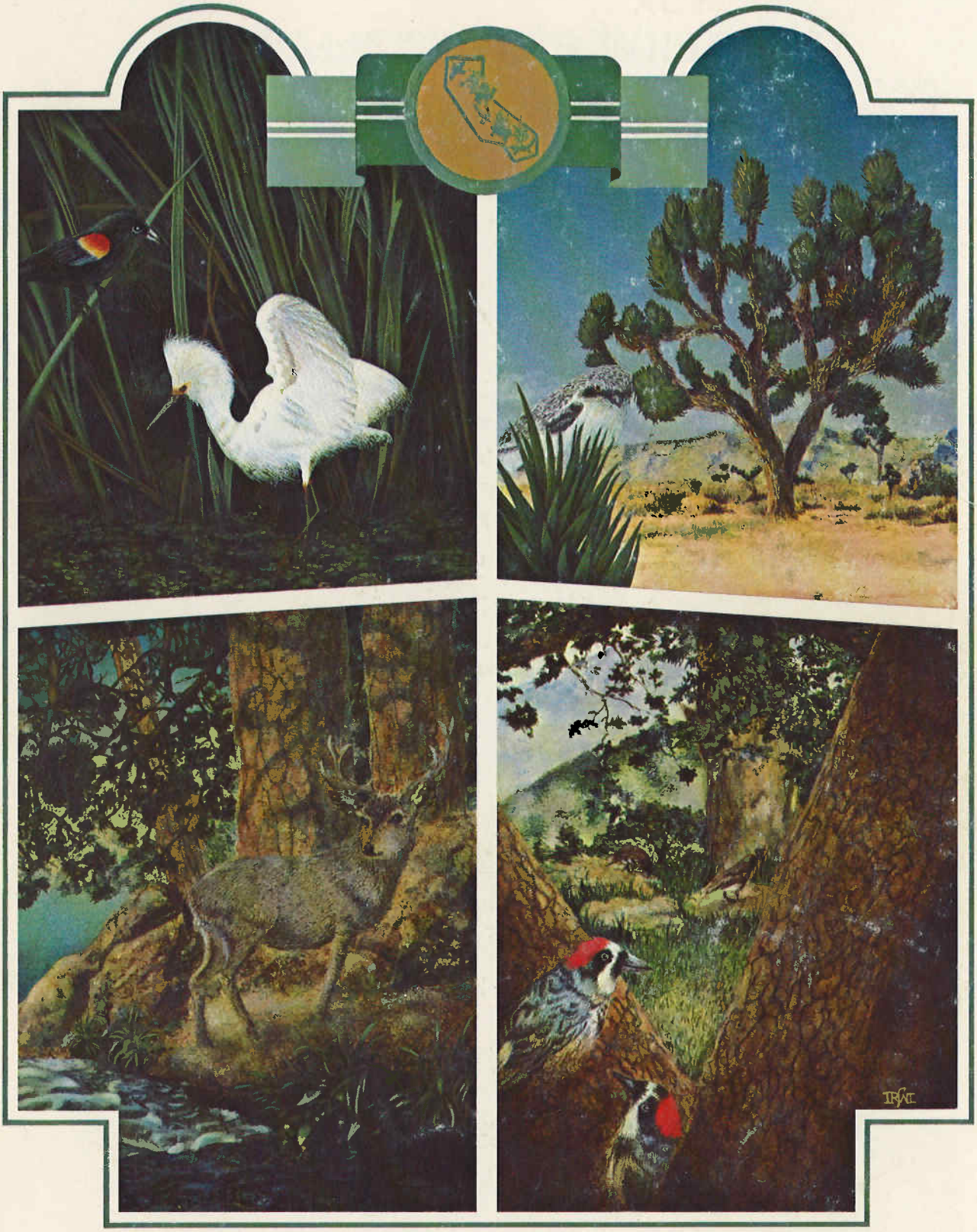

CALIFORNIA'S WILDLIFE

VOLUME III
MAMMALS

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VOLUME III

MAMMALS

Editors

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California Statewide Wildlife Habitat Relationships System

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME
Sacramento, California

April 1990

PREFACE

This volume is the third of three entitled *California's Wildlife.* Together, this set constitutes one of a series of Wildlife Habitat Relationships (WHR) System publications. The purpose of these volumes is to provide basic biological information to users of the statewide WHR computerized database about all terrestrial vertebrate species residing in, or regularly migrating to, California. The database contains species-habitat models to aid biologists in making timely predictions of the wildlife occurring in the various habitats of the state. Additional WHR publications include: *Guide to The California Wildlife Habitat Relationships System* (Airola 1988), and *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988).

The WHR System was initiated in California by the USDA Forest Service and cooperators, with development of wildlife information publications for four zones in California—North Coast, Western Sierra Nevada, Northeast Interior, and Southern California. Only the Southern California document remains to be published. The value of the WHR System was recognized by other state and federal resource agencies, universities, and private institutions having resource responsibilities. In 1981, these interested parties entered into a collaborative, interagency effort to expand the System and to gain broader support.

Thus, the California Interagency Wildlife Task Group (CIWTG) was formed to guide the development of a statewide California WHR System. The CIWTG includes biologists and researchers from 19 agencies, universities, and private institutions. These include the California Departments of Fish and Game, Forestry and Fire Protection, and Parks and Recreation, the California Energy Commission, CALTRANS, University of California (Berkeley and Davis campuses), Humboldt State University, U.S. Fish and Wildlife Service, Bureau of Land Management, National Park Service, Forest Service, Soil Conservation Service, Army Corps of Engineers, Department of Defense, Pacific Gas and Electric Company, and Southern California Edison Company. At the task group's request, the Department of Fish and Game agreed to maintain and administer the program. For a detailed description of the WHR system, refer to the *Guide To The California Wildlife Habitat Relationships System (Airola 1988).*

INTRODUCTION

The species notes and distribution maps in Volume III provide biological information for each species of mammal occurring regularly in California, and included in the WHR database. There are accounts for 181 species of mammals (M001-M186). Volume I (Zeiner *et al.* 1988) contains the accounts for amphibians and reptiles, and those for birds appear in Volume II. These accounts are intended to provide a summary of current knowledge of each species in California for use with the species-habitat models available in the statewide WHR computerized database. Species included in these volumes were taken from Laudenslayer and Grenfell (1983; see Appendix B). Readers will note that a few common and/or scientific names have been changed since Laudenslayer and Grenfell (1983) was published. New names follow those appearing in Jones *et al.* (1986).

