



## Mammal Survey of the Yosemite Transect - 2004

**Survey sites and records-** This year, we expanded our sampling to include “Grinnell” sites outside of the park, as far west as La Grange and Snelling, and as far east as Mono Lake. Of the 22 original “Grinnell” transect sites within the Yosemite transect, 9 general areas were visited (La Grange, Snelling, Coulterville, Porcupine Flat, East Fork Indian Canyon, Vogelsang Lake, Merced Lake, Mono Lake, Aspen Valley) with 6 of them being within the park. Between April and September, our teams of 2-5 individuals visited sites for approximately 10 days each. A total of 217 person-days were spent in the field on small mammal surveys during 2004. Sets of 40 Sherman live traps were set and run within each habitat at each locality for four consecutive day-night periods (the standard mammal “trap-night”) to provide data both on species presence and relative abundance. Within each meadow system, 25-50 32oz plastic cups were sunk in the soil, primarily within vole runways, to assess the presence and absence of shrews (genus *Sorex*). Finally, 30 Tomahawk live traps were set at most localities of mixed conifer forest to survey for species of ground squirrels and chipmunks. We trapped pocket gophers (*Thomomys*) with the aid of Macabee gopher traps or assessed their presence at each locality by recording the presence of fresh mounds. Similarly, we determined the presence of moles (*Scapanus*) by noting fresh mounds and surface runways. Observations of the presence of gray squirrels (*Sciurus*), chickarees (*Tamiasciurus*), and other small mammals (pikas, marmots, and small carnivores such as pine marten, skunks and raccoons) were also recorded. A few specimens of some of these species were salvaged as the result of road kills. All specimens are deposited in the MVZ under Accession #13948, searchable online at <http://elib.cs.berkeley.edu/mvz/>.

We complied with our permit guidelines and generally collected fewer than ten representatives of each species per locality. Exceptions were made with shrews where field identifications are not possible.

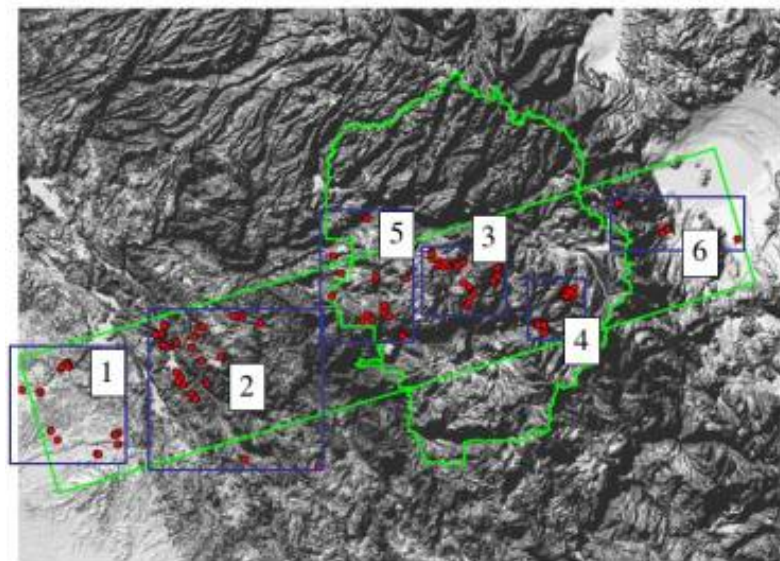


Figure 1. Map of sampling localities for our 2004 mammal survey effort. Each numbered box refers to trapping periods described below. Green rectangle overlaps Grinnell and Storer's Yosemite Transect. The outline of Yosemite National Park is included. Trapping periods 1, 2 and 6 fell completely outside the park. Some road-killed samples were obtained outside the park during period

5.

**La Grange and Snelling (30 April – 8 May)**

We began work here by trapping on land owned by California Fish and Game on the north side of the Tuolumne River, a nearby ranch, near the Old La Grange bridge on the south side of the Tuolumne, near a cemetery W of La Grange, at a farm several miles to the west of La Grange (Peaseley Creek), and set tomahawk traps for ground squirrels along a stretch of road near our base camp at Turlock Lake. We then moved efforts to Snelling where we trapped on California Fish and Game land on the Merced River, at the Kelsey Ranch E of Snelling, and in orchards NW of Snelling. We worked in riparian zones along the Tuolumne River near La Grange and in Oak Woodland uphill from the river. The habitat along the Merced River where we worked was extensively modified by early to mid 20th century dredging and our traplines were restricted to patches of habitat left (willows, grape vines, oaks) among the cobbles and near the road.

