

Pygmy rabbit, *Brachylagus idahoensis*

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Description: A small (230-295 mm TL) "peppery," grayish brown rabbit with short hind legs; hirsute short (67-76 mm) hindfeet; short (35-52 mm), rounded ears covered with silky pelage, both inside and out; and a short, unicolored tail (15-20 mm) which is dusky colored above and below (Orr 1940, Green and Flinders 1980a, 1980b). Pygmy rabbits have the smallest body mass of North America lagomorphs; adult females in California average 397.8 g (246-458 g) and males average 409.3 g (375-435 g) (Orr 1940). There is a single annual molt in August and September (Grinnell et al. 1930); the new pelage described as long, almost silky, and buffy gray on dorsal surfaces and white tinged with cinnamon buff on ventral surfaces (Green and Flinders 1980a, 1980b; Dobler and Dixon 1990). As a result of wear, this taxon undergoes a fairly substantial change in dorsal pelt color during the course of the year being pinkish-drab in the fall, silvery-gray in the winter, brownish-gray in the spring, and "burnt" grayish-brown in the summer (Grinnell et al. 1930). Pygmy rabbits are distinguished from *Sylvilagus* species by their smaller size (generally under 300 mm in total length), short hairy ears, and short, nearly unicolored tail, which is grayish both above and below (white below in other species of *Sylvilagus*) (Orr 1940, Ingles 1965, Jameson and Peeters 1988).

Taxonomic Remarks: Grinnell et al. (1930) placed the pygmy rabbit in the genus *Sylvilagus*, a decision followed by (Orr 1940), Hall and Kelson (1959), and Hall (1981). Green and Flinders (1980a, 1980b) placed them in the genus *Brachylagus*, a convention supported by morphologic (Kenner 1965) and genetic (Johnson and Wicks 1964, Johnson 1968, Robinson et al. 1984) analyses, and accepted by Wilson and Reeder (1993). In our view, the available data warrant being classified in the monotypic genus *Brachylagus*.

Distribution: Pygmy rabbits are confined to sagebrush dominated habitats in the Great Basin and contiguous intermountain areas of the western United States (Green and Flinders 1980a, 1980b). They range from southeastern Washington south through eastern Oregon and northeastern California to southern Mono County, California, eastward through central Nevada, western Utah to western Wyoming, and north to southwestern Montana and southern Idaho (Dobler and Dixon 1990). In California, they occur in eastern Modoc, Lassen, and Mono counties (Orr 1940, Severaid 1950, Jones 1957). The southern limit of their distribution in California is from the vicinity of Lake Crowley in southern Mono County (Jones 1957). Their known elevational range in California extends from approximately 4,800 ft at Goose Lake, Modoc County (USNM 13087; Grinnell 1933) to 8,374 ft at Bodie, Mono County (MVZ 109446; Severaid 1950). Pygmy rabbits are apparently not ubiquitous across their range, but instead exhibit a disjunct, spotty distribution (Dobler and Dixon 1990). They have declined in some areas of their historic range such as eastern Washington (Lyman 1991), Oregon (Weiss and Verts 1984), and California (Williams 1986).

Life History: California populations of the pygmy rabbit have not been well-studied. Information on their natural history is based on studies of populations outside of California (Green and Flinders 1980a, 1980b; Dobler and Dixon 1990). The pygmy rabbit is a shy, elusive species, spending much of the time under dense protective shrub cover or in burrows which it excavates. They are rarely seen more than a few feet from such refuge, rarely cross large areas of open ground (Bradfield 1975, Weiss and Verts 1984). Pygmy rabbits are active year round and are considered to be crepuscular; however, they can be found above ground any time of day (Dobler and Dixon 1990). This species is unique among rabbits in western North America in that it excavates its own burrow (Green and Flinders 1980a, 1980b). Burrows usually have a number of entrances, are constructed into a north or east facing slope (Wilde 1978), often located at the base of sagebrush patches (Green and Flinders

1980a, 1980b). In California, their burrows are generally less than 1 m long and up to 1.5 m deep (Grinnell et al. 1930, Orr 1940). Burrows are an important element of an individual's home range because they provide protection from predation and temperature extremes, and are probably used as nesting sites. Breeding occurs from late February to early May; litters of 5-8 young are born from March through August (Dobler and Dixon 1990).