Each species account summarizes what could be found about taxonomy, distribution, habitat use and requirements, life history, and management for that species. These accounts are intermediate in detail between treatment of a species in a typical field guide, and a literature review. References are provided for those readers who wish to know sources of information, or who require more detail.

In the WHR System, each species is identified by an alphanumeric code (e.g., M001). Species codes are not always consecutive in these volumes, because those species whose occurrence in California is rare or casual are not included in the WHR database. Also, since publication of Laudenslayer and Grenfell (1983), some species have been combined. Scientific names of plants, and descriptions of habitats, mentioned in these volumes mostly follow Mayer and Laudenslayer (1988).

The species notes were prepared under contracts with BioSystems Analysis, Inc., and Harvey and Stanley Associates, Inc., Ron Duke, Project Manager. They were prepared from scientific literature and other sources, and they vary in length, depending upon the amount of information available. Each note was reviewed and improved by biologists familiar with that group of mammals (see Appendix A for names of reviewers). Management Status listings of "California Species of Special Concern" follow Williams (1986). Each species note shows its date of completion. However, key references have been added after these dates in some notes. A final editing was conducted by Marshall White.

The distribution maps accompanying the species notes depict the general distribution of the species in California. Drafts of the distribution maps were prepared initially from the scientific literature under the direction of Blair Csuti. A first revision of the draft maps was conducted by William Grenfell, Jr. and William Laudenslayer, Jr. after the drafts had been sent to several mammalogists for review. Revised maps then were distributed to numerous field biologists throughout California for review. After this review, David Zeiner revised the maps. The maps then were redigitized by Patrick Crevelt, Beth Bennett, and Dorie Grose of the Department of Water Resources.

Illustrations were acquired from two sources. First, 86 mammals were drawn under contract by Lisa Hall. Illustrations for the remaining 95 mammals were provided by the USDA Forest Service. These had been published initially in Verner and Boss (1980). Pacific Gas and Electric Company provided art work for the cover. Roland Risser, Sue Grubb, and Romeo Washington were responsible for administration, development, and completion of the art work. In addition, Flory Nye-Clement of Pacific Gas and Electric Company proofread the text.

As indicated by Airola (1988), information in these volumes is derived from populations in California or from those in similar habitats in western states, whenever available. Information from other areas, and from personal knowledge of preparers, reviewers, and editors, also was used. Often, no information could be found in the necessarily cursory searches. We encourage readers to submit corrections and additional information for use in future revisions to the WHR Coordinator, 1701 Nimbus Road, Suite D, Rancho Cordova, CA 95670.

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SPECIES NOTES AND DISTRIBUTION MAPS

M038 Pallid Bat *Antrozous pallidus*

Family: Vespertilionidae **Order:** Chiroptera **Class:** Mammalia **Date:** November 16, 1984

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The pallid bat is a locally common species of low elevations in California. It occurs throughout California except for the high Sierra Nevada from Shasta to Kern cos., and the northwestern corner of the state from Del Norte and western Siskiyou cos. to northern Mendocino Co. A wide variety of habitats is occupied, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. The species is most common in open, dry habitats with rocky areas for roosting. A yearlong resident in most of the range.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Takes a wide variety of insects and arachnids, including beetles, orthopterans, homopterans, moths, spiders, scorpions, solpugids, and Jerusalem crickets. The stout skull and dentition of this species allows it to take large, hard-shelled prey. Forages over open ground, usually 0.5–2.5 m (1.6–8 ft) above ground level. Foraging flight is slow and maneuverable with frequent dips, swoops, and short glides. Many prey are taken on the ground. Gleaning is frequently used, and a few prey are taken aerially. Can maneuver well on the ground. May carry large prey to a perch or night roost for consumption. Ingestion of fruit in one study (Howell 1980) was a result of feeding on frugivorous moths. Uses echolocation for obstacle avoidance; possibly utilizes prey-produced sounds while foraging.

Cover: Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings. Roost must protect bats from high temperatures. Bats move deeper into cover if temperatures rise. Night roosts may be in more open sites, such as porches and open buildings. Few hibernation sites are known, but probably uses rock crevices.

Reproduction: Maternity colonies form in early April, and may have a dozen to 100 individuals. Males may roost separately or in the nursery colony.

Water: Needs water, but has a good urine-concentrating ability (Geluso 1978).

Pattern: Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Hibernates. Emerges late (30–60 min after sunset), with a major activity peak 90–190 min after sunset, and a second peak shortly before dawn. Briefer foraging periods occur in autumn, and activity is infrequent below 2°C (35°F). Undergoes shallow torpor daily. Hibernates in winter near the summer day roost (Hermanson and O'Shea 1983).

Seasonal Movements/Migration: Makes local movements to hibernation sites. There is a post-breeding season dispersal.

Home Range: Forages 0.5–2.5 km (1–3 mi) from day roost. Capable of homing from distances of a few miles, but not further.

Territory: Social. Most pallid bats (95%) roost in groups of 20, or more, ranging to 162. Group size is important for metabolic economy and growth of young. Young animals occupy the center of clusters. Individuals out of clusters experience higher rates of weight loss (Trune and Slobodchikoff 1976, 1978).