A total of 2310 trap nights was used with mostly Sherman traps leading to capture of 138 animals (5.9% trap success) encompassing 13 species (listed below).

Specific Locality	Latitude	Longitude	Habitat
cemetery, 1 mi W La Grange	37.66281	120.47991	grassland
"	37.66512	120.47865	grassland
California Department of Fish & Game property, La Grange	37.66912	120.46245	mixed forest, modified, chapparal
"	37.66986	120.46229	mixed forest, modified, chapparal
6.3 mi SW La Grange on Lake Rd.	37.6248	120.56688	road edge, agricultural
La Grange	37.6656	120.462	riparian
Reeve's Ranch, 0.7 mi WNW La Grange	37.67372	120.46551	oak woodland
Old La Grange Bridge	37.66611	120.46484	riparian
Peaslee Creek	37.62132	120.52497	oak woodland, riparian
2.6 mi NW Snelling	37.53619	120.48598	agricultural
Kelsey Ranch, 1 km S Kelsey Reservoir	37.52911	120.35127	modified, oak woodland, grassland
Kelsey Ranch, 5.2 mi E Snelling	37.52902	120.35059	"
"	37.54598	120.35863	"
"	37.54927	120.34974	"
Kelsey Reservoir	37.54551	120.35648	marsh
Merced River Ranch	37.51121	120.39391	dredgings
"	37.51207	120.39844	"
Sierra View Ranch, 2.6 mi NW Snelling	37.53619	120.48598	agricultural

**Mammal species present, by habitat:**

Family	Species	Habitat	Commonness	Number of localities	Numbers captured
Soricidae	<i>Sorex ornatus</i>	grasslands	uncommon	3	3
Leporidae	<i>Sylvilagus audobonii</i>	roadsides	common	1‡	1

Sciuridae	<i>Spermophilus beecheyi</i>	roadsides, campgrounds	common	2*	7
Geomyidae	<i>Thomomys bottae</i>	fields, meadows	common	2**	13
Heteromyidae	<i>Dipodomys heermanni</i>	dry grassland	uncommon	1***	7
	<i>Perognathus inornatus</i>	dry scrub	uncommon	1	2
Muridae	<i>Peromyscus boylii</i>	meadows, riverbanks	common	5	19
	<i>Neotoma macrotis</i>	riparian, forest	very common	7	36
	<i>Peromyscus maniculatus</i>	riparian, forest, grassland	very common	9	34
	<i>Reithrodontomys megalotis</i>	grassland, riparian	common	9	19
	<i>Microtus californicus</i>	wetter grassy areas, riparian	common	5	10
	<i>Mus musculus</i>	commensal	uncommon	2****	6
	<i>Rattus rattus</i>	disturbed	uncommon	3*****	3

\*common in most habitats along roads, in orchards, fields, etc.

\*\*commonly observed, but only trapped for in a few localities.

\*\*\*highly abundant in correct habitat. This species was trapped in dry, grassy and sandy environments on Kelsey's Ranch.

\*\*\*\*caught only on developed ranches within 200m of human habitation.

\*\*\*\*\*caught in disturbed habitat (mine tailings) and on a ranch.

‡observed in several places. One roadkill female taken.

## 2. Coulterville area, Hunter Valley (12-14 April, 30 April – 8 May)

Grinnell and colleagues surveyed near Coulterville and also near Pleasanton, which now lies under Lake McClure. We surveyed within a radius of about 10 miles of Coulterville trapping in a variety of habitats including conifer forest, riparian, chaparral, and oak forest. We again used Sherman live traps. We worked primarily on BLM land, but occasionally on private ranches and Forest Service land.

A total of 2635 trap nights was extended with some 175 animals (6.64% trap success) encompassing 17 species (listed below).

