

California Wildlife Habitat Relationships System
California Department of Fish and Wildlife
California Interagency Wildlife Task Group

GLOSSY SNAKE

Arizona elegans

Family: COLUBRIDAE
R056

Order: SQUAMATA

Class: REPTILIA

Written by: S. Morey
Reviewed by: T. Papenfuss
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

This snake is common throughout southern California especially in desert regions. Less common to the north, glossy snakes occur in the interior Coast Ranges as far as Mount Diablo in Contra Costa Co. Glossy snakes are most common in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grass. Elevation from below sea level to 1830 m (6,000 ft).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Glossy snakes feed on a variety of desert lizards including juvenile desert iguanas (Cunningham 1959), and zebra-tailed lizards (Vitt and Ohmart 1977). They are listed as probable predators of side-blotched lizards by Ferguson et al. (1982). Captive individuals have been observed to eat young mice and small birds (Stebbins 1954).

Cover: Primarily nocturnal, glossy snakes spend periods of inactivity during the day and during winter in mammal burrows and rock outcrops, and to a lesser extent under surface objects such as flat rocks and vegetation residue. Individuals occasionally burrow in loose soil.

Reproduction: Eggs are laid a few centimeters below the surface in loose soil, under surface objects or near the base of vegetation, or in abandoned mammal burrows.

Water: No information on water requirements. Glossy snakes are most common in arid regions. Standing water is not an important habitat element.

Pattern: Prefer open sandy areas with scattered brush, but also found in rocky areas.

SPECIES LIFE HISTORY

Activity Patterns: Although some diurnal activity has been reported, glossy snakes are most active at night. Individuals are most commonly encountered in May and June in the south. In the interior Coast Ranges another activity peak occurs prior to the first rains of fall. Periods of winter inactivity occur at all localities.

Seasonal Movements/Migration: Predictable seasonal movements have not been reported for this species in California.

Home Range: The nature of the home range in this species is unknown.

Territory: No evidence for the territorial defense of resources has been reported.

Reproduction: Eggs are probably laid in early July. Clutch sizes range from 3 to 23 (mean

8 or 9). Hatching occurs from late August to mid-September (Stebbins 1954, Aldridge 1979). Mating probably occurs in the spring soon after the end of the period of winter inactivity.

Niche: Glossy snakes may be taken by mammals, owls, and other snakes. The nature of competitive interactions with other species of snakes is unknown. The diet of glossy snakes overlaps to some extent with that of several species of desert snakes.

REFERENCES

- Aldridge, R. D. 1979. Female reproductive cycles of the snakes *Arizona elegans* and *Crotalus viridis*. *Herpetologica* 35:256-261.
- Cunningham, J. D. 1959. Reproduction and food of some California snakes. *Herpetologica* 15:17-19.
- Dixon, J. R., and R. R. Fleet. 1976. *Arizona, A. elegans*. *Cat. Am. Amphibians and Reptiles* 179.
- Ferguson, G. W., K. L. Brown, and V. C. DeMarco. 1982. Selective basis for the evolution of variable egg and clutch size in some iguanid lizards. *Herpetologica* 38:178-188.
- Klauber, L. M. 1946. The glossy snake, *Arizona*, with descriptions of new subspecies. *Trans. San Diego Soc. Nat. Hist.* 10:311-398.
- Stebbins, R. C. 1954. *Amphibians and reptiles of western North America*. McGraw-Hill, New York. 536pp.
- Vitt, L. J., and R. D. Ohmart. 1977. Ecology and reproduction of lower Colorado River lizards: I. *Callisaurus draconoides* (Iguanidae). *Herpetologica* 33:214-222.
- Vitt, L. J., and R. D. Ohmart. 1977. Ecology and reproduction of lower Colorado River lizards: II. *Cnemidophorus tigris* (Teiidae), with comparisons. *Herpetologica* 33:223-234.

R056

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California Wildlife Habitat Relationships System
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TIGER WHIPTAIL

Aspidoscelis tigris

Family: TEIIDAE
R039

Order: SQUAMATA

Class: REPTILIA

Written by: S. Morey

Reviewed by: T. Papenfuss

Edited by: R. Duke

Updated by: CWHR Program Staff, August 2000

DISTRIBUTION, ABUNDANCE, AND MSEASONALITY

This whiptail is widely distributed but uncommon over much of its range in California, except in desert regions where it is abundant in suitable habitats. The species is found throughout the state except in the humid northwest, along the humid outer Coast Ranges, or mountainous regions above 2290 m (7500 ft). Also absent from much of the northern part of the Central Valley (Montanucci 1968). The species occurs in a variety of habitats including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, mixed conifer, pine-juniper, chamise-redshank chaparral, mixed chaparral, desert scrub, desert wash, alkali scrub, and annual grassland.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Whiptails forage actively on the ground near the base of vegetation taking a wide variety of ground-dwelling invertebrates including grasshoppers, beetles, ants, termites, insect larvae, and spiders (Stebbins 1954). Individuals often probe cracks and crevices and dig in loose soil as they forage. Whiptails occasionally appear to stalk larger prey items such as grasshoppers. Individuals have been observed breaking up termite galleries in dead vegetation. Vitt and Ohmart (1977) reported that the diet of whiptails may change seasonally to reflect the abundance of seasonally available prey items.

Cover: Whiptails are always most common in and around dense vegetation. They spend little time in open areas but will cross barren spaces in order to reach the cover of dense shrubs in sparsely vegetated areas. Initially they rely on speed or the cover provided by dense vegetation to avoid predators, but if pursued they will eventually seek refuge in burrows.

Reproduction: Little is known about habitat requirements for courtship, mating, and egg-laying. Loose soil for foraging and nest construction may be an important habitat element.

Water: No information on water requirements. This species is widely distributed in arid regions and does not require permanent water.

Pattern: Whiptails are always most common in and around dense vegetation. They are often found associated with sand areas along gravelly arroyos or washes (Stebbins 1954).

SPECIES LIFE HISTORY

Activity Patterns: Whiptails are primarily diurnal. In the deserts most activity occurs in the morning (Vitt and Ohmart 1977) except on cloudy days when individuals may be active all day. In northern California where summers are milder, the peak of activity occurs about midday (Johnson 1969). Adult whiptails usually become inactive by early fall, but juveniles

extend the period of activity until late fall or even early winter depending on local conditions.

Seasonal Movements/Migration: Pronounced seasonal movement or migration has not been reported for this species in California. Most or all essential habitat requirements are apparently found within the normal area of activity. When long-distance movements do occur they are unpredictable and related to food availability.

Home Range: Average home ranges for whiptails (excluding wandering individuals) have been calculated by Milstead (1957) to be about 0.1 ha (0.26 ac). Jorgensen and Tanner (1963) have reported home range sizes of 0.07 ha (0.18 ac) for males and 0.04 ha (0.10 ac) for females. Parker (1972) reported densities of whiptail lizards in the Sonoran Desert of Arizona to vary from 13-36/ha (5-15/ac). In Nevada Tanner et al. (1969) observed densities ranging from 7-19/ha (3-8 ac).

Territory: Observed overlaps in the home ranges of adult whiptails, coupled with an apparent lack of aggressive behavior between individuals, have suggested to some workers (Milstead 1957, Parker 1972) that there is a lack of male territoriality in this species.

Reproduction: The reproductive season for the tiger whiptail varies geographically and from year to year depending on local conditions. Reproductive behavior generally occurs from May to August. Parker (1972) reported the average clutch size to be 2.9 eggs with a range of 1-5. It is possible that females from the southern California desert regions may lay more than one clutch of eggs per year (Pianka 1970).

Niche: Vitt and Ohmart (1977) suggest that the active, constantly moving behavioral pattern of whiptail lizards makes them subject to a high frequency of predation attempts by diurnal predators. Such predators include snakes, larger lizards, and predaceous birds. Ohmart (1973) found that whiptails make up a large percentage of the food items consumed by roadrunners. Although the food habits of tiger whiptails at times overlap considerably with those of the zebra-tailed lizard (Vitt and Ohmart 1977), competition for food may be minimal since most of the dietary overlap is attributable to the common utilization of seasonally abundant prey. Different foraging microhabitat preferences by the two species further reduce competition where they coexist.

REFERENCES

- Johnson, C. R. 1969. Observations on northern California populations of *Cnemidophorus tigris* (Sauria: Teiidae). *Herpetologica* 25:316-318.
- Jorgensen, C. D., and W. W. Tanner. 1963. The application of the density probability function to determine the home ranges of *Uta stansburiana stansburiana* and *Cnemidophorus tigris tigris*. *Herpetologica* 19:105-115.
- Milstead, W. W. 1957. Observations on the natural history of four species of the whiptail lizard, *Cnemidophorus* (Sauria: Teiidae) in Trans-Pecos Texas. *Southwest Nat.* 2:105-121.
- Montanucci, R. R. 1968. Notes on the distribution and ecology of some lizards in San Joaquin Valley, California. *Herpetologica* 24:316-320.
- Ohmart, R. D. 1973. Observations on the breeding adaptations of the roadrunner. *Condor* 75: 140-149.
- Parker, W. S. 1972. Ecological study of the western whiptail lizard, *Cnemidophorus tigris gracilis* in Arizona. *Herpetologica* 28:360-369.
- Pianka, E. R. 1970. Comparative autecology of the lizard *Cnemidophorus tigris* in different parts of its geographic range. *Ecology* 51:703-720.
- Stebbins, R. C. 1954. *Amphibians and reptiles of western North America*. McGraw-Hill, New York. 536pp.
- Tanner, W. W., et al. 1969.
- Vitt, L. J., and R. D. Ohmart. 1977. Ecology and reproduction of lower Colorado river lizards: ii. *Cnemidophorus tigris* (Teiidae), with comparisons. *Herpetologica* 33:223-234.

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California Wildlife Habitat Relationships System
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WESTERN BANDED GECKO

Coleonyx variegatus

Family: GEKKONIDAE
R008

Order: SQUAMATA

Class: REPTILIA

Written by: L. Palermo

Reviewed by: T. Papenfuss

Edited by: R. Duke, J. Harris

Updated by: CWHR Program Staff, March 2000

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The banded gecko exists in two forms in California. The desert banded gecko (*C. v. variegatus*) is common to uncommon in the desert from northern Inyo Co. south to Mexico. It is found from below sea level to 1750 m (5750 ft) (Macey and Papenfuss 1991) in all desert habitats up to pinyon-juniper or mixed chaparral, but is most abundant in sandy flats and desert washes (Klauber 1945). The San Diego banded gecko (*C. v. abbotti*) occurs in coastal and cismontane southern California from interior Ventura Co. south, although it is absent from the extreme outer coast. It is uncommon in coastal scrub and chaparral, most often occurring in granite or rocky outcrops in these habitats (Klauber 1945, Stebbins 1972).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Banded geckos are opportunistic foragers on insects and other arthropods including beetles, termites, spiders, grasshoppers, sowbugs, and insect larvae (Klauber 1945, Parker and Pianka 1974).

