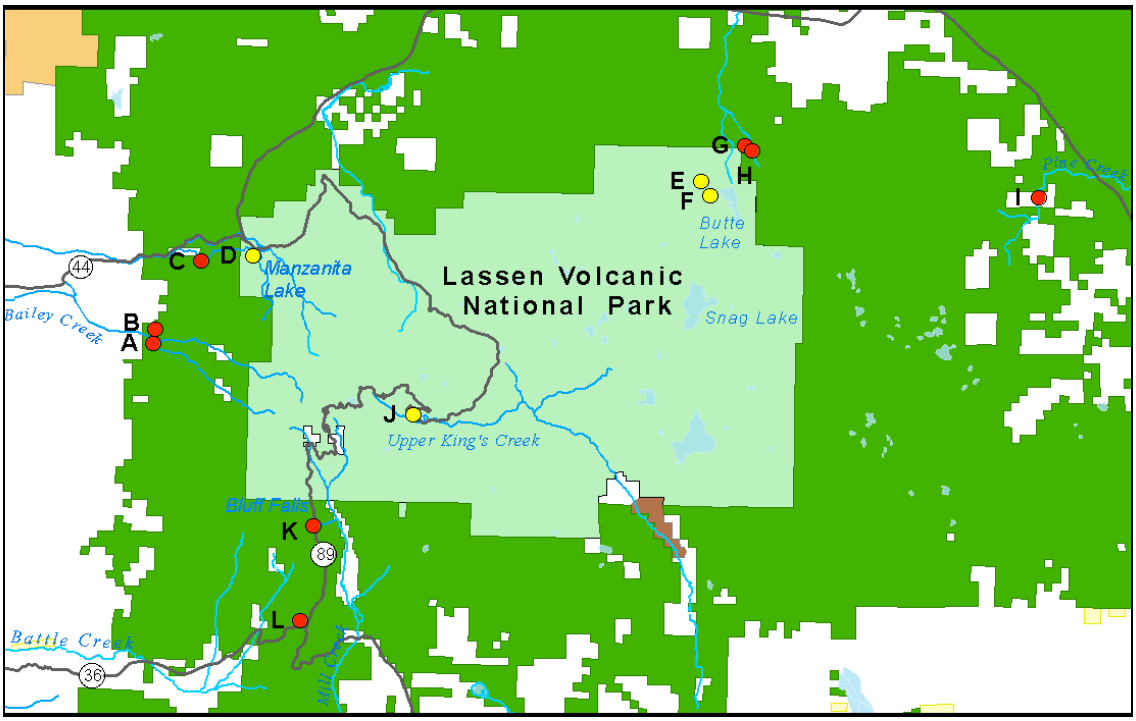
Mu *Project*

Gri men from the transect.

Spe elow:

		Latitude	Longitude	Method
Las				
A		40.4931	-121.62659	shotgun
B				

[redacted]



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Lassen Park West:

Junction of North and South Fork Bailey Creek, 5300 ft., Lassen National Forest:
Sampling dates: 11 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service
Habitat: Mixed conifer forest of white and doug fir, incense cedar, sugar and yellow pine, black oak

Scientific Name	Common Name	Shot Specimen
Passeriformes-Paridae		
Poecile gambeli	Mountain Chickadee	3
Passeriformes-Parulidae		
Dendroica coronata	Yellow-rumped Warbler	4
Passeriformes-Regulidae		
Regulus satrapa	Golden-crowned Kinglet	1
Passeriformes-Sittidae		
Sitta canadensis	Red-breasted Nuthatch	1
Passeriformes-Turdidae		
Catharus guttatus	Hermit Thrush	3
Passeriformes-Tyrannidae		
Empidonax hammondii	Hammond's Flycatcher	5
Passeriformes-Vireonidae		
Vireo cassinii	Cassin's Vireo	1
Vireo gilvus	Warbling Vireo	2
Total		20

USFS Rd. 17, 5900 ft., Lassen National Forest:
Sampling dates: 11 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service
Habitat: Manzanita, black oak, white fir, yellow pine

Scientific Name	Common Name	Shot Specimen
Passeriformes-Fringillidae		
Carpodacus cassinii	Cassin's Finch	1
Passeriformes-Thraupidae		
Piranga ludoviciana	Western Tanager	1
Passeriformes-Turdidae		
Myadestes townsendi	Townsend's Solitaire	1
Passeriformes-Tyrannidae		
Empidonax oberholseri	Dusky Flycatcher	1
Total		4