Specific Locality	Latitude	Longitude	Habitat
1.4 mi W Mt. Bullion	37.50331	120.06969	grassland, chaparral
5.7 mi SE Coulterville	37.63654	120.15194	chaparral
2.3 mi NE Coulterville	37.73657	120.17116	chaparral
2.5 mi NE Coulterville	37.73615	120.16175	chaparral
Black's Creek, 1.9 mi W Coulterville via Hwy. 132	37.70881	120.22121	riparian

Blackstone Creek, 6.5 mi NE Coulterville	37.75496	120.09336	riparian, woodland
Horseshoe Bend Recreation Area, Lake McClure	37.7006	120.2416	chaparral
Hunter Valley Mountain	37.60971	120.17768	chaparral
"	37.61872	120.18696	woodland, chaparral
"	37.63447	120.20695	chaparral
"	37.63996	120.21697	chaparral
"	37.64733	120.21127	chaparral
"	37.65594	120.22132	chaparral
Jordan Creek, 9 mi NNE Coulterville	37.74401	120.03202	riparian, woodland, grassland
Maxwell Creek, 7 km (by air) ESE Coulterville	37.68405	120.12141	chaparral, riparian
Maxwell Creek, Fielding Ranch, 1.5 km NE Coulterville	37.71951	120.17941	oak woodland
Shingle Hill, 7.5 mi NE Coulterville	37.75524	120.07472	
Smith Creek, 6.9 mi NE Coulterville	37.75606	120.08596	riparian, woodland
Stembridge Ranch, 2.4 mi E on Penon Blanco Rd. from Granite Springs Rd.	37.72268	120.26757	chaparral, riparian
Upper Blacks Creek, ca. 5 mi NW Coulterville	37.73983	120.24826	riparian, woodland

### Mammal species present, by habitat:

Family	Species	Habitat	Commonness	Number of Localities	Numbers captured
Soricidae	<i>Sorex trowbridgii</i>	riparian	uncommon	1	1
Leporidae	<i>Sylvilagus bachmani</i>	riparian	uncommon	1*	1
	<i>Lepus californicus</i>	grassland	common	1*	1
Sciuridae	<i>Spermophilus beecheyi</i>	roadsides, meadows	common	2	3
	<i>Sciurus griseus</i>	roadsides, forest	common	3*	3
	<i>Tamias merriami</i>	woodland		1	1
Geomyidae	<i>Thomomys bottae</i>	meadows	common	2**	11
Heteromyidae	<i>Dipodomys heermanni</i>	dry grassland	uncommon	2***	9
	<i>Chaetodipus californicus</i>	chaparral	common	5	14
Muridae	<i>Peromyscus boylii</i>	forest, riparian	common	7	23
	<i>Peromyscus californicus</i>	riparian, forest	uncommon	1	3
	<i>Peromyscus maniculatus</i>	grassland, forest, riparian	common	5*****	25
	<i>Peromyscus truei</i>	chaparral, woodland	common	5	33

	<i>Neotoma macrotis</i>	riparian, forest	common	12	73
	<i>Reithrodontomys megalotis</i>	riparian, grassland	common	6	15
	<i>Mus musculus</i>	commensal	common	1*****	2
	<i>Microtus californicus</i>	riparian, grassland	uncommon	1	10

\*All captures as roadkill in various habitats.

\*\*commonly observed, but only trapped for in one locality.

\*\*\*commonly observed. One obtained as roadkill.

\*\*\*\* This species can often be highly abundant. At one locality we caught 11 in one night with 30 traps.

\*\*\*\*\*This species was caught in a barn on the Stembridge Ranch where mice were eating hay.

### 3. White Wolf, Porcupine Flat, Yosemite Creek, Lehamite Creek, Mt. Hoffmann (21 June – 2 July)

On this trip we worked from White Wolf east to Mt. Hoffmann and Snow Flat. We also surveyed down Lehamite Creek as low as 7100 feet. Most habitats were conifer forest and/or wet meadow but also included some drier habitats dominated by manzanita.

A total of 3997 trap nights was extended with some 764 animals (19.11% trap success) encompassing 20 species (listed below). We also diversified our trapping methods on this trip including more pitfalls and had our largest crew of five persons.

Specific Locality	Latitude	Longitude	Habitat
0.9 mi W Porcupine Flat on Hwy. 120, Yosemite National Park	37.81435	119.57728	mixed conifer
3.8 mi E. White Wolf entrance on Hwy.120, Yosemite National Park	37.83979	119.59254	jeffrey pine, chaparral
Lehamite Creek, Yosemite National Park	37.77441	119.56924	mixed conifer
"	37.77991	119.56425	mixed conifer
McSwain Meadow, Yosemite National Park	37.85193	119.62811	meadow
Old Tioga Mine Rd., Yosemite National Park	37.84309	119.62314	meadow
"	37.84469	119.61269	chaparral, mixed conifer
"	37.84631	119.63327	mixed conifer
Porcupine Flat, Yosemite National Park	37.80489	119.56405	mixed conifer
"	37.80759	119.56455	mixed conifer
SE slope Mt. Hoffmann, Yosemite National Park	37.84097	119.49964	mixed conifer, meadow
Snow Creek at Hwy. 120, Yosemite National Park	37.81763	119.51022	riparian meadow, mixed conifer
Snow Flat, Yosemite National Park	37.82637	119.49919	meadow
White Wolf Campground, Yosemite National Park	37.86644	119.64773	mixed conifer, riparian
"	37.86806	119.64837	"
White Wolf entrance, Yosemite National Park	37.85723	119.64744	mixed conifer