Cover: During the day, geckos stay under rocks, rock caps, boards, fallen yucca stems, cow dung and other litter, or may seek refuge in mammal burrows (Klauber 1945, Miller and Stebbins 1964). Banded geckos hibernate in burrows (Parker 1972).

Reproduction: Eggs are probably buried in ground or under rocks (Mayhew 1968).

Water: Water is obtained from food (Miller and Stebbins 1964).

Pattern: The desert banded gecko occurs in a wide variety of habitats, however the San Diego banded gecko prefers rocky or granite outcrops.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. The peak activity period is two hours after sunset (Klauber 1945, Miller and Stebbins 1964), however, banded geckos may come out in the late afternoon to absorb heat (Brattstrom 1952). They are active April through October with a peak in May. Juveniles may be intermittantly active November through March (Klauber 1945, Parker 1972).

Seasonal Movements/Migration: No data.

Home Range: Parker (1972) estimated densities of 12-25 geckos/ha (5-10 acre) in Arizona. By driving roads at night, Klauber (1945) found 19.4 per 160 km (100 mi) in the Borrego area in San Diego County. On the best trips he encountered one gecko on the road every 3.2 km (2 mi), or 24 specimens in 78.4 km (49 mi).

Territory: Aggressive interactions between males in the laboratory suggest the possibility of territoriality in the field, or may be a means of sex recognition in a species that is not sexually dimorphic. During the day geckos tended to aggregate in shelters in the laboratory (Greenberg 1943).

Reproduction: Mating occurs from April to May, eggs are laid from May through September, and hatchlings appear July through November (Stebbins 1954, Fitch 1970, Parker 1972, Miller and Stebbins 1964). Males emerge in April and attain peak testes size in May followed by testicular regression (Parker 1972). The highest frequency of gravid females was in May and June (Parker 1972). Clutch size is two eggs, one per ovary or oviduct. Eggs are sometimes laid one at a time on different days (Parker 1972). Females store sperm and can produce multiple fertile clutches per season (Mayhew 1968, Parker 1972). Two to three clutches per season are produced. Estimates of incubation time are 30 to 45 days. Males and females reach maturity within one year at 52 mm (2.08 in) and 56 mm (2.24 in), respectively (Fitch 1970, Parker 1972).

Niche: Predators include leaf-nosed snakes, western patch-nosed snakes, night snakes, sidewinders, western diamondback rattlesnakes, coachwhips, and zebra-tailed lizards (Klauber 1945, Funk 1965, Parker 1972). Other possible predators are tarantulas, large centipedes, solpugids, other rattlesnake species, coyotes and foxes (Parker 1972). Tail autotomy is believed to be an important defense mechanism from enemies (Parker 1972, Parker and Pianka 1974). The tail is raised and undulated at the approach of a predator (Johnson and Brodie 1974). The banded gecko can have considerable dietary overlap with sympatric diurnal lizards (e.g., whiptails). Therefore, time of activity may be of limited importance in reducing dietary overlap and competition (Huey and Pianka 1983).

REFERENCES

- Brattstrom, B. H. 1952. The food of the night lizards, genus *Xantusia*. *Copeia* 1952:168-172.
- Dixon, J. R. 1970a. *Coleonyx*. *Cat. Am. Amphibians and Reptiles* 95.1-95.2.
- Dixon, J. R. 1970b. *Coleonyx variegatus*. *Cat. Am. Amphibians and Reptiles* 96.1-96.4.
- Fitch, H. S. 1970. Reproductive cycles in lizards and snakes. *Univ. Kans. Mus. Nat. Hist. Misc. Publ.* 52:1-247.
- Funk, R. S. 1965. Food of *Crotalus cerastes laterorepens* in Yuma County, Arizona. *Herpetologica* 21:15-17.
- Greenberg, B. 1943. Social behavior of the western banded gecko, *Coleonyx variegatus* Baird. *Physiol. Zool.* 16:110-122.
- Huey, R. B., and E. R. Pianka. 1983. Temporal separation of activity and interspecific dietary overlap. Pages 281-290 in R. B. Huey, E. R. Pianka, and T. W. Schoener, eds. *Lizard Ecology*. Harvard Univ. Press, Cambridge. 501pp.
- Johnson, J. A., and E. D. Brodie, Jr. 1974. Defensive behavior of the western banded gecko, *Coleonyx variegatus*. *Anim. Behav.* 22:684-687.
- Klauber, L. M. 1945. The geckos of the genus *Coleonyx* with description of new subspecies. *Tran. San Diego Soc. Nat. Hist.* 10:133-216.
- Macey, J. R. and T. J. Papenfuss. 1991. Reptiles. 291-360. IN *Natural History of the White-Inyo Range eastern California*. C.A. Hall, Jr. Ed. Univ. Calif. Press, Berkeley, California. 536 pp.
- Mayhew, W. W. 1968. The biology of desert amphibians and reptiles. Pages 195-356 in G. W. Brown, Jr., ed. *Desert Biology, Vol. 1*. Academic Press, New York. 638pp.
- Miller, A. H., and R. C. Stebbins. 1964. The lives of desert animals in Joshua Tree National Monument. Univ. California Press, Berkeley. 452pp.
- Parker, W. S. 1972. Aspects of the ecology of a Sonoran desert population of the western banded gecko, *Coleonyx variegatus* (Sauria, Eublepharinae). *Am. Midl. Nat.* 88:209-220.
- Parker, W. S., and E. R. Pianka. 1974. Further ecological observations on the western banded gecko, *Coleonyx variegatus*. *Copeia* 1974:528-531.
- Stebbins, R. C. 1954. *Amphibians and reptiles of western North America*. McGraw-Hill, New York. 536pp.
- Stebbins, R. C. 1972. *California amphibians and reptiles*. Univ. California Press, Berkeley. 152pp.
- Stebbins, R. C. 1985. *A field guide to western reptiles and amphibians*. 2nd ed., revised.

Houghton Mifflin, Boston. 336pp.

R008

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RED DIAMOND RATTLESNAKE

Crotalus ruber

Family: VIPERIDAE
R073

Order: SQUAMATA

Class: REPTILIA

Written by: R. Marlow
Reviewed by: T. Papenfuss
Edited by: S. Granholm

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The red diamond rattlesnake is distributed along coastal San Diego Co. to the eastern slopes of the mountains and north through western Riverside Co. into southernmost San Bernardino Co. Occurs from sea level to 900 m (3000 ft) in chaparral, woodland, and arid desert habitats in rocky areas and dense vegetation. Young snakes are common on the desert side but rare on the coast side of the mountains. This snake is active from mid-spring to mid-fall (Tevis 1943, Stebbins 1954, Klauber 1972).

SPECIFIC HABITAT REQUIREMENTS

Feeding: This snake feeds on rabbits, rodents, lizards, birds and other snakes (Stebbins 1954, Klauber 1972). Prey capture results from waiting for prey and active searching of ground, rocky areas and off the ground in bushes.

Cover: This snake occurs in rocky areas and in dense vegetation. It retreats into rodent burrows, into cracks in rocks or under surface cover objects (Stebbins 1954, Klauber 1972).

Reproduction: Young are live-born and thus require a quiet and safe place for birth, probably in burrows or under substantial cover objects such as large rocks (Stebbins 1954, Klauber 1972).

Water: Water is probably not required.

Pattern: This snake occurs in a wide variety of arid and semiarid habitats that provide dense vegetation or rocky cover.

SPECIES LIFE HISTORY

Activity Patterns: This snake is active from spring to fall, but the period of greatest activity is from March to June. Early in the year it is active during the day but as daytime temperatures increase it becomes active later in the evening. Eventually it is fully nocturnal (Stebbins 1954, Klauber 1972).

Seasonal Movements/Migration: No information.

Home Range: Nothing is known. A report of a home range 8 m in diameter is obviously wrong (Tevis 1943).

Territory: No data.

Reproduction: Copulation occurs in March and April, with egg development requiring approximately 4 months. The young are born from mid-August to October. Litters average 8

young and range from 5-13 (Stebbins 1954, Klauber 1972).

Niche: This snake is probably preyed upon by kingsnakes, roadrunners, and possibly owls. Its close relative *Crotalus viridis* is sympatric with it in coastal areas, and they may compete.

REFERENCES

- Klauber, L. M. 1972. Rattlesnakes: their habits, life histories, and influence on mankind. 2nd ed. Univ. California Press, Berkeley. 1533pp.
- Stebbins, R. C. 1954. Amphibians and reptiles of western North America. McGraw-Hill, New York. 536pp.
- Tevis, L., Jr. 1943. Field notes on a red rattlesnake in lower California. *Copeia* 1943:242-245.

R073

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BLAINVILLE'S HORNED LIZARD

Phrynosoma blainvillii

Family: PHRYNOSOMATIDAE
R029

Order: SQUAMATA

Class: REPTILIA

Written by: S. Morey

Reviewed by: T. Papenfuss

Edited by: R. Duke, D. Alley

Updated by: CWHR Program Staff, March 2000

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Blainville's horned lizard is uncommon to common in suitable habitat. Occurs in valley-foothill hardwood, conifer and riparian habitats, as well as in pine-cypress, juniper and annual grassland habitats. Occurs in the Sierra Nevada foothills from Butte Co. to Kern Co. and throughout the central and southern California coast. Its elevational range extends up to 1200 m (4000 ft) in the Sierra Nevada foothills and up to 1800 m (6000 ft) in the mountains of southern California.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Horned lizards forage on the ground in open areas, usually between shrubs and often near ant nests. Pianka and Parker (1975) noted that this species, like other horned lizards, consumes many ants. Small beetles are taken in large numbers when especially abundant. Stebbins (1954) reported other insects as food items, including wasps, grasshoppers, flies, and caterpillars.

Cover: This species relies on camouflage for protection and often hesitates to move at the approach of a predator. Horned lizards often bask in the early morning on the ground or on elevated objects such as low boulders or rocks. Predators and extreme heat are avoided by horned lizards by burrowing into loose soil. Periods of inactivity and winter hibernation are spent burrowed into the soil under surface objects such as logs or rocks, in mammal burrows, or in crevices.

