

Point Arena mountain beaver, *Aplodontia rufa nigra*

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Description: A medium-sized (300-465 mm TL; 265-333 mm BL), stout, cylindrical muskrat-sized rodent with coarse pelage; furred, short (20-35 mm), cylindrical tail; small eyes; small round ears; short limbs of about equal length; forefeet with functionally opposed thumbs; long stiff rostral vibrissae; and a broad, massive, triangular shaped, laterally compressed skull which lacks postorbital processes. Weight (adult) from 900 to 1,100 g (Taylor 1918, Ingles 1965, Hall 1981, Jameson and Peeters 1988, Steele 1989, Steele and Litman 1994). The pelage is uniformly dark grizzled blackish-brown 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). This is the most strikingly marked subspecies of mountain beaver. It is distinguished from most other mountain beavers by its dark black and gray dorsal coloration and small size (Taylor 1918). It is distinguished from the Point Reyes mountain beaver (*A. r. phaea*), its closest living relative, by its slightly larger size, darker coloration, and cranial characters such as width of interpterygoid fossa, and outline and breadth of nasal bones (Taylor 1914, 1918).

Taxonomic Remarks: Mountain beavers (*Aplodontia rufa*) are a monotypic genus and species in the family Aplodontidae, order Rodentia, suborder Sciurognathi (Wilson and Reeder 1993). Taylor (1914) first described the Point Arena mountain beaver as a full species (*A. nigra*) based on its distinctive black coloration and geographic isolation. Later studies showing wide morphological variability and overlapping cranial characters with *A. r. humboldtiana* and *A. r. phaea* resulted in relegating it as a subspecies of *Aplodontia rufa* (Taylor 1918), a conclusion adopted by subsequent workers (Grinnell, 1933, Hall and Kelson 1959, Hall 1981).

Distribution: Based on 11 museum records and data from Camp (1918) and Taylor (1918), *A. r. nigra* is known from a 24 mi² area in the vicinity of Point Arena, Mendocino County. Colonies historically extended 6.8 mi (10.9 km) along the central Mendocino County coast from the town of Point Arena north to Alder Creek (Camp 1918). Museum specimens document its occurrence at Point Arena, Alder Creek, and Christiansen Ranch (Steele, 1989). Collection of two specimens at Christiansen Ranch in 1951 extended the known range of this taxon 5 mi (8 km) further north (Pfeiffer, 1954). Surveys in 1981 (Steele 1982), 1986 (Steele 1986a, 1986b), 1989 (Steele 1989), and 1991 (Horton and Franzreb 1991) located individuals at Mallo Pass Creek, Irish Creek, Alder Creek, Manchester State Beach (four sites), Lagoon Lake, Minor Hole Road, and Point Arena. These 10 populations were all located within the 12 mi (19 km) long stretch of Mendocino County coast line that the taxon was originally reported to inhabit. Only one (Alder Creek) of the four historic locales was found to still support a population of mountain beavers during the 1980s. Although Grinnell (1933) lists the elevational range of this taxon as below 500 ft (153 m), examination of recent and historic locality records reveal a slightly more restricted elevational range (e.g., from about sea level (13.7 m) at Manchester State Beach to 85.3 m at Christiansen Ranch) (Steele 1986b).

Life History: There are few life history data for the Point Arena mountain beaver. The following summary is based largely on data from other subspecies of *A. rufa* (Godin 1964), Feldhamer and Rochelle 1982, Steele 1986a, 1989, Zeiner et al. 1990, Carraway and Verts 1993). The principal sources used to construct the following life history account of the Point Arena mountain beaver were Steele (1986a, 1986b, 1989) and Horton and Franzreb (1991).

Home ranges of adults vary from 0.01 to 0.08 acres (Horton and Franzreb 1991) with no significant

difference between males and females (Martin 1971). While there is some overlap in mountain beaver home ranges, individuals vigorously defend their nests and burrows except during the breeding season (Steele 1986a, 1989). Underground tunnels are constructed within the home range, usually 6-12 in (15-30 cm) below the surface with numerous openings (Steele 1989). Portions of these tunnels are enlarged to accommodate nests and food storage areas (Camp 1918). The direction and extent of runways and the location of entrances, exits and nests are determined by local topography such as fallen logs, rocks, soil factors, the slope of a bank, and the location of food plants (Voth 1968). Nests are generally located at sites with good drainage, often under mounds, logs, uprooted stumps, or dense thickets (Steele 1989). An average of one or two individuals is found within a single burrow system (Steele 1986b).