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\*\*\*\*While highly abundant, most of our specimens of *T. douglasii* were obtained as roadkill. They are difficult to live trap in tomahawk traps, but on this trip two were caught in tomahawks and one caught in a Sherman live trap.

\*\*\*\*\*Two juveniles were taken at the base of rocky outcrops along a creek that ran through forest.

†This species is commonly associated with oak woodlands and these captures probably represent the edge of its distribution in this part of the park.

††This species was much more common in the past.

†††Where highly common, we took ear clips of live animals and released them otherwise unharmed.

††††This species was collected at Snow Flat, a new locality for the species in the park.

#### 4. Boothe Lake, Fletcher Lake, Merced Lake, Townsely Lake, Vogelsang Lake, Washburn Lake (12 July – 27 July)

We hiked in approximately 7.5 miles with mule support to Vogelsang Lake. We camped just east of Fletcher Lake. Travelling on foot, we worked within approximately 1 mile of camp to reach Evelyn, Booth, Fletcher, Townsley, and Vogelsang Lakes. After approximately one week, we hiked to Merced Lake where we surveyed forest and meadow habitats around Merced Lake, the trail towards Washburn Lake, and along Lewis Creek, all within approximately one mile of camp (1 km E Merced Lake, 37.7391° N; 119.3970° W).

A total of 2657 trap nights was extended with some 569 animals (21.42% trap success) encompassing 20 species (listed below).

Specific Locality	Latitude	Longitude	Habitat
0.7 mi NW Washburn Lake, Yosemite National Park	37.72604	119.39541	riparian, mixed conifer
1 km E Merced Lake, Yosemite National Park	37.73946	119.40217	mixed conifer, aspen, meadow
1 km E of Merced Lake on Lewis Creek, Yosemite National Park	37.73775	119.39605	
1 mi E Merced Lake, Yosemite National Park	37.74036	119.39641	mixed conifer, chaparral
1.5 mi SE Merced Lake, Yosemite National Park	37.73393	119.39339	mixed conifer, meadow
2 mi SE Merced Lake, Yosemite National Park	37.73031	119.3923	granite slab
Boothe Lake, Yosemite National Park	37.79834	119.34946	mixed conifer
camp, east end Fletcher Lake, Yosemite National Park	37.79826	119.33917	mixed conifer
east end Fletcher Lake, Yosemite National Park	37.79778	119.33617	willow, meadow
east end Townsley lake, Yosemite National Park	37.79125	119.32805	talus, meadow
East Shore, Merced Lake, Yosemite National Park	37.73954	119.40923	mixed conifer, meadow
Evelyn Lake, Yosemite National Park	37.80485	119.32759	"
Fletcher Creek, Yosemite National Park	37.78997	119.35275	"
"	37.79036	119.3512	"
Fletcher Lake, Yosemite National Park	37.79652	119.33929	"
Fletcher Lake, Yosemite National Park	37.79982	119.34177	"
Merced Lake, Yosemite National Park	37.74051	119.41345	chaparral

"	37.74069	119.41023	mixed conifer, aspen, meadow
"	37.7409	119.40804	"
Outlet Creek, Vogelsang Lake, Yosemite National Park	37.78949	119.3465	riparian, rocky
Ranger Station, east end Merced Lake basin, Yosemite National Park	37.73314	119.39529	mixed conifer
Vogelsang Lake, Yosemite National Park	37.78769	119.3469	lakeshore, talus
"	37.7882	119.3422	"
west end Townsley lake, Yosemite National Park	37.7965	119.33623	meadow, shrub edge