Reproduction: Little is known about habitat requirements for breeding and egg-laying. Males may use elevated "viewing platforms" such as cow dung (Tollestrup 1981) to locate females during the reproductive season. Eggs are apparently laid in nests constructed by females in loose soil.

Water: No information on water requirements. Does not require permanent water.

Pattern: Inhabits open country, especially sandy areas, washes, flood plains and wind-blown deposits in a wide variety of habitats. Found chiefly below 600 m (2000 ft) in the north and 900 m (3000 ft) in the south.

SPECIES LIFE HISTORY

Activity Patterns: Being a diurnal lizard, most activity occurs during the middle of the day in the spring and fall but is restricted to morning and late afternoon during mid-summer. Nocturnal activity may occur during particularly warm periods. Fall and winter are inactive periods in most areas.

Seasonal Movements/Migration: Pronounced seasonal movement or migration has not been reported. Habitat requirements, such as sites for courtship and display, egg-laying, and hibernation are apparently found within the normal area of activity.

Home Range: Little is known about home range. In Arizona, some individuals of a related horned lizard species, *P. solare*, established well-defined home ranges, while some wandered without establishing one. Males used a larger area than females; the mean maximum distance between capture points was 30 m (98 ft) for males and 15 m (49 ft) for females (Baharav 1975).

Territory: Horned lizards generally lack territorial defense (Lynn 1965, Stamps 1977), but combat between males (Whifford and Whifford 1973) and over female feeding territories (Nussbaum et al. 1983) has been reported.

Reproduction: The reproductive season for the horned lizard varies from year to year and geographically depending on local conditions. Pianka and Parker (1975) reported that egg-laying in southern California extends from late May through June with a mean clutch size of 13 eggs. Stebbins (1954) reported a range of 6 to 16 eggs. Hatching probably occurs after two months. Blainville's horned lizard is apparently unique among lizards in using a belly-to-belly position during copulation (Tollestrup 1981).

Niche: The spiny armour and aggressive behavior towards potential predators exhibited by horned lizards confer only partial immunity from predators. Leopard lizards, sidewinders, striped whipsnakes and other snakes, loggerhead shrikes, and hawks have all been reported as predators of horned lizards. After a review of the genus *Phrynosoma*, Pianka and Parker (1975) concluded that because of their rather specialized diets, most horned lizards probably experience little competition for food from other coexisting lizards.

REFERENCES

- Baharav, D. 1975. Movement of the horned lizard *Phrynosoma solare*. *Copeia* 1975:649-657.
- Lynn, R. T. 1965. A comparative study of display behavior in *Phrynosoma* (Iguanidae). *Southwest. Nat.* 10:25-30.
- Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. *Amphibians and reptiles of the Pacific Northwest*. Univ. Press of Idaho. 332pp.
- Pianka, E. R., and W. S. Parker. 1975. Ecology of horned lizards: a review with special reference to *Phrynosoma platyrhinos*. *Copeia* 1975:141-162.
- Stamps, J. A. 1977. Social behavior and spacing patterns in lizards. Pages 265-334 in C. Gans and D. W. Tinkle, eds. *Biology of the Reptilia*. Vol. 7. Academic Press, London.
- Stebbins, R. C. 1954. *Amphibians and reptiles of western North America*. McGraw-Hill, New York. 536pp.
- Tollestrup, K. 1981. The social behavior and displays of two species of horned lizards, *Phrynosoma platyrhinos* and *Phrynosoma coronatum*. *Herpetologica* 37:130-141.
- Whitford, W. B., and W. G. Whitford. 1973. Combat in the horned lizard *Phrynosoma coronatum*. *Herpetologica* 29:191-193.

R029

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California Wildlife Habitat Relationships System
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COOPER'S HAWK

Accipiter cooperii

Family: ACCIPITRIDAE
B116

Order: FALCONIFORMES

Class: AVES

Written by: C. Polite
Reviewed by: L. Kiff
Edited by: L. Kiff

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

A breeding resident throughout most of the wooded portion of the state. Breeds in southern Sierra Nevada foothills, New York Mts., Owens Valley, and other local areas in southern California. Ranges from sea level to above 2700 m (0-9000 ft). Dense stands of live oak, riparian deciduous, or other forest habitats near water used most frequently.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Catches small birds, especially young during nesting season, and small mammals; also takes reptiles and amphibians. Hunts in broken woodland and habitat edges; catches prey in air, on ground, and in vegetation. Often dashes suddenly from perch in dense cover and pursues prey in air through branches. Sometimes runs down in dense thickets. Uses cover to hide, attack, and approach prey; also soars and makes low, gliding search flights.

Cover: Seldom found in areas without dense tree stands, or patchy woodland habitat.

Reproduction: Nests in deciduous trees in crotches 3-23 m (10-80 ft), but usually 6-15 m (20-50 ft), above the ground. Also nests in conifers on horizontal branches, in the main crotch, often just below the lowest live limbs. Nest is a stick platform lined with bark. Usually nests in second-growth conifer stands, or in deciduous riparian areas, usually near streams.

Water: Nesting and foraging usually occur near open water or riparian vegetation. Wetting or drowning of prey has been described.

Pattern: Frequents landscapes where wooded areas occur in patches and groves (Beebe 1974). Often uses patchy woodlands and edges with snags for perching. Dense stands with moderate crown-depths used for nesting.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Mostly a yearlong resident. Some from more northern areas migrate into California; also moves downslope and south from areas of heavy snow in autumn and returns in spring.

Home Range: In Michigan, Craighead and Craighead (1956) measured 4 home ranges that averaged 311 ha (768 ac) and varied from 96-401 ha (237-992 ac); they estimated that 17 other home ranges averaged 207 ha (512 ac), and varied from 18-531 ha (45-1312 ac). They reported 1 home range in Wyoming of 205 ha (506 ac).

Territory: Males defend an area about 100 m (330 ft) around potential nest sites prior to pair formation (Brown and Amadon 1968). Nests in Oregon were 3.2 to 4.2 km (2 to 2.6 mi) apart (Jackman and Scott 1975). Elsewhere, nests have been reported 1.6 to 2.4 km (1 to 1.5 mi) apart (Meng 1951, Brown and Amadon 1968). Of 77 territories in California, in oak stands, mean distance between nests was 2.6 km (1.6 mi).

Reproduction: Breeds March through August; peak activity May through July. Single-brooded; clutch size 2-6, usually 4-5. Female incubates 35-65 days (Brown and Amadon 1968); male provides food during this period. Young altricial; yearly fledgling success is about 2 young/ pair (Craighead and Craighead 1956).

Niche: An important predator of small birds. Nestlings and immatures not yet skilled at catching prey may be killed by ravens, northern goshawks, and great horned owls (Beebe 1974). May compete, to a limited extent, with sharp-shinned hawks and northern goshawks.

Comments: Breeding numbers reduced in recent decades.

REFERENCES

- Beebe, F. L. 1974. Field studies of the Falconiformes of British Columbia. Brit. Col. Prov. Mus. Occas. Pap. No. 17. 163pp.
- Bent, A. C. 1937. Life histories of North American birds of prey. Part 1. U.S. Natl. Mus. Bull. 167. 409pp.
- Brown, L., and D. Amadon. 1968. Eagles, hawks and falcons of the world. 2 Vols. Country Life Books, London. 945pp.
- Craighead, J. J., and F. C. Craighead, Jr. 1956. Hawks, owls and wildlife. Stackpole Books, Harrisburg, PA. 443pp.
- Garrett, K., and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Soc. 408pp.
- Harrison, C. 1978. A field guide to the nests, eggs and nestlings of north American birds. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Harrison, C. J. O., ed. 1978. Bird families of the world. Harry N. Abrams, Inc., New York. 264pp.
- Henny, C. J., and H.M. Wight. 1972. Population ecology and environmental pollution; red-tailed and Coopers hawks Pages 229-249 in U.S. Fish and Wildlife Service. Population ecology in migrating birds. U.S. Dep. Inter., Fish and Wildl. Serv. Res. Rep. No. 2. Tech. Paper No. 2831.
- Jackman, S. M., and J. M. Scott. 1975. Literature review of twenty three selected forest birds of the Pacific Northwest. U.S. Dep. Agric., For. Serv., Reg. 6, Portland OR. 382pp.
- Meng, H. K. 1951. The Cooper's hawk, *Accipiter cooperii* (Bonaparte). Ph.D. Thesis, Cornell Univ., Ithaca, NY. 202pp.
- Remsen, J. V., Jr. 1978. Bird species of special concern in California. Calif. Dept. of Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.
- Reynolds, R. T. 1975. Distribution, density, and productivity of three species of Accipiter hawks in Oregon. M.S. Thesis, Oregon State Univ., Corvallis. 39pp.
- Udvardy, M. D. F. 1977. The Audubon Society field guide to North American birds: western region. A. Knopf, New York. 855pp. California. Calif. Dep. Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.
- Smith, D. G., and J. R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. Brigham Young Univ., Provo. Sci. Bull. Biol. Ser. 18, No. 3. 76pp.
- Udvardy, M. D. F. 1977. The Audubon Society field guide to North American birds: western region. A. Knopf, New York. 855pp.

California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

SHARP-SHINNED HAWK

Accipiter striatus

Family: ACCIPITRIDAE

Order: FALCONIFORMES

Class: AVES

B115

Written by: C. Polite, J. Pratt

Reviewed by: S. Bailey

Edited by: S. Bailey

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Fairly common migrant and winter resident throughout California, except in areas with deep snow. Breeding distribution poorly documented. Very few breeding records for Cascades/Sierra Nevada. Probably breeds south in Coast Ranges to about 35° lat., and at scattered locations in the Transverse and Peninsular Ranges. May no longer breed in the southern Sierra Nevada. Uncommon winter migrant to Channel Islands. Uncommon permanent resident and breeder in mid-elevation habitats. Breeds in ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats. Prefers, but not restricted to, riparian habitats. North facing slopes, with plucking perches are critical requirements. All habitats except alpine, open prairie, and bare desert used in winter.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Eats mostly small birds, usually no larger than jays; also takes small mammals, insects, reptiles, and amphibians. Perches, and darts out in sudden flight to surprise prey; also cruises rapidly in search flights. Often hunts as a harrier, in low, gliding flights. Often forages in openings at edges of woodlands, hedgerows, brushy pastures, and shorelines, especially where migrating birds are found.

Cover: Roosts in intermediate to high-canopy forest. Nests in dense, even-aged, single-layered forest canopy. Winters in woodlands.

Reproduction: Usually nests in dense, pole and small-tree stands of conifers, which are cool, moist, well shaded, with little ground-cover, near water. Nest is a platform or cup in dense foliage against trunk, or in main crotch of tree, usually 2-24 m (6-80 ft) above ground. Most inconspicuous nest of the accipiters (Call 1978).