USFS Rd. 17 at Manzanita Creek, 5600 ft, Lassen National Forest:
Sampling dates: 11 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service
Habitat: Manzanita, black oak, white fir, yellow pine

Scientific Name	Common Name	Salvaged Specimen	Shot Specimen
Passeriformes-Aegithalidae			
Psaltriparus minimus			3
Passeriformes-Emberizidae			
Passerella iliaca			2
Passeriformes-Icteridae			
Molothrus ater			1
Passeriformes-Paridae			
Poecile gambeli			1
Passeriformes-Parulidae			
Dendroica coronata	Yellow-rumped Warbler	1	
Vermivora celata			1
Passeriformes-Tyrannidae			
Empidonax hammondii			1
Passeriformes-Vireonidae			
Vireo cassinii			1
Vireo gilvus			2
Total		1	12

Manzanita Lake, 5845 ft, Lassen Volcanic National Park:
Sampling dates: 10-14 July 2007
Sampling effort: mistnet – 10 nets, 4 pairs, 2 singles

Land ownership: National Park Service
Habitat: Lodgepole and yellow pine, white fir, tree willows, meadow, manzanita, chinquapin

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Total
Apodiformes-Trochilidae				
Selasphorus rufus	Rufous Hummingbird	1		1
Stellula calliope	Calliope Hummingbird	1		1
Piciformes-Picidae				
Picoides pubescens	Downy Woodpecker	2		2
Piciformes-Certhiidae				
Certhia americana	Brown Creeper	9		9
Piciformes-Emberizidae				
Junco oreganus	Dark-eyed Junco	5		5
Melospiza lincolnii	Lincoln's Sparrow	5		5
Melospiza melodia	Song Sparrow	8		8
Passerella iliaca	Fox Sparrow	5		5
Piciformes-Paridae				
Poecile gambeli	Mountain Chickadee	2		2
Piciformes-Parulidae				
Dendroica coronata				

lily

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Total
Charadriiformes-Scolopacidae				
Actitis macularia	Spotted Sandpiper	4		4
Apodiformes-Trochilidae				
Selasphorus rufus	Rufous Hummingbird	7		7
Passeriformes-Certhiidae				
Certhia americana	Brown Creeper	1		1
Passeriformes-Emberizidae				
Junco oreganus	Dark-eyed Junco	10	56 [b]	66
Melospiza lincolnii	Lincoln's Sparrow	3		3
Spizella passerina	Chipping Sparrow	4		4
Passeriformes-Fringillidae				
Carduelis pinus	Pine Siskin	10	144	154
Carpodacus cassinii	Cassin's Finch	8	1 [a]	9
Passeriformes-Paridae				
Poecile gambeli	Mountain Chickadee	4		4
Passeriformes-Parulidae				
Dendroica coronata	Yellow-rumped Warbler	10	1 [a]	11
Vermivora celata	Orange-crowned Warbler	2		2
Vermivora ruficapilla	Nashville Warbler	1		1
Passeriformes-Sittidae				
Sitta canadensis	Red-breasted Nuthatch	8		8
Sitta carolinensis	White-breasted Nuthatch	1		1
Passeriformes-Troglodytidae				
Troglodytes aedon	House Wren	8		8
Turdus migratorius	American Robin	10		10
Passeriformes-Tyrannidae				
Contopus sordidulus	Western Wood-pewee	1		1
Empidonax oberholseri	Dusky Flycatcher	2		2
Total		94	202	296

[a] Escaped from net. [b] Includes two recaptures.

Lassen Park East:

Butte Lake Campground, 6100 ft, Lassen Volcanic National Park:

Sampling dates: 15-19 July 2007
Sampling effort: mistnet
Land ownership: National Park Service
Habitat: Yellow pine and white fir forest

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Total
Strigiformes-Strigidae				
Aegolius acadicus	Saw-whet Owl		1	1
Apodiformes-Trochilidae				
Selasphorus rufus	Rufous Hummingbird	1		1
Passeriformes-Certhiidae				

Certhia americana	Brown Creeper	2		2
Passeriformes-Corvidae				
Perisoreus canadensis	Gray Jay	1	1[a]	2
Passeriformes-Paridae				
Poecile gambeli	Mountain Chickadee	2		2
Passeriformes-Sittidae				
Sitta canadensis	Red-breasted Nuthatch	3		3
Sitta carolinensis	White-breasted Nuthatch	1		1
Sitta pygmaea	Pygmy Nuthatch	1		1
Passeriformes-Thraupidae				
Piranga ludoviciana	Western Tanager	1		1
Passeriformes-Tyrannidae				
Empidonax hammondii	Hammond's Flycatcher	1		1
Total		13	2	15

[a] Escaped from net.