### Mammal species present, by habitat:

Family	Species	Habitat	Commonness	Number of Localities	Numbers captured
Soricidae	<i>Sorex monticolus</i>	forest, meadow	uncommon	11	29
	<i>Sorex lyelli</i>	meadow, stream edge	uncommon	2	3
	<i>Sorex palustris</i>	riparian	rare	1	1
	<i>Sorex trowbridgii</i>	riparian	uncommon	1	1
Talpidae	<i>Scapanus latimanus</i>	conifer forest	common	1****	1
Sciuridae	<i>Spermophilus beecheyi</i>	aspen/conifer forest	common	2*	5
	<i>Spermophilus beldingi</i>	dry meadows, lake shores	common	4	11
	<i>Spermophilus lateralis</i>	conifer forest	common	6	15
	<i>Tamiasciurus douglasii</i>	conifer forest	common	1**	1
	<i>Marmota flaviventris</i>	conifer forest, meadow	common	1****	1
	<i>Tamias alpinus</i>	talus, meadow edge	common	6	14
	<i>Tamias quadrimaculatus</i>	conifer forest	rare	1	1
	<i>Tamias speciosus</i>	conifer forest	common	5	25
Geomyidae	<i>Thomomys monticola</i>	meadows	common	3	19
Muridae	<i>Peromyscus boylii</i>	forest, riparian	uncommon	3	3
	<i>Peromyscus maniculatus</i>	grassland, forest, riparian	very common	15	123
	<i>Microtus longicaudus</i>	riparian, meadow	common	10	62
	<i>Microtus montanus</i>	wet meadows	common	7	19
Dipodidae	<i>Zapus princeps</i>	riparian	common	7	21



Mustelidae	<i>Mustela erminea</i>	meadow	uncommon	1	2
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\**S. beecheyi* was collected at Merced Lake in the past and this represents the upper limit for this species on the Merced drainage.

\*\**T. douglassi* was only caught in one place, near camp at Merced Lake, but was highly abundant in the forest on the east side of the lake. We also observed this species among lodgepole pine at and around Fletcher Lake where the forest is sparse.

\*\*\*Marmots were quite common in the open grassy areas around lakes, but only one was secured; found dead on a trail, possibly dropped by a predator.

\*\*\*\*One mole was caught by hand in our camp at Merced Lake. Marmots were seen; sign of coyotes were seen.

Notable observations: Apparently Grinnell et al. captured a Belding ground squirrel in the vicinity of Merced Lake. The habitat may have been radically different then as few open meadows exist in the area now, which is mostly filled in with conifers. Unfortunately, we do not have adequate photographs from Grinnell's period.

### 5. Tamarack Flat, Aspen Valley, Cascades (6 August – 12 August)

This short trip included four trap nights at Aspen Valley, 2 trap nights at Tamarack Flat, and 3 trap nights at Cascades. We set traps in the wettest portion of the meadow at Aspen Valley and set Macabee traps along the edge of the meadow where there was abundant sign. This habitat is probably very different from how it was in 1915 when it was last surveyed. Storer, in his original field notes, described it as a "cow infested hole". Also, its name would suggest abundant Aspen, but we saw very few, some of which were being planted near homes in the Valley. The valley did host a trail and road between White Wolf and the northwest edge of the park and there was a roadhouse (mentioned in Dixon's notes). However, the road has been removed east of Aspen Valley and the roadhouse is only represented now by its foundation.

A total of 993 trap nights was extended with some 96 animals (9.66% trap success) encompassing 14 species (listed below).

Specific Locality	Latitude	Longitude	Habitat
Aspen Valley, Yosemite National Park	37.82534	119.77221	mixed conifer, meadow
"	37.82085	119.77466	"
Cascades, Yosemite National Park	37.724	119.71115	mixed oak/conifer
Merced River at Wildcat Creek, Yosemite National Park	37.7206	119.71456	willows, streambank
Tamarack Flat, Yosemite National Park	37.75456	119.74298	chaparral

### Mammal species present, by habitat:

Family	Species	Habitat	Commonness	Number of Localities	Numbers captured
Soricidae	<i>Sorex sp.</i>	forest, meadow	common	1*	5
Sciuridae	<i>Spermophilus beecheyi</i>	aspen/conifer forest	common	2**	3
	<i>Spermophilus lateralis</i>	conifer forest	common	6	15
	<i>Sciurus griseus</i>	conifer forest	common	1	1
	<i>Tamiasciurus douglasii</i>	conifer forest	common	3***	3

	<i>Tamias quadrimaculatus</i>	conifer forest	uncommon	3****	4
	<i>Tamias speciosus</i>	conifer forest	common	1*****	8
	<i>Tamias sp.</i>	conifer forest	unknown	2	5
Geomyidae	<i>Thomomys monticola</i>	meadows	common	1†	13
Muridae	<i>Peromyscus boylii</i>	forest, riparian	common	2††	19
	<i>Peromyscus maniculatus</i>	grassland, forest, riparian	very common	4	25
	<i>Microtus longicaudus</i>	riparian, meadow	common	1	8
	<i>Microtus montanus</i>	wet meadows	rare	1†††	1
Mustelidae	<i>Mustela erminea</i>	meadow	uncommon	1	1
	<i>Spilogale putorius</i>	forest	common	1††††	1

\**Sorex* sp. are still being identified with skull morphology and DNA.