Water: Nest usually located within 90 m (275 ft) of water. Captive individuals drink (Brown and Amadon 1968).

Pattern: Uses dense stands in close proximity to open areas.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Some individuals migrate into California for winter. Others migrate to mountains for summer and downslope to foothills and valleys for winter.

Home Range: In Wyoming, Craighead and Craighead (1956) measured 2 breeding home ranges of 67 ha and 132 ha (166 and 326 ac). Reynolds (1979) reported crude home range of 2750 ha (6600 ac).

Territory: Appears to be same as home range. Distances averaged 4.1 km (2.5 mi) between nests. Very active nest defense.

Reproduction: Breeds April through August; peak late May to July. Clutch averages 4-5 eggs; range 3-8. Incubation 34-35 days, by both parents. Male brings food to female and semi-altricial young; fledging occurs at about 60 days. Among 11 pairs in Oregon, Reynolds (1975) reported 2.7 young/ pair, and a hatching success of 70%. Egg loss was greater than nestling loss. Nests may be reused in later years.

Niche: Fledging is timed to coincide with fledging of prey birds, providing a food supply for young, inexperienced hunters. An important predator of small birds. May compete with Cooper's hawk.

Comments: The least common breeding accipiter in California. Current breeding status in doubt; needs investigation.

REFERENCES

- Brown, L., and D. Amadon. 1968. Eagles, hawks and falcons of the world. 2 Vols. Country Life Books, London. 945pp.
- Call, M. W. 1978. Nesting habits and survey techniques for common western raptors. U. S. Dep. Inter., Bur. Land Manage., Portland, OR. Tech. Note No. 316. 115pp.
- Craighead, J. J., and F. C. Craighead, Jr. 1956. Hawks, owls and wildlife. Stackpole Books, Harrisburg, PA. 443pp.
- Remsen, J. V., Jr. 1978. Bird species of special concern in California. Calif. Dep. Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.
- Reynolds, R. T. 1975. Distribution, density, and productivity of three species of Accipiter hawks in Oregon. M.S. Thesis, Oregon State Univ., Corvallis. 39pp.
- Reynolds, R. T. 1979. Food and habitat partitioning in two groups of coexisting Accipiter. Ph.D. Diss., Oregon State Univ., Corvallis. 116pp.
- Reynolds, R. T., E. C. Meslow, and H. M. Wight. 1982. Nesting habitat of coexisting Accipiter in Oregon. J. Wildl. Manage. 46:124-138. and, OR. Tech. Note No. 316. 115pp.

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Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

California Wildlife Habitat Relationships System
California Department of Fish and Wildlife
California Interagency Wildlife Task Group

TRICOLORED BLACKBIRD

Agelaius tricolor

Family: ICTERIDAE
B520

Order: PASSERIFORMES

Class: AVES

Written by: S. Granholm

Reviewed by: L. Mewaldt

Edited by: R. Duke

Updated by: CWHR Program Staff, August 2008

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Mostly a resident in California. Common locally throughout Central Valley and in coastal districts from Sonoma Co. south. Breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. Feeds in grassland and cropland habitats. Breeds locally in northeastern California. In winter, becomes more widespread along central coast and San Francisco Bay area (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981) and is found in portions of the Colorado Desert. Numbers appear to be declining in California (DeHaven et al. 1975).

SPECIFIC HABITAT REQUIREMENTS

Feeding: In California studies summarized by Skorupa et al. (1980), animal matter, mostly insects and spiders, made up 86-91% of nestling and fledgling diet, and 28-96% of adult diet in spring and summer. Insect consumption in Sacramento Valley reached a peak of 39% in summer (Crane and DeHaven 1978). Seeds and cultivated grains, such as rice and oats, are other major foods, composing most of fall and winter diet. Forages on ground in croplands, grassy fields, flooded land, and along edges of ponds.

Cover: Seeks cover in emergent wetland vegetation, especially cattails and tules; also in trees and shrubs. Roosts in large flocks in emergent wetland or in trees (Terres 1980).

Reproduction: Usually nests in dense cattails or tules; also nests in thickets of willow, blackberry, wild rose, tall herbs. Nest usually located a few ft over, or near, fresh water; also may be hidden on ground among low vegetation. Builds nest of mud and plant materials. Highly colonial; nesting area must be large enough to support a minimum colony of about 50 pairs (Grinnell and Miller 1944).

Water: Nest located over or near fresh water, especially in emergent wetland. Drinking water probably required, at least when seeds and grains are major foods.

Pattern: Frequents fresh emergent wetlands. Nest may be located up to 6.4 km (4 mi) from foraging areas (Orians 1961).

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Not migratory over most of range, but leaves northeastern California in fall and winter, presumably migrating south. Flocks become nomadic in fall seeking food. In winter, flocks become more widespread from Marin to Santa Cruz cos. and in Sacramento River Delta.

Home Range: Breeders in Colusa and Yuba cos. traveled as far as 6.4 km (4 mi) from nest to feed; in each of 2 colonies, members foraged over more than 78 km² (80 mi²) (Orians 1961).

Territory: Breeding territory, which includes only vicinity of nest, usually about 3.3 m² (85 ft²), or less, in dense vegetation, but may be larger in less suitable cover (Orians 1961).

Reproduction: Usual breeding season mid-April into late July. Orians (1960) also reported active breeding in October and November in Sacramento Valley. Polygynous; each male may have several mates nesting in his small territory. A colony varies in size from a minimum of about 50 nests (Grinnell and Miller 1944) to over 20,000 in an area of 4 ha (10 ac), or less (DeHaven et al. 1975). Colonies were even larger in former decades. Apparently has highest nesting density of any blackbird in North America (Ehrlich et al. 1988). Clutch size usually 3 or 4 eggs, range 2-6; may raise 2 broods per yr (Terres 1980). Incubation lasts about 11 days; altricial young tended by female or by both parents. Young leave nest at about 13 days. Probably breeds first at 1 yr (Harrison 1978).

Niche: Highly gregarious in all seasons. Dense breeding colonies vulnerable to massive nest destruction by mammalian and avian predators, including Swainson's hawks (Bent 1958).

REFERENCES

- Bent, A. C. 1958. Life histories of North American blackbirds, orioles, tanagers, and allies. U.S. Natl. Mus. Bull. 211. 549pp.
- Collier, G. 1968. Annual cycle and behavioral relationships in the red-winged and tricolored blackbirds of southern California. Ph.D. Thesis, Univ. California, Los Angeles. 374pp.
- Crane, F. T., and R. W. DeHaven. 1978. Food selection by five sympatric California blackbird species. Calif. Fish and Game 64:255-267.
- DeHaven, R. W., F. T. Crane, and P. P. Woronecki. 1975. Breeding status of the tricolored blackbird, 1969-1972. Calif. Fish and Game 61:166-180.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon and Schuster, New York. 785pp.
- Garrett, K., and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27. 608pp.
- Harrison, C. 1978. A field guide to the nests, eggs and nestlings of North American birds. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Harrison, C. J. O., ed. 1978. Bird families of the world. Harry N. Abrams, Inc., New York. 264pp.
- Lack, D., and J. T. Emlen, Jr. 1939. Observations on breeding behavior in tricolored red-wings. Condor 41:225-230.
- Martin, A. C., H. S. Zim, and A. L. Nelson. 1961. American wildlife and plants, a guide to wildlife food habits. Dover Publ., Inc., New York. 500pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- Neff, J. A. 1937. Nesting distribution of the tri-colored red-wing. Condor 39:61-81.
- Orians, G. H. 1960. Autumnal breeding in the tricolored blackbird. Auk 77:379-398.
- Orians, G. H. 1961. The ecology of blackbird (*Agelaius*) social systems. Ecol. Monogr. 31:285-312.
- Payne, R. B. 1969. Breeding season and reproductive physiology of tricolored and red-winged blackbirds. Univ. Calif. Publ. Zool. 90:1-114.
- Skorupa, J. P., R. L. Hothem, and R. W. DeHaven. 1980. Foods of breeding tricolored blackbirds in agricultural areas of Merced County, California. Condor 82:465-467.
- Terres, J. K. 1980. The Audubon Society encyclopedia of North American birds. A. Knopf, New York. 1100pp.

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

California Wildlife Habitat Relationships System
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California Interagency Wildlife Task Group

RUFOUS-CROWNED SPARROW

Aimophila ruficeps

Family: EMBERIZIDAE

Order: PASSERIFORMES

Class: AVES

B487

Written by: D. Dobkin

Reviewed by: L. Mewaldt

Edited by: R. Duke, S. Granholm

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

A common resident of sparse, mixed chaparral and coastal scrub habitats (especially coastal sage) from Mendocino and Tehama cos. south to the Mexican border. Uncommon on lower slopes of western Sierra Nevada, and on Santa Cruz Island (Grinnell and Miller 1944). Most numerous in western portion of range in California. Frequents relatively steep, often rocky hillsides with grass and forb patches; also grassy slopes without shrubs, if rock outcrops are present.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Forages on ground in herbage and in litter beneath shrubs, gleaning from ground and foliage; also gleans foliage of live oak (Verner and Boss 1980). Eats seeds, insects, spiders, grass and forb shoots. Eats mostly insects and spiders in breeding season (Bent 1968).

Cover: Secretive; seeks cover in shrubs, rocks, and grass and forb patches. Frequently found in open shrubland in valley foothill hardwood-conifer savannah and open chaparral (Verner and Boss 1980).

Reproduction: Nest concealed on ground at base of grass tussock or shrub, occasionally in a shrub.

Water: Frequents dry habitats. No additional information found.

Pattern: Breeds and feeds on steep, dry, herbage-covered hillsides with scattered shrubs and rock outcrops.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Not migratory. May be some movement upslope postbreeding to 1220 m (4000 ft) in western Sierra Nevada (Gaines 1977b).

Home Range: Home range, estimated from nesting density, was about 1.5 ha (3.7 ac) in southern California chaparral (Cody 1974). In Arizona oak woodland, Balda (1969, 1970) reported 6 pairs and 11 pairs per 40 ha (100 ac).

Territory: In southern California coastal sage scrub, territory averaged about 0.8 ha (2.0 ac), range 0.5 to 1.3 ha (1.2 to 3.2 ac) (Bent 1968).

Reproduction: Breeds from mid-March to mid-June with a peak in May. Monogamous;

breeding territories may occur in groups (Pemberton 1910). Clutch size 2-5 eggs, usually 3 or 4. Incubation by female only, but altricial young tended by both parents (Harrison 1978).

