

Point Reyes mountain beaver, *Aplodontia rufa phaea*

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Description: This is a medium-sized (300-465 mm TL), stout, compact, cylindrical muskrat-sized burrowing rodent with coarse textured pelage; a well-furred, short (20-35 mm), cylindrical tail; small eyes; small round ears; short limbs of about equal length; forefeet with functionally opposed thumbs; digits with long curved claws; long stiff rostral vibrissae; and a relatively broad, massive, triangular shaped, laterally compressed skull which lacks postorbital processes (Taylor 1918, Ingles 1965, Hall 1981, Jameson and Peeters 1988, Steele 1989). Pelage is uniformly dark grizzled blackish-brown both dorsally and ventrally with a white spot below each ear (Ingles 1965, Carraway and Verts 1993). Both sexes have similar coarse-textured, dull pelage with thick underfur and sparse guard hairs (Carraway and Verts 1993). Coastal individuals of this species tend to be darker than inland animals (Taylor 1918). The Point Reyes mountain beaver is the smallest subspecies of mountain beaver known and is the lightest colored of the races found along the Pacific Coast (Merriam 1899a, Taylor 1918). Point Reyes mountain beavers average 308 mm (range 280-344 mm) in total length (Taylor 1918). *A. r. phaea* can be distinguished from the Point Arena mountain beaver (*A. r. nigra*), its likely closest relative, by its slightly smaller size, and lighter grizzled brown coloration (Taylor 1918). Cranial features such as a short incisive foramina, a narrow interpterygoid fossa, and the outline and breadth of its nasal bones are characters which distinguish the Point Reyes mountain beaver from other mountain beaver subspecies except for *A. r. nigra*, which it resembles cranially (Merriam 1899a, Taylor 1918).

Taxonomic Remarks: General taxonomic remarks made for *A. r. nigra* also apply to this taxon. Citing its small size, Merriam (1899a) described the Point Reyes mountain beaver as a species (*A. nigra*). Taylor (1918) placed it as a subspecies of *A. rufa*, a conclusion followed by subsequent authors (Grinnell 1933, Hall and Kelson 1959, Hall 1981). The karyotype of *A. r. phaea* ($2n = 46$, six pairs of metacentric and 16 pairs of submetacentric autosomes, and a submetacentric Y-chromosome) is the same reported for *A. r. californica* (McMillin and Sutton 1972). No genetic studies were available at the time of this review.

Distribution: Point Reyes is the southernmost location along the coast which supports mountain beavers. Based on museum specimens, the elevational range of *A. r. phaea* is from ca. 40 ft at Limantour Bay to approximately 1,000 ft at Mount Wittenberg. Historically, this taxon was distributed within an area of approximately 110 mi² (285 km²) in western Marin County (Camp 1918, Taylor 1918), extending from approximately 6 mi (9.6 km) west of Inverness east to Lagunitas and south to four mi (6.4 km) south of Olema (Grinnell 1933, Steele 1989). A local trapper from Inverness reported in 1918 to Camp (unpubl. field notes) that mountain beavers were in every gulch west of Inverness Ridge between Brions and Division Ranchos south to Bolinas Bay, and were less common east of Inverness Ridge (Steele 1989). Museum specimens (n=109) are known from 16 localities in western Marin County: eight locations between 0.75 and 6 mi (1.2 and 9.6 km) W of Inverness (Murphy and Heims Ranches), Marshall Ranch, Point Reyes (21 specimens from unspecified locations), 3 mi (4.8) NE of Point Reyes, Limantour Bay, Lagunitas, three locations from just W to 9 mi (14.4 km) W of Olema (Bear Valley and Tevis Ranches, and Mount Wittenberg), and 4 mi (6.4 km) S of Olema (Williams 1986, Steele 1989). With the exception of Lagunitas, all of the specimen-vouchered localities for this taxon are currently under the jurisdiction of the Point Reyes National Seashore.