\*\*Ground squirrels were observed in a variety of habitats.

\*\*\**S. douglasii* were observed in all forested habitats, but only trapped at Tamarack Flat. Other specimens were recovered as roadkill.

\*\*\*\*Two specimens were taken at Aspen Valley and two were taken as roadkill near Crane Flat.

\*\*\*\*\**T. speciosus* was taken quickly at Tamarack Flat in both Sherman and Tomahawk traps.

†*T. monticola* was abundant along the edges of Aspen Valley.

††*P. boylii* was the most common species captured near Cascades on Hwy. 140 in oak/conifer forest.

††† This is apparently the first record of *M. montanus* at Aspen Valley.

†††† One specimen was obtained as a roadkill.

Notable observations: There was abundant rat sign in structures near Cascades and we set traps for them (both tomahawks and Victor rat traps) without success. We also found limited but fresh vole sign along Wildcat Creek where it entered the Merced River. Traps were set for two nights but no voles were captured. Chipmunks were also observed near Cascade Creek, but were not caught or seen close enough to identify. At 3500 feet, this would be an interesting species to document as either a lower limit of one of the more common Yosemite species like *T. speciosus* or *T. quadrimaculatus*, or perhaps one of the more common lower elevation species such as *T. merriami*.

## 6. Williams Butte, Bohler Creek, Mono Mills, Lee Vining Creek (27 August – 4 September)

A total of 1215 trap nights was extended with some 594 animals (48.88% trap success) encompassing 20 species (listed below).

Specific Locality	Latitude	Longitude	Habitat
Bohler Creek	37.90028	119.12977	sagebrush, riparian, aspen

Mono Mills	37.88811	118.96021	yellow pine parkland, sagebrush
SE slope Williams Butte	37.90779	119.1158	piñonjuniper woodland, sagebrush
Warren Fork of Lee Vining Creek	37.95386	119.2285	mt mahogany, shrub
"	37.95421	119.22578	willow riparian, wet meadow

### Mammal species present, by habitat:

Family	Species	Habitat	Commonness	Number of Localities	Numbers captured
Soricidae	<i>Sorex monticolus</i>	forest, meadow	uncommon	1*	2
Sciuridae	<i>Spermophilus beecheyi</i>	riparian/conifer forest	uncommon	2	2
	<i>Spermophilus lateralis</i>	conifer forest	common	2	4
	<i>Tamiasciurus douglasii</i>	conifer forest	common	1	1
	<i>Tamias amoenus</i>	chaparral, conifer forest	abundant	3	38
	<i>Tamias minimus</i>	sagebrush	abundant	2	26
	<i>Tamias speciosus</i>	conifer forest	common	1	3
Geomyidae	<i>Thomomys talpoides</i>	dry meadow	common	1	6
Heteromyidae	<i>Perognathus parvus</i>	sagebrush	common	2	7
Muridae	<i>Peromyscus boylii</i>	forest, riparian	common	1	1
	<i>Peromyscus maniculatus</i>	grassland, forest, riparian	very common	4	53
	<i>Onychomys leucogaster</i>	sagebrush	uncommon	1	1
	<i>Lemmys curtatus</i>	sagebrush	uncommon	2	2
	<i>Microtus longicaudus</i>	riparian, meadow	common	2	45
	<i>Microtus montanus</i>	Wet meadows	rare	2	11
Dipodidae	<i>Zapus princeps</i>	meadows, riparian	common	2	7
Mustelidae	<i>Mustela erminea</i>	meadow	uncommon	1	4
	<i>Mustela frenata</i>	riparian	uncommon	1	1

**Mammalian molecular genetic analyses** -- We have continued to add to our database of genetic information about select mammalian taxa through the Yosemite Transect. For some species, we have good geographic coverage throughout California; for others, very little.