The breeding season is limited. Parturition occurs in late February and March. Litter size is usually two to three, infrequently four or five, young per year following a 28-30 day gestation (Pfeiffer 1958). Females are monoestrous and all ovulate synchronously within a population during a 5-7 week period in mid-to-late winter (Pfeiffer 1958). Females reach sexual maturity in their second year (Pfeiffer 1958).

Mountain beavers require substantial daily amounts of drinking water and thermoregulate within a narrow range of mild ambient temperatures between 6 and 16° C and reach their upper thermal tolerance limit at 30° C (Johnson 1971, Kinney 1971). They are apparently unable to enhance evaporative water loss when heat-stressed (Goslow 1964, Johnson 1971, Kinney 1971). When surface temperatures are too warm, mountain beavers thermoregulate either by seeking refuge in their burrow or by orienting their body to maximize passive loss of body heat. Mountain beaver nests and burrow systems temper daily and seasonal changes in temperature and humidity. These osmotic and thermoregulatory limitations restrict mountain beavers to cool, moist areas and limit their surface activity to moderate temperature days and cool night-time hours (Dolph et al. 1962, House et al. 1963, Nungesser and Pfeiffer 1965, Schmidt-Nielsen and Pfeiffer 1970, Johnson 1971, Kinney 1971, Steele 1986a, Horton and Franzreb 1991).

Another limiting factor for mountain beaver populations is the availability of protein for growth (Voth 1968). Steele (1989:26) suggests that this requirement for high protein content "may explain why mountain beaver growth pattern is usually slow and age of first reproduction is late." While mountain beavers are known to use virtually any green plants in their habitat for food and nesting material (Scheffer 1929), their preferred food is succulent herbaceous plant material and deciduous tree bark and leaves (Steele 1982, 1986a, Voth 1968). According to Voth (1968), mountain beavers utilize an uncontested niche by foraging on plant species normally toxic to many other vertebrates such as lupine (*Lupinus* sp.), larkspur (*Delphinium* sp.), foxglove (*Digitalis* sp.), thistle (*Cirsium* sp.), and nettle (*Urtica* sp.). *A. r. nigra* utilizes most of the understory plants in its habitat, but prefers succulent herbaceous vegetation such as sword fern (*Polystichum munitum*), cow parsnip (*Heracleum*), salal (*Gaultheria shallon*), nettle, and salmonberry (*Rubus spectabilis*) (Camp 1918, Steele 1982, 1986b, 1989). The Point Arena mountain beaver forages nocturnally (Steele 1986b).

There are no data available on population densities of the Point Arena mountain beaver. Population densities for other mountain beaver subspecies range from 1.4 to 2.2 per acre (Neal and Borrecco 1981, Lovejoy and Black 1979) and up to 9 animals per acre (Voth 1968). Based on surveys conducted between 1981 and 1991, Steele (1989:7) reports that the Point Arena mountain beaver "exists as small disjunct populations occupying relatively small areas." Steele (1986b, 1989) estimated that the number of individual Point Arena mountain beavers per site ranged from 3 to 10 or more, for an overall population estimate of 100 individuals (Horton and Franzreb 1991). He estimated that *A. r. nigra* occupied roughly 24 acres of approximately 100 acres of available habitat

and that sites varied in size from 3.7 to 19.8 acres (Steele 1986b, 1989, Horton and Franzreb 1991).