NW shore Butte Lake, 6100 ft, Lassen Volcanic National Park:
Sampling dates: 15-19 July 2007
Sampling effort: mistnet
Land ownership: National Park Service
Habitat: Aspen, lodgepole pine, yellow pine, white fir, willow thickets

Scientific Name	Common Name	Mistnet Specimen	Mistnet Released	Total
Piciformes-Picidae				
Sphyrapicus ruber	Red-breased Sapsucker	3		3
Sphyrapicus thyroideus	Williamson's Sapsucker	1		1
Columbiformes-Columbidae				
Zenaida macroura	Mourning Dove	1		1
Apodiformes-Trochilidae				
Selasphorus rufus	Rufous Hummingbird	1		1
Stellula calliope	Calliope Hummingbird	1		1
Passeriformes-Cardinalidae				
Passerina amoena	Lazuli Bunting	2		2
Passeriformes-Certhiidae				
Certhia americana	Brown Creeper	6		6
Passeriformes-Corvidae				
Cyanocitta stelleri	Steller's Jay	1		1
Nucifraga columbiana	Clark's Nutcracker	2		2
Passeriformes-Emberizidae				
Junco oreganus	Dark-eyed Junco	3	1[a]	4
Melospiza melodia	Song Sparrow	1		1
Passeriformes-Paridae				
Poecile gambeli	Mountain Chickadee	1		1
Passeriformes-Parulidae				
Dendroica coronata	Yellow-rumped Warbler	1		1
Passeriformes-Sittidae				
Sitta canadensis	Red-breasted Nuthatch	1		1
Passeriformes-Thraupidae				
Piranga ludoviciana	Western Tanager	1		1

Passeriformes-Troglodytidae				
Troglodytes aedon	House Wren	1	1[a]	2
Passeriformes-Turdidae				
Turdus migratorius	American Robin	1		1
Passeriformes-Tyrannidae				
Contopus cooperi	Olive-sided Flycatcher	1		1
Contopus sordidulus	Western Wood-pewee	3		3
Empidonax hammondii	Hammond's Flycatcher	1		1
Total		33	2	35

[a] Escaped from net.

USFS Rd. 32N09, 6000 ft, 1 mi N and 1 mi E Butte Lake Campground, Lassen National Forest:

Sampling dates: 16-19 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service
Habitat: White fir, yellow and lodgepole pine, manzanita

Scientific Name	Common Name	Shot Specimen
Piciformes-Picidae		
Colaptes auratus	Northern Flicker	1
Picoides albolarvatus	White-headed Woodpecker	3
Picoides villosus	Hairy Woodpecker	1
Sphyrapicus ruber	Red-breasted Sapsucker	5
Passeriformes-Corvidae		
Cyanocitta stelleri	Steller's Jay	1
Passeriformes-Emberizidae		
Junco oreganus	Dark-eyed Junco	1
Passerella iliaca	Fox Sparrow	1
Pipilo chlorurus	Green-tailed Towhee	2
Passeriformes-Paridae		
Poecile gambeli	Mountain Chickadee	2
Passeriformes-Parulidae		
Dendroica coronata	Yellow-rumped Warbler	1
Passeriformes-Sittidae		
Sitta canadensis	Red-breasted Nuthatch	3
Passeriformes-Thraupidae		
Piranga ludoviciana	Western Tanager	2
Passeriformes-Troglodytidae		
Troglodytes aedon	House Wren	1
Passeriformes-Turdidae		
Turdus migratorius	American Robin	2
Passeriformes-Tyrannidae		
Contopus cooperi	Olive-sided Flycatcher	2
Contopus sordidulus	Western Wood-pewee	1
Passeriformes-Vireonidae		
Vireo gilvus	Warbling Vireo	4
Total		33

Pole Spring, 6000 ft, 1 mi N and 1.5 mi E Butte Lake Campground, Lassen Nat'l. Forest:
Sampling dates: 16-19 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service
Habitat: Lodgepole and yellow pine, white fir, aspen, cottonwood, meadow