As we reported last year, mammals fall into several groups of patterns of geographic variation. 1) Some species show little variation across the entire state. Examples include Belding's ground squirrel, *Spermophilus beldingi*; Golden-mantled ground squirrel, *S. lateralis*; Shadow chipmunk, *Tamias senex*; Yellow Pine chipmunk, *Tamias amoenus*; Brush mouse, *Peromyscus boylii*; and long-tailed voles, *Microtus longicaudus*. 2) Others exhibit little variation across Yosemite National Park, but do vary within California. Examples include mountain beaver, *Aplodontia rufa*; Alpine chipmunk, *Tamias alpinus*; Montane voles, *Microtus montanus*; and Jumping mice, *Zapus princeps*; 3) Others still have geographic variation partitioned in various parts of the state, including within Yosemite. Some examples include Beechey ground squirrels, *Spermophilus beecheyi*; Bushy-tailed woodrat, *Neotoma cinerea*; Montane pocket gopher, *Thomomys monticola*; and Botta's pocket gopher, *Thomomys bottae*. To put their variation in perspective, the table below summarizes detected variation in the mitochondrial cytochrome b gene. The distances represent mean uncorrected (p) genetic distance among individuals. That is, the number of substitutions / number of base pairs sequenced. Below the table are several examples of mammal distributions with their genetic distances displayed. Black lines (or blue for *T. monticola*) indicate the general distribution of the species across California. *Thomomys bottae* is essentially cosmopolitan across the state. Colored lines indicate the distribution of genetic groups, to the extent that we have sampled them.

### Pairwise variation in the cytochrome b gene among individuals of various species of mammals

Taxon	# sequences	Within Yosemite	Within CA
<b>Little Variation</b>			
<i>Spermophilus beldingi</i>	17	0.003568	0.003667
<i>S. lateralis</i>	30	0.000749	0.009788
<i>Tamias senex</i>	16	0.000000	0.002924
<i>T. amoenus</i>	32	0.001248	0.005261
<i>Microtus longicaudus</i>	47	0.005967	0.007095
<i>Peromyscus boylii</i>	16	0.003704	0.003819
<i>Sorex lyelli</i>	8	0.000000	0.000000
<i>S. monticolus</i>	46	0.001797	0.001996
<b>Variable Statewide/Not in YNP</b>			
<i>Aplodontia rufa</i>	6	0.006579	0.053728
<i>Tamias alpinus</i>	10	0.007283	0.019055
<i>Microtus montanus</i>	23	0.007138	0.010223
<i>Zapus princeps</i>	23	0.001089	0.050604
<i>T. speciosus</i>	54	0.000727	0.032397
<b>Variable Statewide &amp; YNP</b>			
<i>Spermophilus beecheyi</i>	12	0.021722	0.057643
<i>Neotoma cinerea</i>	15	0.041199	0.041195
<i>Thomomys monticola</i>	59	0.054282	0.091166
<i>T. bottae</i>	44	0.013872	0.126747
<i>Sorex trowbridgi</i>	68	0.001633	0.029246