Pygmy rabbit populations fluctuate, but there is no indication they show the multi-annual cycles like snowshoe hares. Annual adult mortality is high (88% for one study), with the majority of this occurring during the winter (Wilde 1978). Juvenile mortality is initially high with 50% of juveniles disappearing within five weeks of emergence (Wilde 1978). Pygmy rabbits have been reported at densities of 0.7-1.4 per ha in Utah (Janson 1946), and up to 45 per ha in prime habitat in Idaho (Green 1978). Home range characteristics have not been reported. This species apparently does not range far from its burrow entrance; most feeding activity is within 50 m of the burrow in the winter and slightly further in the spring (Janson 1946, Orr 1940). The maximum distance reported is 2.6 km (Green and Flinders 1981). Big sagebrush (*Artemisia tridentata*) is the dominant food source year-round (Green and Flinders 1980a, 1980b). The relative proportion of sagebrush consumed varies with season, with more consumed during the winter (comprising up to 99% of their diet) than summer (Green and Flinders 1980a, 1980b). Grasses constitute 30-40% of the mid-summer to fall diet along with a variety of forbs (Dobler and Dixon 1990). Predators of pygmy rabbits include bobcat (*Lynx rufus*), coyote (*Canis latrans*), weasel (*Mustela frenata*), badger (*Taxidea taxus*), red fox (*Vulpes vulpes*), owls and hawks (Green and Flinders 1980a, 1980b).

Habitat: Pygmy rabbits typically occur in dense, tall sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus* sp.), and bitterbrush (*Purshia tridentata*), in deep, friable soils (Orr 1940, Green and Flinders 1980a, 1980b, Dobler and Dixon 1990). At Mono Lake, they have been reported in willow (*Salix* spp.) and buffaloberry (*Shepherdia* sp.) thickets (Harris 1982). Dense stands of sagebrush along intermittent stream channels, fence lines, and in borrow ditches next to roads may serve as avenues for dispersal (Green and Flinders 1980a, 1980b). Suitable habitat for this species includes dense, tall sagebrush, deep soil suitable for burrowing, and good grass and forb cover for summer forage (Dobler and Dixon 1990). Characteristics of habitats inhabited by pygmy rabbits in Oregon and Idaho include high shrub height (56 to 84 cm), high shrub cover density (28.8 to 46%), and deep soils (Green and Flinders 1980a, 1980b; Weiss and Verts 1984). The depth and strength of soil were physical properties of soil that were associated with sites occupied by pygmy rabbits, and were probably related to excavation of burrows (Weiss and Verts 1984).

Status: Class II. Pygmy rabbits may be common at a few locations in the state, but have a restricted, spotty distribution, and tend to be uncommon throughout most of their California range. Pygmy rabbits require dense sagebrush, for both food and cover, and soft soils for burrowing (Chapman et al. 1990). They are vulnerable in California because of their restricted distribution, narrow habitat requirements, limited dispersal capabilities, small home ranges, and small, fragmented populations. The primary threat to this species comes from loss, degradation and fragmentation of sagebrush rangeland from overgrazing, agricultural conversions, sagebrush removal for range improvement, and wildfires (Dobler and Dixon 1990, Chapman et al. 1990). Populations situated on the edge of the species range, such as those in California, and populations which are small and/or fragmented, are particularly vulnerable to local extinctions resulting from demographic or genetically related stochastic events.

Large areas of the species historic range in California have been altered by intensive livestock grazing, dryland farming and irrigated agriculture. The removal of sagebrush to improve rangelands for livestock grazing has rendered many areas of sagebrush rangeland unsuitable for pygmy rabbits.