Scientific Name	Common Name	Shot Specimen
Galliformes-Odontophoridae		
Oreortyx pictus	Mountain Quail	3
Columbiformes-Columbidae		
Zenaida macroura	Mourning Dove	1
Piciformes-Picidae		
Picoides albolarvatus	White-headed Woodpecker	2
Picoides villosus	Hairy Woodpecker	1
Sphyrapicus ruber	Red-breasted Sapsucker	2
Passeriformes-Cardinalidae		
Pas		

Habitat: Yellow pine forest with sagebrush understory

Scientific Name	Common Name	Shot Specimen
Piciformes-Picidae		
Picoides villosus	Hairy Woodpecker	1
Passeriformes-Tyrannidae		
Contopus sordidulus	Western Wood-pewee	1
Passeriformes-Vireonidae		
Vireo gilvus	Warbling Vireo	2
Total		4

Mineral vicinity

Bluff Falls, 6400 ft., 0.75 mi South Lassen Volcanic National Park Boundary on Highway 89:

Sampling dates: 13 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service
Habitat: Lodgepole and western white pine, white and red fir, alders, prostrate manzanite, wet meadow with corn lily

Scientific Name	Common Name	Shot Specimen
Piciformes-Picidae		
Picoides villosus	Hairy Woodpecker	2
Sphyrapicus ruber	Red-breasted Sapsucker	6
Passeriformes-Corvidae		
Cyanocitta stelleri	Steller's Jay	1
Passeriformes-Fringillidae		
Carpodacus cassinii	Cassin's Finch	3
Passeriformes-Paridae		
Poecile gambeli	Mountain Chickadee	2
Passeriformes-Parulidae		
Dendroica coronata	Yellow-rumped Warbler	2
Vermivora ruficapilla	Nashville Warbler	1
Passeriformes-Thraupidae		
Piranga ludoviciana	Western Tanager	1
Passeriformes-Tyrannidae		
Contopus cooperi	Olive-sided Flycatcher	1
Contopus sordidulus	Western Wood-pewee	2
Total		21

Summit Creek, 5600 ft., 0.5 mi N Morgan Summit:

Sampling dates: 12 July 2007
Sampling effort: shotgun
Land ownership: U.S. Forest Service

Habitat: White and red fir, lodgepole and sugar pine, yellow pine, manzanita, alders, meadow

Scientific Name	Common Name	Shot Specimen
Piciformes-Picidae		
Picoides albolarvatus	White-headed Woodpecker	1
Picoides villosus	Hairy Woodpecker	1
Sphyrapicus ruber	Red-breasted Sapsucker	5
Passeriformes-Sittidae		
Sitta canadensis	Red-breasted Nuthatch	3
Passeriformes-Thraupidae		
Piranga ludoviciana	Western Tanager	1
Passeriformes-Turdidae		
Myadestes townsendi	Townsend's Solitaire	3
Passeriformes-Vireonidae		
Vireo gilvus	Warbling Vireo	1
Total		15

Discussion

The goals of our resurvey work were to permanently document the avifauna at historic collecting sites in the Lassen Transect, for comparison with surveys conducted ~80 years ago. Our collections supplement the bird point-count transect data conducted by another team of workers affiliated with the MVZ. The combined surveys conducted by collecting and point-count transects give a more complete picture of the avian communities than either approach alone.

It is premature to discuss how avian communities have changed in the transect since the 1920s, because we are still comparing and analyzing data. However, some notable changes include the presence of Wild Turkeys (*Meleagris* gallopavo), European Starlings (*Sturnus vulgaris*), Brown-headed Cowbirds (*Molothrus ater*) – none of which were recorded in historic times and whose presence is likely due to land-use or other human-related changes (e.g., not climate change). The documented presence of Gray Jays (*Perisoreus canadensis*) in Lassen Volcanic National Park, and the abundance of breeding Steller's Jays (*Cyanocitta stelleri*) at a site in the Madeline Plains, are intriguing and require further study. Another change that requires further study is the apparent absence of Ruby-crowned Kinglets (*Regulus calendula*), a species that was observed above 4800 ft in the historic surveys but not present at any sites that we visited in the transect. We will report on these changes, and other observations, as the data are analyzed and published.

Literature Cited

Grinnell et al. 1930. Vertebrate Natural History of a Section of Northern California through the Lassen Peak Region. University of California Press.