All known extant populations of this taxon occur on lands administered by the Point Reyes National Seashore. Currently there are no known extant populations of this taxon situated off the peninsula on privately held lands east of Inverness Ridge. Four extant populations which Steele (1989)

reported finding in 1981 include: a north-facing slope above Rogers Ranch and the Sir Francis Drake Highway, just off the road to Mount Vision, on a north-facing slope above Home Ranch Creek, and on a steep south-facing slope above Glenbrook Creek (Steele 1989). Although Steele (1989) reported finding several old mountain beaver burrows in the Five Brooks area, he did not find any active colonies on the Point Reyes peninsula south of Glenbrook Creek. Based on sighting and field survey data contained in files at the Point Reyes National Seashore headquarters, Evens (1988) reported populations occur on moist fern-covered slopes from "Tomales Point south along the northeast facing slopes of Inverness Ridge to Arroyo Hondo at Palomarin". Dense colonies of this taxon occur in the vicinity of Mount Vision, Point Reyes Hill, Laguna Canyon and Chute Gulch, with incidental observations from Spring Valley, in the Ledum Swamp drainage system, and on the northeast slope of Point Reyes Hill. Evens (1988) also reports "an extensive colony in Devils Canyon is nearly continuous with the Home Ranch colony along Home Ranch Creek." Based on data presented in Evens (1988) and on more extensive surveys of the Point Reyes National Seashore (G. Fellers pers. comm.), it appears that the Point Reyes mountain beaver has a larger geographic range and is more common on the Point Reyes peninsula than reported by Williams (1986) or Steele (1989).

Life History: The life history of the Point Reyes mountain beavers is similar to that of the Point Arena mountain beaver (Camp 1918, Pfeiffer 1958, Steele 1989). Breeding occurs during a short 5-7 week period in mid- to late winter. A single litter is produced in late February following a gestation of 28-30 days. Based on uterine scars, the average litter size is 2.4-2.8 young (Pfeiffer 1958).

Like the Point Arena mountain beaver, Point Reyes mountain beavers are restricted to cool, moist areas which have a year-round supply of water, and tend to limit their surface activity to moderate temperature days and cool nighttime hours. The burrow system excavated by *A. r. phaea* is elaborate and contains a large number of burrow entrances connected to one another by passages by from 6-18 in (15-46 cm) underground, several food storage chambers and a nest chamber (Camp 1918). *A. r. phaea* is active year-round (Camp 1918), and is largely nocturnal, although it is known to occasionally forage during daylight (Camp 1918, Steele 1989). Individuals generally take short foraging trips and return to the burrow with clipped vegetation (Steele 1989). The Point Reyes mountain beaver eats various succulent herbaceous vegetation including: salal (*Gaultheria shallon*), cow parsnip (*Heracleum*), sword fern (*Polystichum munitum*), and stinging nettle (*Urtica*), which make up a major part of their diet; and bracken fern (*Pteridium aquilinum*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), poison oak (*Toxicodendron diversilobum*), Oregon grape (*Berberis*), mint roots, red alder (*Alnus rubra*) and willows (*Salix*), which play a lesser role in their diet (Camp 1918, Steele 1989). In areas of dense coastal sage scrub, considerable time is spent foraging in low trees and shrubs to clip new growth (Steele 1989).

Densities are expected to be similar to those recorded for other mountain beaver subspecies (1.4-2.2 individuals per acre). Based on burrow counts of four populations, Steele (1989) estimated that the number of mountain beavers per site ranged from 0.1 to 3.0 individuals per acre (0.3 to 7.5 per ha) for an overall population estimate of 31-38 or more individuals. It is likely that the population estimate for this subspecies is probably much higher than the 31-38 individuals that Steele (1989) estimated were present during field surveys in 1981.

Habitat: According to Grinnell (1933:195), the Point Reyes mountain beaver inhabits "hillside seepage areas overgrown to sword fern and thimble-berry." Camp (1918) mentioned the apparent association of this taxon with north-facing slopes. Hooper (1944) noted that *A. r. phaea* was found on cool moist slopes with rich humus soils with extensive and continuous heavy chaparral or clumps

of sword fern. According to Evens (1988), favorable habitat includes "moist, sloped soils with dense clumps of sword fern growing in easily excavated, humus-rich soil." Four extant populations were located in sheltered gulches or on steep, north-facing slopes with well drained easily excavated soils vegetated with dense stands of vegetation (Steele 1989). Three of the extant sites were located adjacent to perennial streams and were vegetated with coastal scrub dominated by an overstory of salmonberry, coyote brush (*Baccharis* sp.), poison oak (*Toxicodendron diversilobum*), and cow parsnips (Steele 1989). The fourth extant population was located along the northwest slope of Mount Vison within a Bishop pine forest (Steele 1989). This population was situated within a break in the forest canopy which supported a denser understory growth of sword fern, elderberry (*Sambucus*), salal, and stinging nettle (Steele 1989). Thus the characteristic habitat of the Point Reyes mountain beaver includes moist, well drained, north-facing slopes vegetated with an overstory tangle of shrubs, and a dense understory of sword fern, bracken fern (*Pteridium aquilinum*), salal, stinging nettle and other low plants characteristic of the coastal scrub community.