Reproduction: Mates from late October–February. Fertilization is delayed, gestation is 53–71 days. Young are born from April–July, mostly from May–June. The average litter is 2, but females reproducing for the first time usually have 1 young. Litter size is 1–3. The altricial young are weaned in 7 wk, and are observed flying in July and August. Females nurse only their own young. Females and juveniles forage together after weaning. Females mate in first autumn, males in second. Maximum recorded longevity is 9 yr, 1 mo (Cockrum 1973).

Niche: This slow-flying, maneuverable species is adapted to feed on large, hard-shelled prey on the ground or in foliage. It is known to roost with a number of other bats, principally *Myotis spp.* and *Tadarida brasiliensis.* Owls and snakes are known predators.

Comments: Very sensitive to disturbance of roosting sites. Such sites are essential for metabolic economy, juvenile growth and as night roosts to consume prey.

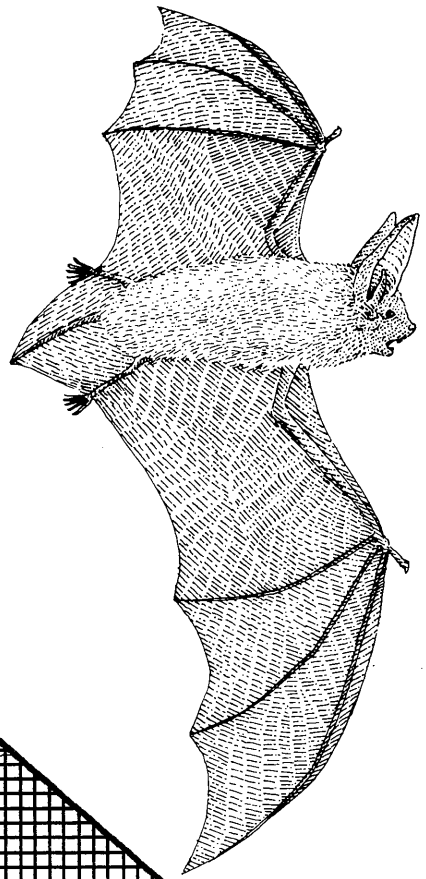
REFERENCES

Hatt 1923, Huey 1936, Engler 1943, Orr 1954, Beck and Rudd 1960, Ross 1961, 1967, Cockrum and Cross 1964, Davis 1966, 1969a, 1969b, Licht and Leitner 1967, O'Farrell *et al.* 1967, Barbour and Davis 1969, O'Farrell and Bradley 1970, Easterla and Whitaker 1972, Cockrum 1973, Dietz 1973, Black 1974, Findley *et al.* 1975, Brown 1976, Trune and Slobodchikoff 1976, 1978, Vaughan and O'Shea 1976, O'Shea and Vaughan 1977, Whitaker *et al.* 1977, Geluso 1978, Howell 1980, Freeman 1981, Hermanson and O'Shea 1983.

PALLID BAT

AUTHORSHIP

Species Note Prepared By: J. Harris
Species Note Edited By: D. Alley, R. Duke
Species Note Reviewed By: P. Brown



M077 Western Gray Squirrel *Sciurus griseus*

Family: Sciuridae **Order:** Rodentia **Class:** Mammalia
Management Status: Harvest Species **Date:** March 4, 1982

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Fairly common locally in mature stands of most conifer, hardwood, and mixed hardwood-conifer habitats in the Klamath, Cascade, Transverse, Peninsular, and Sierra Nevada Ranges (Ingles 1965). Also found in the Sacramento Valley in riparian stands, and in other suitable habitats.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Opportunistic feeders. Diet varies with the availability of seasonal and local foods. They eat hypogeous fungi, pine nuts, acorns, fruits of California bay, other fruits and nuts, forbs, and other tender shoots and leaves (Steinecker and Browning 1970, Steinecker 1977). Fungi are important spring and summer foods, and acorns, when available, are very important summer, fall, and winter foods. Gray squirrels bury nuts singly 8-10 cm (3-4 in) deep (scatter-hoard), and then dig them up to eat in the winter. They locate these nuts, and hypogeous fungi, with their keen sense of smell, although deep snow hampers this ability.

Cover: Use mature tree stands for cover. Require cavities in trees and snags for nests.

Reproduction: In winter, make brood nests in tree and snag cavities, often enlarging an abandoned woodpecker cavity. They also build nests on branches of oak, fir, or pine trees. Nests are lined with shredded bark, grass, moss, and lichen.

Water: Have been observed lapping water from cavities and streams.

Pattern: These squirrels are dependent upon mature stands of mixed conifer and oak habitats. Closely associated with oaks. Require large trees, mast, and snags.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong diurnal activity; most active in early morning and late afternoon (Maser *et al.* 1981).

Seasonal Movements/Migration: Non-migratory.

Home Range: Home range in the Sierra Nevada foothills varied from 0.2 to 0.7 ha (0.5 to 1.8 ac) for females, and from 0.5 to 1.0 ha (1.2 to 2.5 ac) for males (Ingles 1947). Home ranges of males overlapped considerably.

Territory: In Butte Co., territories averaged 1/4 to 1/3 the size of home ranges (Ingles 1947). Lactating females defended territories of 0.1 to 0.3 ha (0.3 to 0.8 ac).

Reproduction: Breed from January through September, with most births occurring March into June. Gestation period 43-44 days; 1 litter/yr. Average litter size 3-4 (range 1-5).

Niche: Potential predators include coyotes, foxes, bobcats, martens, and large hawks and owls. Heavy snowfall covers stores of buried food, and increases predation pressure. May damage commercial fruit and nut crops. Local populations occasionally decimated by disease. Numbers have been reduced by removal of snags, duff, slash, or oak trees.