Niche: Eggs and nestlings preyed upon by snakes and small mammals (Bent 1968). Friedmann (1971) reported the first record of cowbird parasitism in this species. May occur in family groups postbreeding (Ehrlich et al. 1988).

REFERENCES

- Balda, R. P. 1969. Foliage use by birds of the oak-juniper woodland and ponderosa pine forest in southeastern Arizona. *Condor* 71:399-412.
- Balda, R. P. 1970. Effects of spring leaf-fall on composition and density of breeding birds in two southern Arizona woodlands. *Condor* 72:325-331.
- Bent, A. C. (O. L. Austin, Jr., ed.). 1968. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. 3 Parts. U.S. Natl. Mus. Bull. 237. 1889pp.
- Cody, M. L. 1974. Competition and the structure of bird communities. Princeton Univ. Press, Princeton, NJ. 318pp.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon and Schuster, New York. 785pp.
- Friedmann, H. 1971. Further information on the host relations of the parasitic cowbirds. *Auk* 88:239-255.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27. 608pp.
- Harrison, C. 1978. A field guide to the nests, eggs and nestlings of North American birds. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Pemberton, J. R. 1910. Notes on the rufous-crowned sparrow. *Condor* 12:123-125.
- Verner, J., and A. S. Boss. 1980. California wildlife and their habitats: Western Sierra Nevada. U.S. Dep. Agric., For. Serv., Berkeley. Gen. Tech. Rep. PSW-37. 439pp.

California Wildlife Habitat Relationships System
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GOLDEN EAGLE

Aquila chrysaetos

Family: ACCIPITRIDAE
B126

Order: FALCONIFORMES

Class: AVES

Written by: C. Polite, J. Pratt
Reviewed by: L. Kiff
Edited by: L. Kiff

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Uncommon permanent resident and migrant throughout California, except center of Central Valley. Perhaps more common in southern California than in north. Ranges from sea level up to 3833 m (0-11,500 ft) (Grinnell and Miller 1944). Habitat typically rolling foothills, mountain areas, sage-juniper flats, desert.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Eats mostly lagomorphs and rodents; also takes other mammals, birds, reptiles, and some carrion. Diet most varied in nonbreeding season. Needs open terrain for hunting; grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats. Soars 30-90 m (98-297 ft) above ground in search of prey, or makes low, quartering flights, often 7-8 m (23-26 ft) above ground. Occasionally searches from a perch and flies directly to prey (Carnie 1954). Sometimes pirates food from other predators. Hunting in pairs apparently common.

Cover: Secluded cliffs with overhanging ledges and large trees used for cover.

Reproduction: Nests on cliffs of all heights and in large trees in open areas. Alternative nest sites are maintained, and old nests are reused. Builds large platform nest, often 3 m (10 ft) across and 1 m (3 ft) high, of sticks, twigs, and greenery. Rugged, open habitats with canyons and escarpments used most frequently for nesting.

Water: No data found. Water needs probably met from prey.

Pattern: Uses rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Mostly resident, but may move downslope for winter, or upslope after breeding season. Some migrate into California for winter.

Home Range: Home range probably same as territory. Size of home range related to prey density and availability, and openness of terrain.

Territory: Territory estimated to average 57 km² (22 mi²) in Idaho (Beecham and Kocher 1975), 171-192 km² (66-74 mi²) in Montana (McGahan 1968), 23 km² (9 mi²) in Utah (Smith and Murphy 1973), 93 km² (36 mi²) in southern California (Dixon 1937), and 124 km² (48 mi²) in northern California (Smith and Murphy 1973).

Reproduction: Breeds from late January through August; peak in March through July. Clutch size 1-3, usually 2. Eggs laid early February to mid-May. Incubation 43-45 days (Beebe 1974), and nestling period usually 65-70 days.

Niche: Occasionally preys on domestic calves and lambs. May compete with ferruginous hawks for small mammals, and with California condors for carrion. May desert nest in early incubation if disturbed by humans (Thelander 1974).

REFERENCES

- Beebe, F. L. 1974. Field studies of the Falconiformes of British Columbia. Brit. Col. Prov. Mus. Occas. Pap. No. 17. 163pp.
- Beecham, J. J., and M. N. Kochert. 1975. Breeding biology of the golden eagle in southwestern Idaho. Wilson Bull. 87:506-513.
- Carnie, S. K. 1954. Food habits of nesting golden eagles in the coast ranges of California. Condor 56:3-12.
- Dixon, J. B. 1937. The golden eagle in San Diego County, California. Condor 39:49-56.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27. 608pp.
- McGahan, J. 1968. Ecology of the golden eagle. Auk 85:1-12.
- McGeen, D. S., and J. J. McGeen. 1968. The cowbirds of Otter Lake. Wilson Bull. 80:84-93.
- Olendorff, R. R. 1976. The Food habits of North American golden eagles. Amer. Midl. Nat. 95:231-3-236.
- Remsen, J. V., Jr. 1978. Bird species of special concern in California. Calif. Dep. Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.
- Smith, D. G., and J. R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. Brigham Young Univ., Provo. Sci. Bull. Biol. Ser. 18, No. 3. 76pp.
- Thelander, C. G. 1974. Nesting territory utilization by golden eagles (*Aquila chrysaetos*) in California during 1974. Calif. Dept. Fish and Game, Sacramento. Wildl. Manage. Branch Admin. Rep. 74-7. 19pp.ican rough-legged hawk. Pages 269-284 in A. C. Bent. Life histories of North American birds of prey. Part 1. U.S. Natl. Mus. Bull. No. 167. 409pp.
- Udvardy, M. D. F. 1977. The Audubon Society field guide to North American birds: western region. A. Knopf, New York. 855pp.
- Zarn, M. 1975. Rough-legged hawk, *Buteo lagopus sanctijohannis*. U.S. Dep. Inter., Bur. Land Manage., Wash. DC. Tech. Note No. 270. 23pp.

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COSTA'S HUMMINGBIRD

Calypte costae

Family: TROCHILIDAE

Order: APODIFORMES

Class: AVES

B288

Written by: M. Green

Reviewed by: L. Mewaldt

Edited by: R. Duke, S. Granholm

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common in summer and uncommon in winter. Most common and widespread in southern California, but also breeds locally along the western edge of the San Joaquin Valley (McCaskie et al. 1979) and the eastern edge of the Sierra Nevada north through Inyo Co. Has nested in Monterey Co. since 1981, and occurs regularly in spring and summer in Siskiyou Co. (McCaskie et al. 1988). In winter, largely restricted to the southern coast, but also winters on southern deserts (Garrett and Dunn 1981). There is upslope movement after breeding and during fall migration (Garrett and Dunn 1981). Occurs in more arid habitats than other hummingbirds in California. Primary habitats are desert wash, edges of desert riparian and valley foothill riparian, coastal scrub, desert scrub, desert succulent shrub, lower-elevation chaparral, and palm oasis. An uncommon transient on the Channel Islands (Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Various herbaceous and woody plants provide flower nectar; also takes small insects and spiders. In winter, exotic shrubs such as bottlebrush important (Garrett and Dunn 1981). Hovers when gathering nectar and insects.

Cover: Mostly shrubs, but also trees, provide cover.

Reproduction: Nest placed in a wide variety of trees, cacti, shrubs, woody forbs, and sometimes vines (Bent 1940). Nest height averages about 1.5 m (5 ft) (Woods 1927). Nest sometimes located close to water source, but more often well away from water (Johnsgard 1983).

Water: No additional data found. Nectar provides much water.

Pattern: Occurs primarily in arid scrub and chaparral habitats and in riparian edge.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Arrives in southern deserts in late January, but not until mid-March on the coast and northern interior areas. Most desert breeders depart by late May, but numbers remain high on the coast until late September. There is upslope movement after breeding and during fall migration. Uncommon along the southern coast in winter.

Home Range: No data found.

Territory: Male has large territory, often 1 to 1.5 ha (2.5 to 3.7 ac) (Johnsgard 1983).

Territory usually contains scattered tall perches and many food sources.

Reproduction: Breeds from March through May in the deserts, and from April through July on the coast. Promiscuous; female nests in close proximity to others in favorable areas (Bent 1940). Usually 2 eggs laid, and 1 brood raised per season. Incubation lasts 15-18 days. Young altricial; fledge in 20-23 days. All nesting duties performed by female, as is usual in hummingbirds.

Niche: As with other small hummingbirds, apparently taken infrequently by predators.

REFERENCES

- Bent, A. C. 1940. Life histories of North American cuckoos, goatsuckers, hummingbirds, and their allies. U.S. Natl. Mus. Bull. 176. 506pp.
- DeSante, D. F., and D. G. Ainley. 1980. The avifauna of the South Farallon Islands, California. Studies in Avian Biol. No. 4. Cooper Ornithol. Soc., Lawrence, KA. 104pp.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon and Schuster, New York. 785pp.
- Johnsgard, P. A. 1983. The hummingbirds of North America. Smithsonian Inst. Press, Washington DC. 303pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1988. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Soc., Berkeley. Reprinted with suppl. 108pp.
- Woods, R. S. 1927. The hummingbirds of California. Auk 44:297-318.

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Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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TURKEY VULTURE

Cathartes aura

Family: CATHARTIDAE
B108

Order: CICONIIFORMES

Class: AVES

Written by: G. Ahlborn
Reviewed by: L. Kiff
Edited by: L. Kiff, G. Ahlborn

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common in breeding season throughout most of California. Absent to uncommon in most of state in winter, with greatest concentrations in coastal regions. Not found at highest elevations in Sierra Nevada. Occurs in open stages of most habitats that provide adequate cliffs or large trees for nesting, roosting, and resting.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Primarily eats carrion; rarely rotting fruit, live birds, eggs, or live mammals. A highly specialized static soarer, foraging aerially over roads, fields, open forests, and nearly all open habitats. Searches for carrion from the air and from a perch, aided by sense of smell. May rob young herons of food (Temple 1969).

Cover: Large trees, rock outcrops, and riparian thickets are used for roosting, perching, and sunning.

Reproduction: Cliffs, rock outcrops with rims, ledges, and cavities in trees, snags, and logs used for nesting.

Water: Drinks occasionally (Brown and Amadon 1968). Captives have been observed for 6-12 mo without free water (Hatch 1970).

Pattern: Suitable habitat consists of extensive open areas with protected nest and roost sites provided by large trees, snags, thickets, shrubs, and rock outcrops.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Migrates south or downslope for winter. Some individuals in coastal regions winter in California. Remainder of population migrates, mostly to Central America, for the winter. Large flocks concentrate along well defined, traditional migration routes in autumn.