Status: Class I. The Point Reyes mountain beaver has a very restricted range, has lost a portion of its historically occupied habitat to urban and agricultural developments, and lost approximately 60% of its known populations to the 1995 Mount Vison Fire. Today, much of its 110 mi² (285 km²) historic range is no longer suitable habitat. Although extant populations are afforded some protection as a result of occurring on lands administered by Point Reyes National Seashore, not all of the private lands on the Point Reyes Peninsula are administered by the Federal Government, and feral and exotic herbivores such as axis and fallow deer and cattle continue to degrade mountain beaver habitat within the Seashore. Since Europeans settled the Point Reyes area, native habitats have been extensively modified. Bishop pine and Douglas-fir forests have been intensively harvested for timber, large expanses of coastal brush have been burned and cleared by ranchers to provide grassy fields for livestock grazing and agricultural planting, and native perennial grasslands have been replaced with introduced annual grasslands as a result of intensive livestock grazing (Evens 1988). Suitable coastal scrub habitat for *A. r. phaea* is reduced and fragmented (Steele 1989). Habitat east of Inverness Ridge continues to be heavily impacted from development of private residences, and from intensive grazing by dairy cattle. As a result, there are currently no known extant colonies of Point Reyes mountain beavers east of the Inverness Ridge. It is unknown whether the National Park Service's current management practices for feral and exotic herbivores are having a positive or negative effect on this taxon. Also, there are currently no management plans address the conservation needs of this species at the Point Reyes National Seashore, the Samuel P. Taylor and Tomales Bay State Parks, or the Golden Gate National Recreation Area. This taxon continues to be threatened by degradation of its coastal scrub habitat from feral and exotic herbivore grazing, and from habitat conversion to urban and agricultural uses.