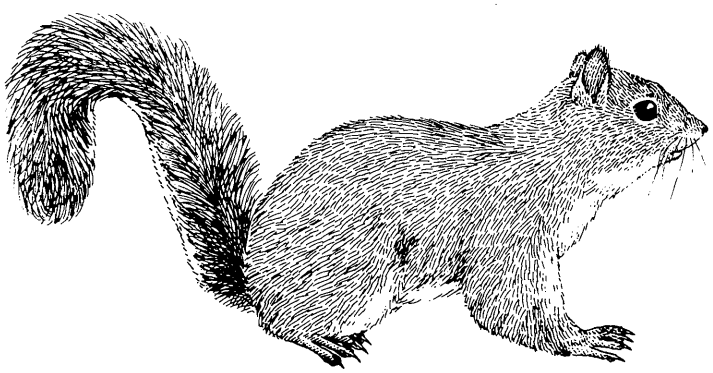
REFERENCES

Ingles 1947, 1965, Steinecker and Browning 1970, Asserson 1974, Steinecker 1977, Maser *et al.* 1981.

WESTERN GRAY SQUIRREL

AUTHORSHIP

Species Note Prepared By: T. E. Harvey
Species Note Edited By: M. White, C. Polite
Species Note Reviewed By: M. White



M119 Brush Mouse *Peromyscus boylii*

Family: Cricetidae **Order:** Rodentia **Class:** Mammalia **Date:** December 20, 1983

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The brush mouse occurs throughout California with the following exceptions: coastal region north of Monterey Bay, Central Valley grasslands, portions of the eastern Sierra Nevada, and the Mojave Desert. It is common to abundant in early to mid-seral stages of valley foothill hardwood, valley foothill hardwood-conifer, riparian, and chamise-redshank, mixed, and montane chaparral habitats. Less common in dense-canopy forest than in open-canopy forest. Elevational range from sea-level to over 3050 m (10,000 ft) (Jameson 1951, Baker 1968).

SPECIFIC HABITAT REQUIREMENTS

Feeding: As other *Peromyscus* species, the brush mouse forages for seeds (especially acorns), fungi, and green vegetation, and feeds opportunistically on arthropods, especially insects in spring. Forages on ground, in shrub understory and in small tree canopy.

Cover: Prefers dense shrub cover for escape, feeding, and reproduction, and requires at least moderate shrub cover. Strongly associated with brush, slash, logs, rocks, and thick forest litter.

Reproduction: Grass nests are built in rock crevices, rotting logs, abandoned burrows, cavities in snags, or in the branches of shrubs (McCabe and Blanchard 1950, Jameson 1953, Brown 1964).

Water: Drinks under lab conditions. Under natural conditions, probably seeks water, but also obtains water from food and dew.

Pattern: Moderate to dense shrub canopy, with or without rock piles or rock outcrops, or in sparse understory with oak woodland overstory. Prefers mesic environments with abundant ground cover.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Active above ground all year.

Seasonal Movements/Migration: None.

Home Range: In California, home ranges of males averaged 0.11 ha (0.27 ac), and varied from 0.02-0.38 ha (0.04-0.95 ac); female home ranges averaged 0.17 ha (0.41 ac), and varied from 0.02-0.65 ha (0.06-1.6 ac) (Storer *et al.* 1944). Densities of residents ranged from 2.0-17.3/ha (0.8-7.0/ac), and from 0.5-20.5/ha (0.2-8.3/ac) among nonresidents.

Territory: Females are territorial against other females during the breeding season.

Reproduction: Breeds from February through October, peaking in April to May and June to August; dates depend on amount of mast. Brush mice are solitary nesters. Gestation is 23 days for nonlactating females and 26-32 days for lactating females. Litter size averages 3 young (range 2-6). Probably 1-4 litters/yr. Females sexually mature on average at 51 days.

Niche: The brush mouse is an opportunistic granivore. Likely competitors are *Peromyscus maniculatus, P. truei,* and *P. californicus. P. boylii* probably is the most arboreal of these (Holbrook 1979). Predators include snakes, raptorial birds, and predatory mammals.

REFERENCES

Storer *et al.* 1944, McCabe and Blanchard 1950, Jameson 1951, 1953, Brown 1964, Baker 1968, Holbrook 1979.

BRUSH MOUSE

AUTHORSHIP

Species Note Prepared By: P. Brylski
Species Note Edited By: R. Duke
Species Note Reviewed By: H. Shellhammer

M127 Dusky-footed Woodrat *Neotoma fuscipes*

Family: Cricetidae **Order:** Rodentia **Class:** Mammalia
Management Status: *N. f. riparia,* California Species of Special Concern **Date:** August 5, 1983

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The dusky-footed woodrat is common in California. It is found throughout the Coast Ranges, and in the northern interior (central Siskiyou Co., Modoc Co., central to northwest Lassen Co., and northeastern Shasta Co.). Also widespread along entire western slope of the Sierra Nevada, mostly below 2150 m (7000 ft). Generally absent from cultivated land and open grasslands of Central Valley. Common to abundant in forest habitats of moderate canopy and moderate to dense understory. Can be abundant in chaparral habitats.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Feeds mainly on woody plants, especially live oak, maple, coffeeberry, alder, and elderberry when available (Linsdale and Tevis 1951). Other woody plants eaten elsewhere; English (1923) listed 37 species of plants eaten by the dusky-footed woodrat. Also eats fungi, flowers, grasses, acorns. Forages on ground, in bushes, and in trees.

Cover: Prefers moderate canopy in a variety of habitats. Houses are built of sticks and leaves at the base of, or in a tree, around a shrub, or at the base of a hill. Houses may measure 2.4 m (8 ft) in height and 2.4 m (8 ft) in diameter (English 1923).

Reproduction: Nests are located in the stick house, and are constructed of shredded grass, leaves, and other miscellaneous materials (e.g., bird feathers). Vestal (1938) reported the following average dimensions: 112 mm (4.4 in) x 101 mm (4 in) with a depth of 85 mm (3.4 in). Abundance probably limited by availability of nest-building materials. Competition for houses is constant and intense (Linsdale and Tevis 1951).