Home Range: No data found, but observations indicate turkey vulture uses extensive areas. Individuals regularly forage out 24-32 km (15-20 mi) from roost or nest.

Territory: Little evidence of territoriality found. In California, as many as 500 juveniles observed using communal roosts August through October.

Reproduction: A ritualized display including several individuals may precede mating (Loftin and Tyson 1965, Brown and Amadon 1968). Lays 1 clutch/ yr of 2 eggs, rarely 1 or 3.

Incubates 38-41 days (Brown and Amadon 1968). Semialtricial young hatch with eyes open; cared for by both parents for 80 days, or more.

Niche: Often feeds with ravens and condors, although apparently subordinate to each. Golden eagles and coyotes may keep turkey vulture from carcasses.

REFERENCES

- Bent, A. C. 1937. Life histories of North American birds of prey. Part 1. U.S. Natl. Mus. Bull. 167. 409pp.
- Brown, L., and D. Amadon. 1968. Eagles, hawks and falcons of the world. 2 Vols. Country Life Books, London. 945pp.
- Coles, V. 1944. Nesting of the turkey vulture in Ohio caves. *Auk* 61:219-228.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon and Schuster, New York. 785pp.
- Garrett, K., and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27. 608pp.
- Hatch, D. E. 1970. Energy conserving and heat dissipating mechanisms of the turkey vulture. *Auk* 87:111-124.
- Loftin, H., and E. L. Tyson. 1965. Stylized behavior in turkey vulture courtship dance. *Wilson Bull.* 77:193.
- McKelvey, M. 1965. Unusual bathing habits of the turkey vulture. *Condor* 67:265.
- Temple, S. A. 1969. A case of turkey vulture piracy on great blue herons. *Wilson Bull.* 81:94.
- Work, T. H., and A. J. Wool. 1942. The nest life of the turkey vulture. *Condor* 44:149-159.

B108

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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VAUX'S SWIFT

Chaetura vauxi

Family: APODIDAE
B281

Order: APODIFORMES

Class: AVES

Written by: S. Granholm
Reviewed by: L. Mewaldt
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

A summer resident of northern California. Breeds fairly commonly in the Coast Ranges from Sonoma Co. north, and very locally south to Santa Cruz Co.; in the Sierra Nevada; and possibly in the Cascade Range. Prefers redwood and Douglas-fir habitats with nest-sites in large hollow trees and snags, especially tall, burned-out stubs. Fairly common migrant throughout most of the state in April and May, and August and September. A few winter irregularly in southern coastal lowlands (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Feeds exclusively on flying insects taken in long, continuous foraging flights. Feeds high in the air over most terrains and habitats; also feeds commonly at lower levels in forest openings, above burns, and especially above rivers (Grinnell and Miller 1944) and lakes (Terres 1980).

Cover: Roosts in hollow trees and snags, and occasionally in chimneys and buildings; often in large flocks (Bent 1940).

Reproduction: Nests in redwood, Douglas-fir, and occasionally other coniferous forests. Nest typically built on the vertical inner wall of a large, hollow tree or snag, especially tall stubs charred by fire (Bent 1940). Enters nesting tree from the top or through cracks in the side, and almost always locates nest near the bottom of a cavity, regardless of the height of the entrance. Occasionally nests in chimneys and buildings.

Water: No data found.

Pattern: The most important habitat requirement appears to be an appropriate nest-site in a large, hollow tree. Forages over most terrains and habitats, often high in the air. Shows an apparent preference for foraging over rivers and lakes.

SPECIES LIFE HISTORY

Activity Patterns: Activity diurnal, including migration. May enter torpor in periods of cold weather, when flying insects are scarce, as some other swifts do (Terres 1980).

Seasonal Movements/Migration: Apparently mostly migrates to wintering grounds in Mexico and Central America, but a few winter irregularly in coastal lowlands of southern California. Fairly common in spring and fall migration throughout the state, though unpredictable in occurrence.

Home Range: No data found.

Territory: Territoriality has not been reported; territory presumably limited to nest site.

Reproduction: Breeds from early May to mid-August. Solitary nesting apparently typical. Clutch size 3-7 eggs, usually 4-5; incubation lasts 18-20 days. Altricial young tended by both parents; leave the nesting tree at about 28 days (Harrison 1978).

Niche: Sometimes heavily parasitized by lice, which can cause considerable mortality (Bent 1940). May roost early on cold days (Ehrlich et al. 1988).

REFERENCES

- Baldwin, P. H., and W. F. Hunter. 1963. Nesting and nest visitors of the Vaux's swift in Montana. *Auk* 80:81-85.
- Baldwin, P. H., and N. K. Zaczkowski. 1963. Breeding biology of the Vaux swift. *Condor* 65:400-406.
- Bent, A. C. 1940. Life histories of North American cuckoos, goatsuckers, hummingbirds, and their allies. U.S. Natl. Mus. Bull. 176. 506pp.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. *The birder's handbook*. Simon and Schuster, New York. 785pp.
- Garrett, K., and J. Dunn. 1981. *Birds of southern California*. Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. *Pac. Coast Avifauna* No. 27. 608pp.
- Harrison, C. 1978. *A field guide to the nests, eggs and nestlings of north American birds*. W. Collins Sons and Co., Cleveland OH. 416pp.
- Lack, D. 1956. A review of the genera and nesting habits of swifts. *Auk* 73:1-32.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. *Birds of northern California, an annotated field list*. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- Terres, J. K. 1980. *The Audubon Society encyclopedia of North American birds*. A. Knopf, New York. 1100pp.

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HORNED LARK

Eremophila alpestris

Family: ALAUDIDAE
B337

Order: PASSERIFORMES

Class: AVES

Written by: M. Green
Reviewed by: L. Mewaldt
Edited by: R. Duke, D. Winkler

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

A common to abundant resident in a variety of open habitats, usually where trees and large shrubs are absent. Found from grasslands along the coast and deserts near sea level to alpine dwarf-shrub habitat above treeline. Less common in mountain regions, on the North Coast (McCaskie et al. 1979), and in coniferous or chaparral habitats. Mostly leaves mountains in winter, but small flocks may remain to winter on windswept, snow-free areas at high elevations in the Sierra Nevada (Gaines 1977b). In winter, flocks in desert lowlands and other areas augmented by winter visitants, many migrating from outside the state (Garrett and Dunn 1981). Resident on the Channel Islands (Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Mostly eats insects, snails, and spiders during breeding season; adds grass and forb seeds and other plant matter to diet at other seasons (Bent 1942). Walks along ground, searching for food.

Cover: Grasses, shrubs, forbs, rocks, litter, clods of soil, and other surface irregularities provide cover.

Reproduction: Builds grass-lined nest; cup-shaped in depression on ground in the open.

Water: Drinks freely from waterholes, but individuals have survived in captivity for 16-31 days without water (Airola 1980).

Pattern: Frequents grasslands and other open habitats with low, sparse vegetation.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Yearlong, resident within the state. After breeding, becomes very gregarious; often forms large flocks that forage and roost together. Migrants from outside of California join these wintering flocks, especially in the southeastern desert region of the state. Migrant status on the Farallon Islands indicates a latitudinal movement along the coast as well (DeSante and Ainley 1980).

Home Range: No data found.

Territory: Verbeek (1967) estimated typical territory as 1.6 ha (4 ac) in Wyoming alpine tundra. In midwestern farmland, territory reported as 0.6 to 3.2 ha (1.5 to 8 ac) (Beason and Franks 1974), 0.4 to 5.3 ha (1-13 ac) (Pickwell 1931), and 4.9 ha (12 ac) (Fitch 1958).

Reproduction: Breeds from March through July, with peak activity in May. Pair nests solitarily; lays 2-5 eggs, average 3-4. Frequently raises 2 broods in a season (Bent 1942). Incubation 10-14 days; altricial young tended by both parents. Young leave nest at 9-12 days, and can fly 3-5 days later (Harrison 1978).

Niche: Eggs and nestlings subject to predation from mammals and snakes. Adults are prey for falcons.

REFERENCES

- Airola, D. A., ed. 1980. California wildlife habitat relationships program: Northeast Interior Zone. Vol III. Birds. U.S. Dep. Agric., For. Serv., Lassen Natl. For., Susanville. 590pp.
- Beason, R. C., and E. C. Franks. 1974. Breeding behavior of the horned lark. *Auk* 91:65-74.
- Bent, A. C. 1942. Life histories of North American flycatchers, larks, swallows, and their allies. U.S. Natl. Mus. Bull. 179. 555pp.
- DeSante, D. F., and D. G. Ainley. 1980. The avifauna of the South Farallon Islands, California. *Studies in Avian Biol.* No. 4. Cooper Ornithol. Soc., Lawrence, KA. 104pp.
- Fitch, H. S. 1958. Home ranges, territories, and seasonal movements of vertebrates of the Natural History Reservation. *Univ. Kans., Lawrence. Publ. Mus. Nat. Hist.* 11:63-326.
- Gaines, D. 1977b. Birds of the Yosemite Sierra. California Syllabus, Oakland. 153pp.
- Garrett, K., and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Soc. 408pp.
- Harrison, C. 1978. A field guide to the nests, eggs and nestlings of north American birds. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Harrison, C. J. O., ed. 1978. Bird families of the world. Harry N. Abrams, Inc., New York. 264pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- Pickwell, G. 1931. The prairie horned lark. *St. Louis Acad. Sci. Trans.* 27:1-153.
- Verbeek, N. A. M. 1967. Breeding biology and ecology of the horned lark in alpine tundra. *Wilson Bull.* 79:208-218.

B337

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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LOGGERHEAD SHRIKE

Lanius ludovicianus

Family: LANIIDAE
B410

Order: PASSERIFORMES

Class: AVES

Written by: S. Granholm
Reviewed by: L. Mewaldt
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

A common resident and winter visitor in lowlands and foothills throughout California. Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. In the Great Basin, from Inyo Co. north, population declines markedly from November through March. Rare on coastal slope north of Mendocino Co., occurring only in winter. Occurs only rarely in heavily urbanized areas, but often found in open cropland. Sometimes uses edges of denser habitats (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Eats mostly large insects; also takes small birds, mammals, amphibians, reptiles, fish, carrion, and various other invertebrates. Searches for prey from a perch at least 0.6 m (2 ft) above ground (Grinnell and Miller 1944), often much higher. Usually flies directly to prey on ground or in a shrub; sometimes hovers. Frequently skewers prey on thorn, sharp twig, wire barb, or forces it into a crotch to feed on or to cache for feeding later. Sometimes hawks aerial insects.

Cover: Often uses shrub or small tree (Bent 1950).