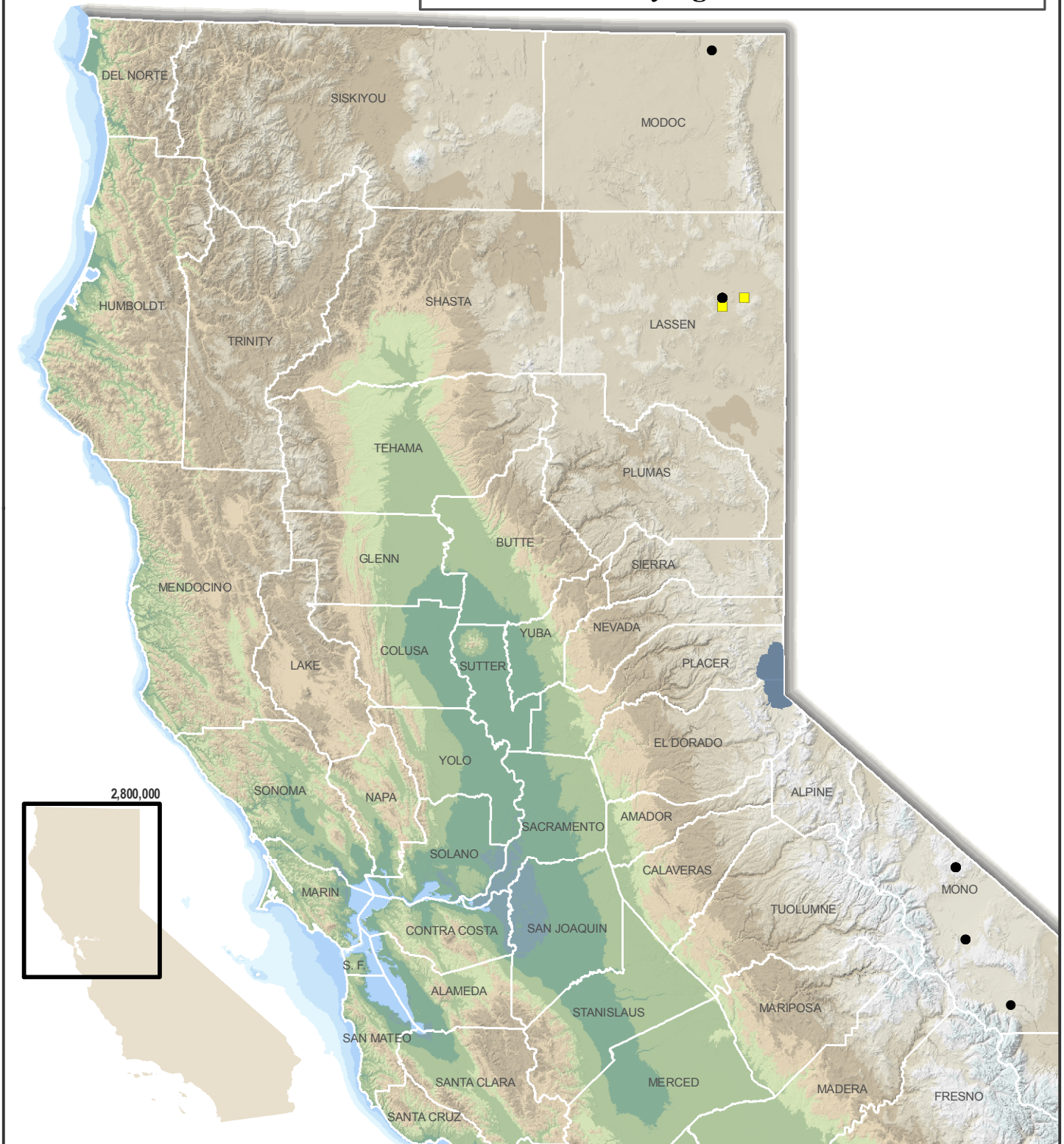
Chapman et al. (1990) state that cattle grazing "is incompatible with the conservation of pygmy rabbit habitat, except in areas that have become so open that grazing is likely to increase the sagebrush density." Heavy livestock grazing is known to increase the density of big sagebrush and reduce perennial grasses and forbs available to pygmy rabbits (Ellison 1960). Because cattle are known to congregate in tall stands of sagebrush during the summer seeking shade, protection from wind, and relief from insects, they tend to damage the structure of tall stands of sagebrush by trampling the understory, breaking off branches and opening the canopy, which in turn opens up the understory and results in a reduction in food and shelter for pygmy rabbits. Wildfires and brush clearing on rangelands also adversely affect sagebrush habitat for pygmy rabbits. Because of these alterations to the sagebrush community in California, pygmy rabbits are restricted in distribution. Weiss and Verts (1984) suggested that pygmy rabbit populations are susceptible to rapid declines and local extirpations, and that the fragmentation of sagebrush communities poses a threat to extant populations because of this susceptibility.

Pygmy rabbits are currently designated as a resident small game species in California. They can be hunted from July 1 through the last Sunday in January, with a bag limit of 10 per day in Lassen and Modoc counties, and five per day in Mono County. Although there is no estimate of the number of pygmy rabbits that are harvested annually as a result of this hunting season, the effect of hunting on pygmy rabbit populations in California is probably not significant. This is because hunters probably kill relatively few pygmy rabbits due in part to the rabbit's secretive habits, localized distribution, and tendency to rarely venture away from dense brush. Accurate data on the annual harvest of this species in California is needed, however, so that the Department can evaluate whether the current hunting program is adversely affecting remaining populations.

Management Recommendations: The first priority for this taxon is to gather more detailed data on its current distribution, abundance, population status, and precise habitat requirements in California. This should be followed by studies on its basic biology including breeding biology, demographics, and especially dispersal capabilities. Basic life history data specific to California pygmy rabbit populations are needed to help evaluate whether grazing and other types of habitat disturbances are adversely affecting extant populations. Research on the basic biology of the pygmy rabbit will provide information to develop appropriate long-term conservation and management measures. More detailed information on the ecology and biology of the pygmy rabbit will also help to more accurately determine the level of hunting that small, fragmented pygmy rabbit populations can sustain. An understanding of genetic variation present in fragmented populations of this taxon in California is needed to plan for the size and configuration of habitat patches required for maintaining genetically and demographically viable populations. Finally, State and Federal land and resource management agencies should consider the habitat requirements of *Brachylagus idahoensis* when evaluating activities such as grazing, brush clearing, and controlled burns proposed for lands within its the range. Protecting the densest deep soil sagebrush areas and surrounding buffer zones of several hectares is probably the most important element to ensure the survival of viable populations of the pygmy rabbit in California.

PYGMY RABBIT

Brachylagus idahoensis



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

■ CNDDDB 1978 and before