Water: Drinks water, but may be sustained by leafy vegetation and fungi.

Pattern: Prefers forest habitats with moderate canopy, year-round greenery, a brushy understory, and suitable nestbuilding materials. Well-developed understory at base of a single evergreen may be suitable for a single individual.

SPECIES LIFE HISTORY

Activity Patterns: Mostly nocturnal. May reduce activity on moonlit or rainy nights. Active year-round.

Seasonal Movements/Migration: None.

Home Range: In Sonoma Co., home ranges averaged 0.23 ha (0.58 ac) for males, 0.19 ha (0.48 ac) for females, and 0.17 ha (0.43 ac) for juveniles; densities reached a peak of 20 individuals/ha (8/ac) in late summer (Cranford 1977). In Monterey Co., an individual may confine its lifetime activity around a single tree, or range over 18.7 ha (46.2 ac) (Linsdale and Tevis 1951). In chaparral habitat, density was reported to reach 18.8/ha (7.5/ac) (Bleich 1973).

Territory: The nest is defended against competitors.

Reproduction: Breeds from December to September, with a peak in mid-spring. Litter size averages 2-3 young (range 1-4) (Linsdale and Tevis 1951, Verner and Boss 1980). One to 5 litters per yr. Females probably are promiscuous.

Niche: The dusky-footed woodrat is heavily preyed upon by owls, coyotes, bobcats, hawks, and perhaps snakes. Other small mammals and amphibians and reptiles are known to use woodrat houses. Cattle grazing probably reduces carrying capacity for woodrats by removing cover. Wildfires and prescribed burning are likely to be detrimental by destroying houses.

Comments: *N. f. riparia* is a California Species of Special Concern (Williams 1986).

REFERENCES

English 1923, Vestal 1938, Linsdale and Tevis 1951, Hooven 1959, Bleich 1973, Cranford 1977, Verner and Boss 1980, Williams 1986.

DUSKY-FOOTED WOODRAT

AUTHORSHIP

Species Note Prepared By: P. Brylski
Species Note Edited By: R. Duke
Species Note Reviewed By: H. Shellhammer

M149 Gray Fox *Urocyon cinereoargenteus*

Family: Canidae **Order:** Carnivora **Class:** Mammalia
Management Status: Harvest Species **Date:** January 25, 1982

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Uncommon to common permanent resident of low to middle elevations throughout most of the state. Frequents most shrublands, valley foothill riparian, montane riparian, and brush stages of many deciduous and conifer forest and woodland habitats. Also found in meadows and cropland areas.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Omnivorous. Rabbits, mice, gophers, woodrats, and squirrels are the principal foods (Trapp and Hallberg 1975). Also eats large amounts of fruits, nuts, grains, grasshoppers and crickets, beetles, moths and butterflies, carrion, and small amounts of herbage. Stalks and pounces on rodents and rabbits, or may pursue for short distances. Readily climbs into crooked trees, or those with branches 3 m (10 ft), or less, from the ground (Ingles 1965).

Cover: Brush, natural cavities, and occasionally human-made structures, provide cover.

Reproduction: Dens in natural cavities, in rocky areas, snags, logs, brush, slash and debris piles, abandoned burrows, and under buildings. Nest material usually dry grass, leaves, or shredded bark.

Water: Requires a permanent water source near den; probably drink daily.

Pattern: Suitable habitat consists of shrublands, brushy and open-canopied forests, interspersed with riparian areas, providing water.

SPECIES LIFE HISTORY

Activity Patterns: Active all year. Primarily crepuscular and nocturnal, occasionally active in daytime.

Seasonal Movements/Migration: Non-migratory.

Home Range: In Wisconsin, home ranges varied from 0.13 to 3.1 km² (0.05 to 1.2 mi²). In Florida, home ranges averaged 7.7 km² (3 mi²), and in Utah, home ranges averaged 1.0 km² (0.4 mi²) (Trapp and Hallberg 1975). Near Davis, California, Fuller (1978) found that 4 females had an average home range of 1.2 km² (0.5 mi²).

Territory: Family groups (parents with juveniles) usually are separated spatially, indicating territoriality (Trapp and Hallberg 1975).

Reproduction: Mates February through March. In California, most births occur in April (Grinnell *et al.* 1937), following a gestation of approximately 63 days. Average litter size is 4 pups; range 2-7 (Fritzell and Haroldson 1982). One litter/yr. Males and females are sexually mature at 1 yr.

Niche: Adult gray foxes have few predators. Large hawks, golden eagles, great horned owls, domestic dogs, and bobcats may prey on pups. May carry tularemia and rabies (Jennings *et al.* 1960, Jackson 1961). Population levels may be affected by rabies.

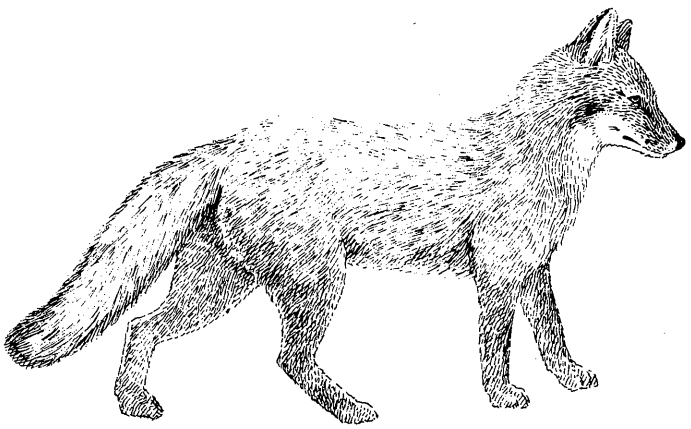
REFERENCES

Grinnell *et al.* 1937, Jennings *et al.* 1960, Jackson 1961, Lord 1961, Ingles 1965, Seymour 1968, Trapp and Hallberg 1975, Fuller 1978, Trapp 1978, Fritzell and Haroldson 1982.