Reproduction: Builds nest on stable branch in densely-foliaged shrub or tree, usually well-concealed (Miller 1931, Bent 1950). Nest height 0.4 to 15 m (1.3 to 50 ft) above ground, occasionally higher (Harrison 1978). Nearly all of 77 nests found by Porter et al. (1975) in Colorado were below 4.5 m (15 ft).

Water: Not reported drinking in desert areas, although often seen near water (Miller and Stebbins 1964, Smyth and Coulombe 1971). Drinks and bathes in captivity (Miller 1931, Bent 1950), although captives can live on a meat diet without water (Bartholomew and Cade 1963).

Pattern: Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low or sparse herbaceous cover.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: A large portion of population in Great Basin, south to Inyo Co., departs for winter. In areas of residence, winter numbers augmented by visitors from north, and species is even more widespread than when breeding.

Home Range: Apparently same as territory. According to Bent (1950), forages within territory year-round.

Territory: Ten territories in open shrubland in Contra Costa and Kern cos. averaged 7.6 ha (18.7 ac), and varied from 4.5 to 16 ha (11-40 ac) (Miller 1931). A central or "headquarters" area within each territory, containing lookout perches, feeding areas, and a roost site, was defended vigorously. Territory defended by solitary individuals through nonbreeding season. Breeding territory usually a winter territory of parents. Smith (1973) also observed territory defended aggressively year-round. In Colorado, 77 nests were at least 400 m (1300 ft) apart, and territory was much smaller in diameter (Porter et al. 1975).

Reproduction: In California, lays eggs from March into May, and young become independent in July or August. A monogamous, solitary nester; clutch size 4-8 (Porter et al. 1975). May be double-brooded, (Harrison 1978), but among 77 nests in Colorado, Porter et al. (1975) found no second broods. Incubation lasts 14-15 days. Altricial young tended by both parents and leave nest at 18-19 days. Young may be driven off parents' territory 2-3 mo later (Miller 1931). Probably breeds first at 1 yr (Harrison 1978).

Niche: In Idaho sagebrush, substantially reduced density of nesting passerines by harassing and preying on adults and nestlings (Reynolds 1979). In southern Illinois, where population had declined, Anderson and Duzan (1978) found a correlation between DDE contamination and eggshell thinning, but no decline in nesting success; DDE may have reduced survival. Morrison (1979) found no evidence of eggshell thinning in California or Florida. Largest source of nest failure in Colorado was predation, probably by magpies (Porter et al. 1975).

Comments: Although populations have declined elsewhere, they have remained fairly stable in the Pacific states (Morrison 1981). *L. I. mearnsi*, the San Clemente loggerhead shrike, is Federal Endangered (California Department of Fish and Game 1989).

REFERENCES

- Anderson, W. L., and R. E. Duzan. 1978. DDE residues and eggshell thinning in loggerhead shrikes. *Wilson Bull.* 90:215-220.
- Bartholomew, G. A., and T. J. Cade. 1963. The water economy of land birds. *Auk* 80:504-539.
- Bartholomew, G. A., and W. R. Dawson. 1953. Respiratory water loss in some birds of southwestern United States. *Physiol. Zool.* 26:162-166.
- Bent, A. C. 1950. Life histories of North American wagtails, shrikes, vireos, and their allies. *U.S. Natl. Mus. Bull.* 197. 411pp.
- California Department of Fish and Game. 1989. 1988 annual report on the status of California's state listed threatened and endangered plants and animals. Sacramento. 129pp.
- Garrett, K., and J. Dunn. 1981. *Birds of southern California.* Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. *The distribution of the birds of California.* Pac. Coast Avifauna No. 27. 608pp.
- Harrison, C. 1978. *A field guide to the nests, eggs and nestlings of north American birds.* W. Collins Sons and Co., Cleveland, OH. 416pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. *Birds of northern California, an annotated field list.* 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- Miller, A. H. 1931. Systematic revision and natural history of the American shrikes (*Lanius*). *Univ. Calif. Publ. Zool.* 38:11-242.
- Miller, A. H., and R. C. Stebbins. 1964. *The lives of desert animals in Joshua Tree National Monument.* Univ. California Press, Berkeley. 452pp.
- Morrison, M. L. 1979. Loggerhead shrike eggshell thickness in California and Florida. *Wilson Bull.* 91:468-469.
- Morrison, M. L. 1981. Population trends of the loggerhead shrike in the United States. *Am.*

Birds 35:754-757.

Porter, D. K., M. A. Strong, J. B. Giezentanner, and R. A. Ryder. 1975. Nest ecology, productivity, and growth of the loggerhead shrike on the shortgrass prairie. *Southwest. Nat.* 19:429-436.

Reynolds, T. D. 1979. The impact of loggerhead shrikes on nesting birds in a sagebrush environment. *Auk* 96:798-800.

Smith, S. M. 1973. Aggressive display and related behavior in the loggerhead shrike. *Auk* 90:287-298.

Smyth, M., and H. M. Coulombe. 1971. Notes on the use of desert springs by birds in California. *Condor* 73:240-243.

B410

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. *California's Wildlife*. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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BLACK-TAILED GNATCATCHER

Polioptila melanura

Family: SYLVIIDAE
B378

Order: PASSERIFORMES

Class: AVES

Written by: T. Kucera, 1997

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The black-tailed gnatcatcher and the California gnatcatcher (*P. californica*) recently were elevated from subspecies to the specific level (Atwood 1988, American Ornithologists' Union 1989). Each is distinct in plumage, voice, habitat preference, and abundance. The black-tailed gnatcatcher is a fairly common resident below about 300 m (1,000 ft) in desert wash habitat from Palm Springs and Joshua Tree National Monument south, and common along the Colorado River. Now rare in eastern Mojave Desert north to the Amargosa River, Inyo Co. Nests primarily in wooded desert wash habitat, but also occurs sparingly in desert scrub habitat, especially in winter (Grinnell and Miller 1944, Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Glean insects and spiders from foliage of shrubs (Bent 1949). Also eat a few seeds.

Cover: Shrubs provide roosting, nesting, and other cover.

Reproduction: Weave a small, deep cup from hemp-like fibers, leaves, plant down, spider silk, in a shrub 0.6-0.9 m (2-3 ft) above ground (Woods 1928).

Water: No information found, but probably not a requirement.

Pattern: *P. melanura* is most numerous in desert wash habitat with dense mesquite, paloverde, ironwood, acacia. Absent from areas where introduced saltcedar or other exotic vegetation dominates (Small 1994).

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Resident in nesting areas.

Home Range: Probably equal to territory, at least in breeding season. In New Mexico, Raitt and Maze (1968) reported 0.6 to 2 pairs per 40 ha (100 ac). In Arizona, Emlen (1974) reported 1.6 per 40 ha (100 ac).

Territory: In desert riparian habitat along the lower Colorado River in Arizona, territory varied from 1.01 to 1.78 ha (2.5 to 4.4 ac) in different study areas and years (Laudenslayer 1981).

Reproduction: Monogamous. Peak egg laying in April and May. Incubation 14-15 days, by both sexes. Clutch averages 4 eggs, range 3-5. Both sexes feed altricial young, which fledge at 9-10 days (Bent 1949).

Niche: Friedmann (1963) reported 13 records of cowbird parasitism, but suggested may be victimized more frequently than records suggest. Taylor (1966) found 3 parasitized pairs.

Comments: The black-tailed gnatcatcher is a California Species of Special Concern (Remsen 1978) and has declined in numbers markedly in recent decades (Grinnell and Miller 1944, Remsen 1978).

REFERENCES

- American Ornithologists' Union. 1989. Thirty-seventh supplement to the American Ornithologists' Union Check-list of North American birds. *Auk* 106:532-538.
- Atwood, J. L. 1988. Speciation and geographic variation in the black-tailed gnatcatchers. *Ornithol. Monogr.* No. 42. 74pp.
- Bent, A. C. 1949. Life histories of North American thrushes, kinglets, and their allies. *U.S. Natl. Mus. Bull.* 196. 454pp.
- Emlen, J. T., Jr. 1974. An urban bird community in Tucson, Arizona: derivation, structure, regulation. *Condor* 76:184-197.
- Friedmann, H. 1963. Host relations of the parasitic cowbirds. *U.S. Natl. Mus. Bull.* 233. 276pp.
- Garrett, K., and J. Dunn. 1981. *Birds of southern California.* Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. *Pac. Coast Avifauna* No. 27. 608pp.
- Laudenslayer, W. F., Jr. 1981. Habitat utilization by birds of three desert riparian communities. Ph.D. Thesis, Arizona State Univ., Tempe. 148pp.
- Raitt, E. J., and R. L. Maze. 1968. Densities and species composition of breeding birds of a creosote bush community in southern New Mexico. *Condor* 70:193-205.
- Remsen, J. V., Jr. 1978. Bird species of special concern in California. *Calif. Dep. Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1.* 54pp.
- Small, A. 1994. *California birds: their status and distribution.* Ibis Publishing Co., Vista, CA.
- Taylor, W. K. 1966. Additional records of black-tailed gnatcatchers parasitized by the dwarf brown-headed cowbird. *Am. Midl. Nat.* 76:242-243.
- Woods, R. S. 1928. Nesting of the black-tailed gnatcatcher. *Condor* 30:139-143.

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Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. *California's Wildlife.* Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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LAWRENCE'S GOLDFINCH

Spinus lawrencei

Family: FRINGILLIDAE
B544

Order: PASSERIFORMES

Class: AVES

Written by: S. Granholm
Reviewed by: L. Mewaldt
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Highly erratic and localized in occurrence. Rather common along western edge of southern deserts, fairly common but erratic from year to year in Santa Clara Co. (Kaiser 1976) and on coastal slope from Monterey Co. south, and uncommon in foothills surrounding Central Valley. Present mostly from April through September. Breeds in open oak or other arid woodland and chaparral, near water. Rarely breeds along immediate coast. Typical habitats include valley foothill hardwood, valley foothill hardwood-conifer, and, in southern California, desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. Nearby herbaceous habitats often used for feeding. Winters erratically in southern coastal lowlands and Colorado River Valley; can be common locally. Small numbers also winter in northern California (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Eats mostly seeds; also a few insects. Favored seeds include pigweed, fiddleneck, starthistle, and chamise (Martin et al. 1961). Feeds on forbs and shrubs, plucking seeds from plants. Also gleans seeds from ground.

Cover: Uses trees and shrubs for nesting, resting, escape, and other cover. Perches on fences and transmission wires.