Habitat: Mountain beavers occur in densely vegetated areas along the Pacific Coast and Sierra Nevada which receive heavy rainfall (Feldhamer and Rochelle 1982, Steele 1986a). According to Grinnell (1933:195), the Point Arena mountain beaver "inhabits wet ravine sides heavily clothed with thimble-berry and associated plants." *A. r. nigra* populations occur on steep, north-facing slopes of ridges and gullies near the coast in the vicinity of Point Arena (Camp 1918, Steele 1986b). Consistent features of Point Arena mountain beaver habitat included an abundant supply of food plants which usually formed an impenetrable thicket, and moderately deep, firm, well drained soil (Steele 1989). The ten extant Point Arena mountain beaver populations were found in four types of habitat including coastal scrub, stabilized dunes (coastal strand), coniferous forest, and riparian (Horton and Franzreb 1991). Coastal scrub was the characteristic habitat utilized by mountain beaver populations at Point Arena, Minor Hole Road, Alder Creek, Lagoon Lake, and Mallo Pass Creek (Steele 1986b). The Irish Creek site was vegetated with a coniferous overstory composed of Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*) and Bishop pine (*Pinus muricata*), and an herbaceous understory consisting of elements from both riparian and coastal scrub habitats (Steele 1986b). Of the four mountain beaver populations at Manchester State Beach, two were situated in coastal scrub and two were in an area of stabilized dunes (Steele 1986b). The two populations in coastal strand were less sheltered than other *A. r. nigra* populations; however, strong winds and a persistent marine influence did prevent drastic fluctuations in temperature at these two sites (Steele, 1986b).

Status: Class I. Since 1986, the Department has listed this taxon as a highest priority Species of Special Concern (Williams 1986). Because of its "limited distribution (i.e., 10 sites), narrow physiological habitat tolerances, small overall population number (100 individuals), and threats of habitat loss from urban development, pesticide application, predation by feral animals as well as house pets, and human disturbance" the USFWS listed *A. r. nigra* as an Endangered species (Horton and Franzreb 1991:64721). Given these threats and the fact that only about 100 Point Arena mountain beavers remain on about 100 acres of habitat at 10 small (3 to 20 individuals per site), disjunct sites, this taxon is facing imminent extinction and appears to meet the criteria for State-listing as Endangered.

The most important threat to the species is existing and ongoing loss and fragmentation of habitat to urban and agricultural uses. This loss of habitat is the direct result of construction of roads, new homes, and facilities, as well as loss and degradation of habitat from brush clearing, and livestock grazing (Horton and Franzreb 1991). Roughly half of the ten remaining Point Arena mountain beaver populations occur on California Department of Parks and Recreation lands. All extant populations are threatened with inbreeding depression that could threaten long-term survival. Natural catastrophic events such as wildfires (see also species account for *A. r. phaea*), floods, disease, drought, or earthquakes could eliminate all individuals from a number of these already depressed populations to the point where this taxon could not recover.