GRAY FOX

AUTHORSHIP

Species Note Prepared By: G. Ahlborn
Species Note Edited By: M. White
Species Note Reviewed By: M. White



M153 Raccoon *Procyon lotor*

Family: Procyonidae **Order:** Carnivora **Class:** Mammalia
Management Status: Harvest Species **Date:** January 26, 1982

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Widespread, common to uncommon permanent resident throughout most of the state. Occurs in all habitats except alpine, and desert types without water; marginal in Great Basin shrub types. Most abundant in riparian and wetland areas at low to middle elevations (Grinnell *et al.* 1937).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Raccoons are omnivorous, and highly opportunistic. In spring, eat primarily animal matter; crayfish, fish, arthropods, amphibians, a few small mammals, birds, and eggs. In summer and fall, eat large amounts of grains, acorns, other nuts, and fruits. Forage along all saline and freshwater riparian habitats, in shallow water, in vegetation, and on the ground. Frequently feed in agricultural and urban areas.

Cover: Raccoons use cavities in trees, snags, logs, and rocky areas for dens and other cover. Also use cover provided by abandoned buildings and dense vegetation. Use dens, and, especially in mild weather, use daily nest sites.

Reproduction: Nest in secure dens. Tree dens generally are 6.1 to 12.2 m (20 to 40 ft) above the ground.

Water: Permanent water is necessary for drinking and feeding. Closely associated with water.

Pattern: The juxtaposition of riparian habitats and other wetlands, and forest and shrubland types is important to raccoon populations.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Remain dormant in winter dens (Lotze and Anderson 1979).

Seasonal Movements/Migration: Non-migratory.

Home Range: Ellis (1964) found home ranges averaging 225 ha (555 ac), and varying from 85-380 ha (210-940 ac). In Michigan, home ranges of males averaged 204 ha (503 ac), and varied from 18.2-814 ha (45-2021 ac). Home ranges of females averaged 108 ha (268 ac), and varied from 5.3-376 ha (13-9330 ac) (Stuewer 1943). In North Dakota, home ranges of males varied from 396-1468 ha (979-3627 ac), and from 532 to 743 ha (1315-1836 ac) for females (Fritzell 1977). Pregnant females have larger home ranges, which may vary considerably. Lotze and Anderson (1979) reported population densities of 1 raccoon per 5-43 ha (12-106 ac).

Territory: Radiotelemetry studies suggest that male raccoons may be territorial towards other males, but that females are not territorial (Lotze and Anderson 1979).

Reproduction: In California, raccoons breed from January through March. Females ovulate spontaneously (Sanderson and Nalbandov 1973). Most young are born March through May. Litters average 3-4, and range from 1-8. Gestation lasts about 63 days (range = 54-65 days). Young weaned at 60-90 days, and become semi-independent at about 130 days. Males and females begin breeding in first or second yr (Lotze and Anderson 1979).

Niche: Raccoons are very adaptable, and tolerant of most human activity. May be pests when they prey on domestic animals, or consume cultivated fruits, vegetables, and other crops. Great horned owls, bobcats, and domestic dogs prey on raccoons. Diseases carried include trichinosis, rabies, leptospirosis, tularemia, and Chagas' disease. Canine distemper is an important mortality factor, especially among young (Johnson 1970).

REFERENCES

Grinnell *et al.* 1937, Stuewer 1943, Asdell 1964, Ellis 1964, Rue 1964, Johnson 1970, Urban 1970, Newberry 1973a, Sanderson and Nalbandov 1973, Fritzell 1977, Lotze and Anderson 1979.

RACCOON

AUTHORSHIP

Species Note Prepared By: G. Ahlborn
Species Note Edited By: M. White, G. Ahlborn
Species Note Reviewed By: M. White

M162 Striped Skunk *Mephitis mephitis*

Family: Mustelidae **Order:** Carnivora **Class:** Mammalia
Management Status: Harvest Species **Date:** March 4, 1982

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common, yearlong resident from sea level to timberline (Grinnell *et al.* 1937). Found in nearly all habitats, but frequents earlier seral stages of conifer and deciduous forests, and intermediate-canopy stages of brush and shrub areas. Commonly found in grass/forb stages of most habitats, riparian areas, and many natural, and human-induced, herbaceous shrub and forest ecotones. Absent from many xeric areas of the Mojave and Colorado deserts.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Striped skunks are omnivorous. Primarily eat insects, small mammals, other small vertebrates, eggs, crustaceans, fruits, seeds, and some carrion. Search and dig on ground, in earth, logs, and stumps for food (Wade-Smith and Verts 1982).

Cover: Use cavities and crevices in rock areas, snags, logs, stumps, under buildings, and use abandoned burrows for cover. Excavate burrows in friable, well-drained soils, and also may den above ground in heavy cover.

Reproduction: Den in burrows and cavities described above used for reproduction.

Water: Probably require drinking water.

Pattern: Good habitat includes a complex mosaic of brush stages of forest habitats, riparian areas, meadows, or other open areas in brush and forest habitats. Use edges between types extensively.

SPECIES LIFE HISTORY

Activity Patterns: Mostly nocturnal; some crepuscular activity. May remain in den during periods of inclement weather.

Seasonal Movements/Migration: Non-migratory.

Home Range: In Illinois, summer home ranges of 4 individuals varied from 34-753 ha (83-1860 ac). Winter movements were restricted to a small area near the central den in areas with winter snow (Storm 1972). Average length-to-width ratio of home ranges was about 3:1. Several females, or a male and 1, or more, females, frequently shared a winter den. Females moved about freely within the home ranges of several males (Storm 1972).