Figure 2. *Spermophilus beecheyi*

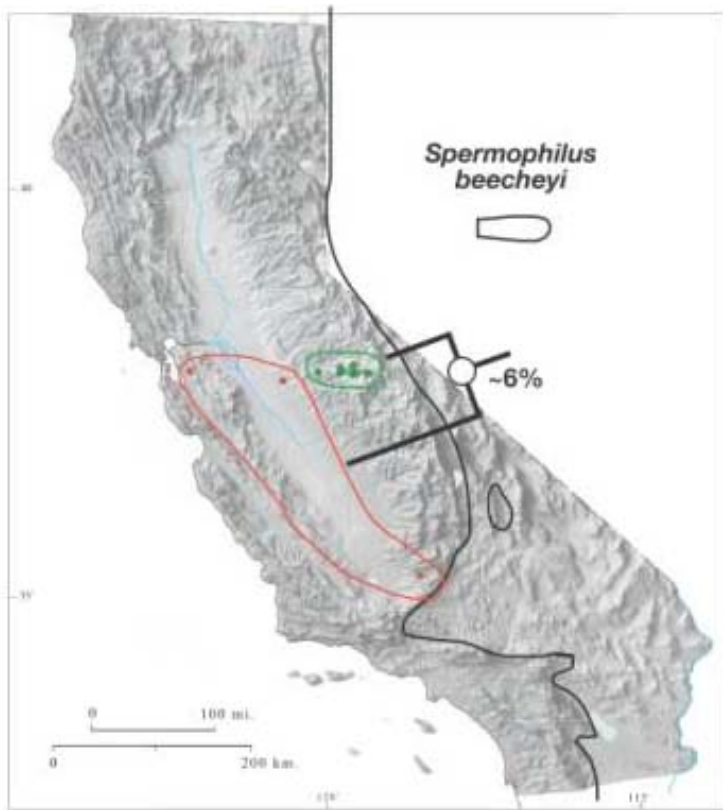


Figure 3. *Neotoma cinerea*

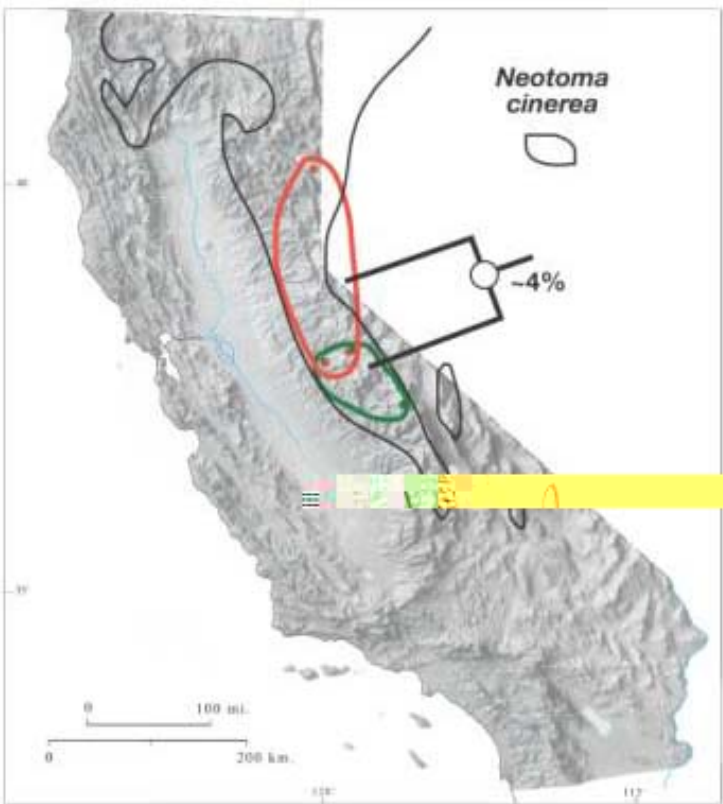


Figure 4. *Thomomys bottae*

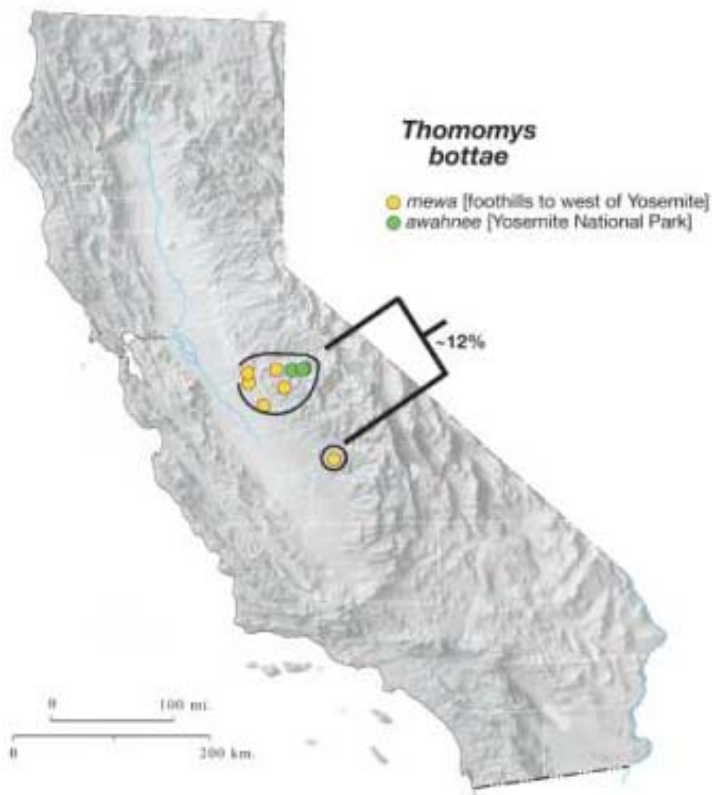


Figure 5. *Thomomys monticola*