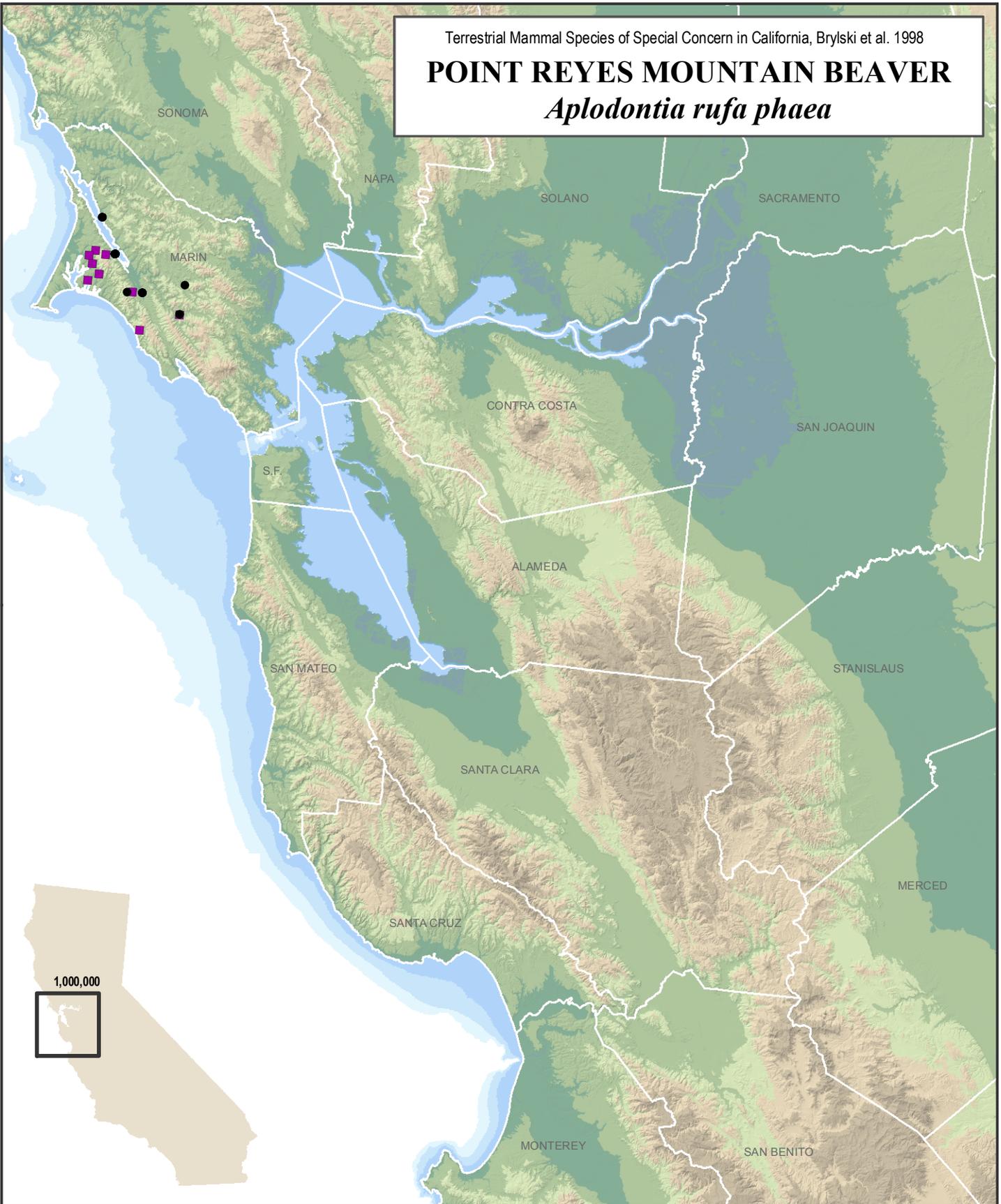
In October 1995, the Mount Vison fire burned more than 12,300 acres of the Point Reyes peninsula (Stallcup 1995). This fire destroyed 40% of the known habitat of the Point Reyes mountain beaver as well as about 60% of the known populations (G. Fellers pers. comm.). Although recent surveys of the burn area revealed that mountain beavers were more widespread than previously thought, no mountain beavers have been found within the burn area (G. Fellers pers. comm.). Until the Mount Vison fire, it appeared that within the Seashore, the trend of reduction in *A. r. phaea* habitat from feral herbivore grazing had been reversed. However, the recent wildfire demonstrates the susceptibility of Point Reyes mountain beavers to catastrophic events such as fire. Due to the decline in available habitat and to the loss of a substantial portion of the known populations of this taxon to fire, the Point Reyes mountain beaver could be threatened with possible extinction in the future, if special protection and management efforts are not implemented to help protect remaining populations.

Management Recommendations: A management plan for the Point Reyes mountain beaver should be prepared and implemented by the National Park Service. Steele (in review) recommended that *i*) long-term monitoring of existing populations be undertaken, and *ii*) a recovery plan should be prepared and implemented, and should consider artificial movement of individuals to maintain existing populations or create new populations in unoccupied habitat within its historic range. Until an area-wide survey for the species is completed, remaining areas of suitable north-facing coastal scrub habitat in the Point Reyes area should be protected or preserved to ensure this taxon's survival. Impact analyses of all proposed developments or changes in land use should be prepared that analyze adverse affects on the species and their consistency with the recovery plan. The effects of feral and exotic herbivore grazing (cattle, fallow and axis deer) on habitat should also be assessed. If feral herbivore grazing is found to be detrimental, grazing should be eliminated from areas that currently contain restricted populations of this taxon. A biochemical study of extant populations of *A. r. phaea* should be undertaken to investigate the evolutionary relationship of this taxon with other coastal mountain beaver populations, and to evaluate the potential problem of inbreeding of remaining populations.

Terrestrial Mammal Species of Special Concern in California, Brylski et al. 1998

POINT REYES MOUNTAIN BEAVER

Aplodontia rufa phaea



• Locations verified by authors
(captures, observations, museum records)

■ CNDDDB 1979 - 1998