Territory: In captivity, adult males and pregnant, or lactating, females must be housed separately. In eastern Oregon, Thomas (1979) reported territories of 17-38 ha (43-95 ac). The minimum area required for a population of striped skunks was estimated to be about 259 ha (640 ac) by Thomas (1979).

Reproduction: Breed from late January through March (Verts 1967). Gestation period about 63 days average (range = 59-77 days). One litter of about 4 (range= 2-10) born April through June (Verts 1967, Maser *et al.* 1981). Young weaned at 60-75 days. Both males and females mature sexually at 10 mo (Wade-Smith and Verts 1982).

Niche: Great horned owls, mountain lions, eagles, coyotes, badgers, foxes, and bobcats are known to prey upon striped skunks. Eat large numbers of insects and rodents. An important carrier of rabies; also carry leptospirosis and tularemia. Logging, agriculture, and urban developments that create open areas, fragmented habitats, and mosaics of vegetation may improve habitat for striped skunks, allowing them to expand their range.

REFERENCES

Grinnell *et al.* 1937, Jackson 1961, Verts 1967, Bailey 1971, Storm 1972, Wade-Smith and Richmond 1975, Thomas 1979, Maser *et al.*1981, Wade-Smith and Verts 1982.

STRIPED SKUNK

AUTHORSHIP

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M166 Bobcat *Felis rufus*

Family: Felidae **Order:** Carnivora **Class:** Mammalia
Management Status: Harvest Species **Date:** January 25, 1982

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common to uncommon, permanent resident throughout most of California. Use nearly all habitats and successional stages. Optimal habitats are brushy stages of low and mid-elevation conifer, oak, riparian, and pinyon-juniper forests, and all stages of chaparral.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Bobcats largely are carnivorous. They eat various lagomorphs, rodents, a few deer (mostly young fawns), and some birds, reptiles, amphibians, and invertebrates. They also may consume substantial amounts of vegetation, mostly fruits and some grass (Provost *et al.* 1973, Fritts and Sealander 1978b). These cats stalk or ambush prey on the ground, from trees, or atop logs or rocks. Usually pursue prey for only a few leaps or bounds. May cache when prey abundant or too large to consume in 1 day.

Cover: Use cavities in rock areas, hollow logs, snags, stumps, and dense brush for cover.

Reproduction: Dens usually located in cavities in rock areas, in hollow logs, snags, stumps, or in dense brush.

Water: No information on water needs found. Probably need to drink water regularly.

Pattern: Suitable habitats for bobcats consist of large areas of broken, rough, rocky terrain supporting brushy deciduous and conifer forests or chaparral, adjacent to smaller areas of riparian habitat and stands of dense forest. Availability of water may limit bobcat distribution in xeric regions.

SPECIES LIFE HISTORY

Activity Patterns: Active yearlong. Mostly nocturnal and crepuscular, some diurnal activity.

Seasonal Movements/Migration: Non-migratory. Distances travelled in 24 hr ranged from 2.6 km (1.6 mi) for an adult female, to 4.8 km (3 mi) for adult males.

Home Range: Female home ranges usually overlap very little; those of males may overlap those of other males or females (Bailey 1974). In Riverside Co., Zezulak and Schwab (1980) reported that home ranges of 7 bobcats varied from 4.7-53.6 km^2 (1.8-20.7 mi^2), with a mean of 26.3 km^2 (10.3 mi). In Idaho, home ranges of females averaged 19.3 km^2 (7.5 mi^2), and varied from 9.1-45.3 km^2 (3.5-17.5 mi^2). Those of males averaged 42.1 km^2 (16.3 mi^2), and varied from 6.5-107.9 km^2 (2.5-41.7 mi^2) (Bailey 1974).

Territory: Scent marking appears to reduce actual contact, and fighting is very unusual. In Idaho, territory and home range probably coincide (Bailey 1974, 1981). In northeastern California, Zezulak (1981) reported that home ranges overlapped up to 30% among females, but there was almost no overlap among males. In southern California, Lembeck (1978) noted almost no overlap of female home ranges, and up to 89% overlap among males. Zezulak and Schwab (1980) reported results intermediate to Zezulak (1981) and Lembeck (1978). Zezulak and Schwab (1980) speculated that bobcats may be territorial in some situations, but not all. This flexibility in behavior results in higher population levels where they are not territorial.

Reproduction: Bobcats usually breed in winter (Young 1958, Gashwiler *et al.* 1961). Gestation period 60-70 days; most young probably born in spring in California. Litter size averaged 3.5 in Wyoming, 2.8 in Utah, and 2.5 in Arkansas; range = 1-7. One litter/yr. Females polyestrous. Females breed in first yr; males in second yr. Lactation continues about 60 days. Individuals may live 10-14 yr.

Niche: Great horned owls may kill young bobcats (Jackson 1961), and adults occasionally are taken by mountain lions (Young 1958) and domestic dogs. Bobcats and coyotes may compete (Robinson 1961), and when coyote numbers are reduced by predator control, bobcat numbers may increase (Nunley 1978).

REFERENCES

Young 1958, Gashwiler *et al.* 1961, Jackson 1961, Robinson 1961, Provost *et al.* 1973, Bailey 1974, 1981, Crowe 1975, Fritts and Sealander 1978a, 1978b, Lembeck 1978, Nunley 1978, Zezulak and Schwab 1980, Zezulak 1981.