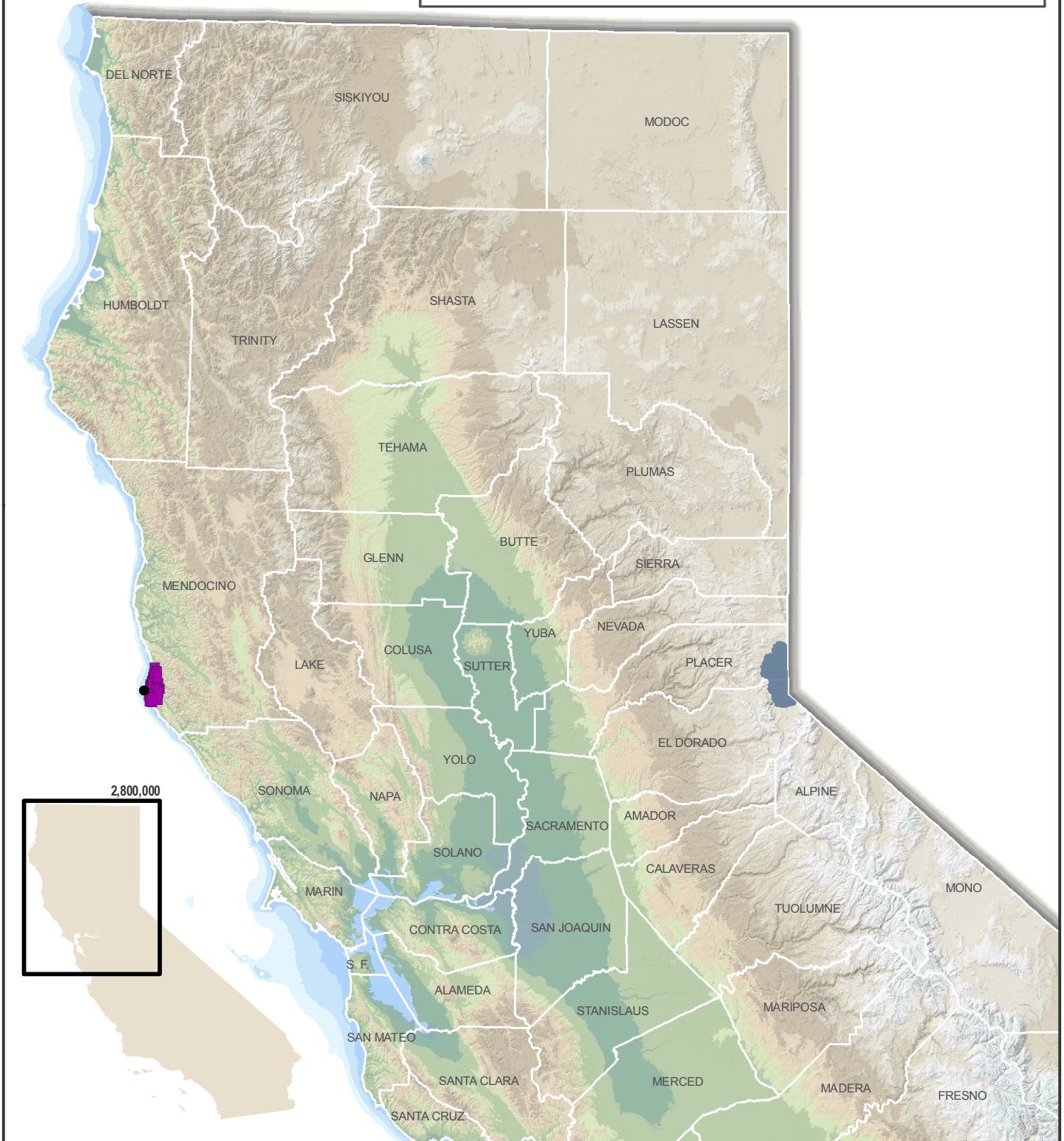
The Point Arena mountain beaver is also being adversely affected by the following factors: reduction in the quality and quantity of its native habitats as a result of the uncontrolled expansion of exotic plants such as gorse (*Ulex europaeus*), pampas grass (*Cortaderia selloana*), and broom (*Cytisus* spp.); loss of individuals due to road kills, rodent control trapping and poisoning, and predation by feral and non-feral house pets; decline in habitat quality at a number of the remaining *A. r. nigra* populations from dumping of trash and human disturbance; and habitat fragmentation that eliminates the opportunity for populations to expand into unoccupied favorable habitats or for genetic exchange to occur between neighboring population sites (Steele 1986b, Horton and Franzreb 1991).

Management Recommendations: Detailed field surveys should be conducted of all extant populations and remaining adjacent suitable habitats, and of other potential habitat along the central Mendocino County coastline. Because a significant portion of the range of this taxon is under private ownership, opportunities of purchasing habitat or protecting it through conservation easements should be explored. Also, a habitat enhancement program should be initiated to protect remaining habitat from grazing pressure and future urban and agricultural developments, including the establishment of habitat buffers around known populations. A biochemical study of all extant populations of this taxon is needed to better define the genetic distinctiveness of *A. r. nigra* and to evaluate the genetic health of remaining populations. Steele (in review) recommended that *i*) long-term monitoring of existing populations be undertaken, and *ii*) recovery plans be prepared and implemented, that include consideration of translocation of individuals to maintain existing populations or create new populations in unoccupied habitat within its historic range.

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

POINT ARENA MOUNTAIN BEAVER

Aplodontia rufa nigra



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

■ CNDDB 1979 - 1998