BOBCAT

AUTHORSHIP

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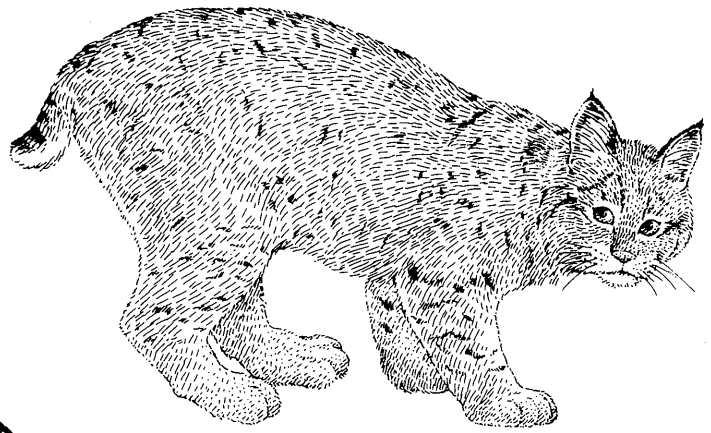

M181 Mule Deer *Odocoileus hemionus*

Family: Cervidae **Order:** Artiodactyla **Class:** Mammalia
Management Status: Harvest Species **Date:** March 4, 1982

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common to abundant, yearlong resident or elevational migrant with a widespread distribution throughout most of California, except in deserts and intensively farmed areas without cover (Longhurst *et al.* 1952, Ingles 1965). Occur in early to intermediate successional stages of most forest, woodland, and brush habitats. Prefer a mosaic of various-aged vegetation that provides woody cover, meadow and shrubby openings, and free water.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Mule deer browse and graze. Prefer tender new growth of various shrubs (e.g., ceanothus, mountain mahogany, bitterbrush), many forbs, and a few grasses (Wallmo 1978, 1981). Forage from ground surface into bushes and trees as high as can reach. Also dig out subterranean mushrooms. Food preferences vary with season, forage quality, and availability. Forbs and grasses are important in spring. Feed heavily on acorns where available, primarily in autumn. Various shrubs are critical in summer and winter. Commonly frequent salt or mineral licks.

Cover: Brushy areas and tree thickets are important for escape cover. Vegetative cover critical for thermal regulation in winter and summer. Frequent various aspects of habitat during the year to aid in thermal regulation (e.g., use south-facing slopes more in cold weather, and northfacing slopes more in hot weather).

Reproduction: Fawning occurs in moderately dense shrublands and forests, dense herbaceous stands, and high-elevation riparian and mountain shrub habitats, with available water and abundant forage.

Water: Deer require about 2.8 l (3 qt) of water/day/45 kg (100 lb) of body weight.

Pattern: Suitable habitat is a mosaic of vegetation, providing an interspersion of herbaceous openings, dense brush or tree thickets, riparian areas, and abundant edge.

SPECIES LIFE HISTORY

Activity Patterns: Mule deer generally are crepuscular, but may be active day or night. Miller (1970) found that activity patterns were influenced by abrupt changes or extremes in temperature, precipitation, and relative humidity.

Seasonal Movements/Migration: May be resident or migratory. In the mountains of California, migrate downslope in winter, to areas having less than 46 cm (18 in) of snow. As the snow melts, migrate to higher elevations to the summer range.

Home Range: Typical home ranges of small doe and fawn groups were 1-3 km² (0.4-1.1 mi²), but varied from 0.5 to 5.0 km² (0.2 to 1.9 mi²) in Lake Co. (Taber and Dasmann 1958). Bucks usually have larger home ranges, and travel longer distances than doe and fawn groups (Brown 1961). Statewide, densities of 7-23 deer/km² (18-60/mi²) are typical, varying from 2-40/km² (5-104/mi²) (Longhurst *et al.* 1952). Home ranges usually are less than 1.6 km (1 mi) in diameter. Dasmann and Taber (1956) and Miller (1970) reported that the home range consists of many small areas from which the deer obtains its life requisites. Individual deer may use parts of the home range only seasonally.

Territory: Adult does may defend small areas in late spring and early summer when caring for newborn fawns. Usually area includes immediate vicinity surrounding the fawns, and changes with daily movements. Does may defend this territory from all deer and predators. In Lake Co., these territories averaged 0.14 km² (0.09 mi²) (Dasmann and Taber 1956). Bucks usually solitary, although may associate in small groups. In spring and summer, several groups of bucks may associate to form feeding herds. However, each group maintains an individual distance from the others, and retains its integrity. As rut begins, individuals disperse, and tend to avoid each other during mating activities.

Reproduction: Mule deer are serially polygynous. Rutting season occurs in autumn. A dominant buck tends an estrous doe until matings are completed, or the buck is displaced by another buck. Bucks do not keep harems. Gestation period is 195-212 days. Fawns are born from early April to midsummer, varying geographically. Fawning peaks from late April through mid-June. Males and females are mature sexually at 1.5 yr. Twins are common after the first or second fawning; triplets are rare. Mule deer may live more than 10 yr in the wild, and longer in captivity (Taylor 1956, Wallmo 1981, Anderson and Wallmo 1984).

Niche: Natural predators of deer have been reduced in numbers in most areas. Overpopulation, with resultant winter die-offs and destruction of habitat, occurs periodically in California, as in other states. Mule deer are preyed upon regularly by mountain lions and coyotes, and occasionally by bobcats, black bears, and domestic dogs. Deer populations can respond rapidly to habitat management. However, populations can decline in response to fragmentation, degradation, or destruction of habitat caused by urban expansion, incompatible use of land resources (e.g., timber, water, rangeland), and disturbances by humans. Mule deer compete potentially for food with domestic cattle and sheep, wild horses, wild pigs, and black bears. Six subspecies occur in California, of which *O. h. columbianus,* the black-tailed deer, and *O. h. californicus,* the California mule deer, are the most abundant and widespread (Ingles 1965, Hall 1981).

REFERENCES

Longhurst *et al.* 1952, Dasmann and Taber 1956, Taylor 1956, Taber and Dasmann 1958, Brown 1961, Ingles 1965, Miller 1970, Wallmo 1978, 1981, Hall 1981, Anderson and Wallmo 1984.

MULE DEER

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