Reproduction: Builds nest in dense foliage of a tree or shrub. Prefers to nest in an oak; also uses cypress or planting of deodar cedar (Grinnell and Miller 1944), riparian thicket, other species (Garrett and Dunn 1981). Most often nests near water in open, arid woodland (Garrett and Dunn 1981), but also uses chaparral.

Water: Apparently requires drinking water (Grinnell and Miller 1944, Linsdale 1950); often bathes (Linsdale 1950, Coutlee 1968b).

Pattern: Requires open woodland or shrubland, a nearby source of water, and forb and shrub seeds.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Most individuals that breed in California winter in other southwestern states and in northern Mexico, and are absent from September to March. Moderate numbers winter erratically in southern coastal lowlands and Colorado River Valley, but few remain in northern California.

Home Range: In Monterey Co., ranged up to 0.8 km (0.5 mi) from nest to feed or drink

(Linsdale 1957).

Territory: Diameter of territory around nest was 18-22 m (60-72 ft) (Linsdale 1950) and 11 m (36 ft) (Linsdale 1957) in Monterey Co., and 10-15 m (33-50 ft) elsewhere in California (Coutlee 1968a). Occasionally nests colonially: Hanna (in Bent 1968) reported " a dozen" nests in a small juniper, and Dawson (1923) recorded 10 nests in 2 adjacent trees.

Reproduction: Breeding season begins in late March or early April. A monogamous breeder; nests singly or near several other pairs. Lays 3-6 eggs per clutch, usually 4 or 5. Incubation lasts 12-13 days (Coutlee 1966). Altricial young tended by both parents and leave nest at about 11 days. Probably breeds first at 1 yr (Harrison 1978).

Niche: Apparently some competition for nest sites between lesser and Lawrence's goldfinches (Coutlee 1966). Closely associated with oaks. Occurs in flocks throughout year, sometimes with other seedeaters; other goldfinches, house finches, juncos, lark sparrows. Attracted to salt (Ehrlich et al. 1988).

REFERENCES

- Bent, A. C. (O. L. Austin, Jr., ed.). 1968. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. 3 Parts. U.S. Natl. Mus. Bull. 237. 1889pp.
- Coutlee, E. L. 1966. The comparative behavior of lesser and Lawrence's goldfinches. Ph.D. Thesis, Univ. California, Los Angeles. 125pp.
- Coutlee, E. L. 1968a. Comparative breeding behavior of lesser and Lawrence's goldfinches. *Condor* 70:288-242.
- Coutlee, E. L. 1968b. Maintenance behavior of lesser and Lawrence's goldfinches. *Condor* 70:378-384.
- Dawson, W. L. 1923. The birds of California. 4 Vols. South Moulton Co., San Diego. 2121pp.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The Birder's handbook. Simon and Schuster, New York. 785pp.
- Garrett, K., and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. *Pac. Coast Avifauna* No. 27. 608pp.
- Harrison, C. 1978. A field guide to the nests, eggs and nestlings of North American birds. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Kaiser, S. 1976. Passerine migration through the Inner Coast Range of central California. M.A. Thesis, San Jose State Univ., San Jose. 120pp.
- Linsdale, J. M. 1950. Observations on the Lawrence goldfinch. *Condor* 52:255-259.
- Linsdale, J. M. 1957. Goldfinches on the Hastings Natural History Reservation. *Am. Midl. Nat.* 57:1-119.
- Martin, A. C., H. S. Zim, and A. L. Nelson. 1961. American wildlife and plants, a guide to wildlife food habits. Dover Publ., Inc., New York. 500pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.

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BREWER'S SPARROW

Spizella breweri

Family: EMBERIZIDAE
B491

Order: PASSERIFORMES

Class: AVES

Written by: D. Dobkin, S. Granholm

Reviewed by: L. Mewaldt

Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

A common summer resident and breeder east of the Cascade-Sierra Nevada crest, in mountains and higher valleys of Mojave Desert, and in those bounding southern end of the San Joaquin Valley. Breeds in treeless shrub habitats with moderate canopy, especially in sagebrush. Now mostly absent from former breeding grounds in southwestern California (Garrett and Dunn 1981). Breeds locally above pinyon-juniper belt (McCaskie et al. 1979), and apparently on western slope of Sierra Nevada (Verner and Boss 1980). Common in winter in open desert scrub and cropland habitats of southern Mojave and Colorado deserts, usually in areas with some herbaceous understory. Occurs as a rare fall transient west of Sierra Nevada, and as an uncommon fall transient and rare spring transient in southern coastal districts (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Eats mostly insects and spiders in summer and seeds of grasses and forbs in winter. Picks seeds from ground, gleans and pursues insects on ground; occasionally feeds in low shrubs (Bent 1968).

Cover: In summer, often finds cover in sagebrush in extensive stands with moderate canopy unbroken by trees, usually 0.5-1.3 m (1.5-4.0 ft) in height. Similar shrub habitats, such as bitterbrush, are used to a lesser extent. In nonbreeding season, uses a variety of brushlands of similar structure (Grinnell and Miller 1944), plains, and fields (Garrett and Dunn 1981).

Reproduction: Nest is a cup of dry grass stems, forbs, and rootlets lined with fine grasses, rootlets, and hairs (Harrison 1978). Nest usually located in center of a sagebrush or other shrub up to 1.2 m (3.9 ft) above ground, but usually less than 0.3 m (1 ft). Rarely nests on ground.

Water: Commonly drinks and bathes, but may not require free water (Linsdale 1938). Apparently can meet water needs by eating insects (Ohmart and Smith 1970), and can subsist on dry seeds for 3 wk (Ehrlich et al. 1988).

Pattern: Breeds in extensive shrub stands with moderate canopy, especially sagebrush. Winters in open desert scrub and similar habitats, plains, and fields.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Breeding populations present mostly May through August. Not known whether wintering populations represent California breeders or migrants

from elsewhere. Present for wintering mostly September through April. Migrants elsewhere in California occur mostly in September and October and April and May. May move upslope postbreeding.

Home Range: An individual chased by Linsdale (1938) remained within an area 150 yd in diameter (136 m), suggesting its breeding home range. In Wyoming sagebrush, density was 30-40 pairs per 40 ha (100 ac). In Montana, Best (1972) found 45-50 pairs per 40 ha (100 ac) in unsprayed sagebrush, and 15-33 pairs per 40 ha (100 ac) in the first yr after herbicide spraying that killed all sagebrush. Gashwiler (1977) reported 27-36 pairs per 40 ha (100 ac) in Oregon sagebrush. In successional brushfields in Sierra Co., Bock and Lynch (1970) reported 3.6 pairs per 40 ha (100 ac). In the same area, Savidge (1978) found 45 pairs per 40 ha (100 ac) in unsprayed brush, and 22.3 pairs per 40 ha (100 ac) in a matched plot sprayed heavily with herbicide.

Territory: No data found.

Reproduction: Breeds primarily from May through August with a peak in June. Usually lays 3 or 4 eggs per clutch, occasionally 5. Incubation 11-13 days; altricial young fledge in 8-9 days (Harrison 1978, Ehrlich et al. 1988).

Niche: Wyoming sagebrush habitat was abandoned after herbicide spraying (Schroeder and Sturges 1975). Density declined after spraying in Montana sagebrush (Best 1972), and in successional brushfields in Sierra Co. (Savidge 1978). Apparently an uncommon cowbird host (Ehrlich et al. 1988).

REFERENCES

- Bent, A. C. (O. L. Austin, Jr., ed.). 1968. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. 3 Parts. U.S. Natl. Mus. Bull. 237. 1889pp.
- Best, L. B. 1972. First-year effects of sagebrush control on two sparrows. *J. Wildl. Manage.* 36:534-544.
- Bock, C. E., and J. F. Lynch. 1970. Breeding bird populations of burned and unburned conifer forests in the Sierra Nevada. *Condor* 72:182-189.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. *The birder's handbook*. Simon and Schuster, New York. 785pp.
- Garrett, K., and J. Dunn. 1981. *Birds of southern California*. Los Angeles Audubon Soc. 408pp.
- Gashwiler, J. S. 1977. Bird populations in four vegetational types in central Oregon. U.S. Dep. Inter. Fish and Wildl. Serv., Portland OR. Special Tech. Rep. No. 205. 20pp.
- Grinnell, J., and A. H. Miller. 1944. *The distribution of the birds of California*. Pac. Coast Avifauna No. 27. 608pp.
- Harrison, C. 1978. *A field guide to the nests, eggs and nestlings of North American birds*. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Linsdale, J. M. 1938. Environmental responses of vertebrates in the Great Basin. *Am. Midl. Nat.* 19:1-206.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. *Birds of northern California, an annotated field list*. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- Ohmart, R. D., and E. L. Smith. 1970. Use of sodium chloride solutions by the brewer's sparrow and tree sparrow. *Auk* 87:329-341.
- Savidge, J. A. 1978. Wildlife in an herbicide-treated Jeffrey pine plantation in eastern California. *J. For.* 76:476-478.
- Schroeder, M. H., and D. L. Sturges. 1975. The effect on the Brewer's sparrow of spraying big sagebrush. *J. Range Manage.* 28:294-297.
- Verner, J., and A. S. Boss. 1980. *California wildlife and their habitats: Western Sierra Nevada*. U.S. Dep. Agric., For. Serv., Berkeley. Gen. Tech. Rep. PSW-37. 439pp.

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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YELLOW-HEADED BLACKBIRD

Xanthocephalus xanthocephalus

Family: ICTERIDAE
B522

Order: PASSERIFORMES

Class: AVES

Written by: S. Granholm

Reviewed by: L. Mewaldt

Edited by: R. Duke

Updated by: CWHR Program Staff, August 2005 and August 2008

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Breeds commonly, but locally, east of Cascade Range and Sierra Nevada, in Imperial and Colorado River valleys, in the Central Valley, and at selected locations in the coast ranges west of the Central Valley. Nests in fresh emergent wetland with dense vegetation and deep water, often along borders of lakes or ponds. Forages in emergent wetland and moist, open areas, especially cropland and muddy shores of lacustrine habitat. Restricted distribution in Central Valley in winter, occurring mainly in the western portion. Fairly common in winter in Imperial Valley. Occurs as a migrant and local breeder in deserts and along Orange county coast. Has bred, at least irregularly, as high as 2000 m (6600 ft) in San Bernardino Mts. (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Adult feeds primarily on seeds and cultivated grains; eats insects in breeding season. In Sacramento Valley, insect consumption reached a peak of 20% in summer (Crane and DeHaven 1978). Young fed mostly insects, some spiders and snails (Willson 1966). Feeds in emergent vegetation, along moist shorelines, and in nearby grasslands and croplands, preferably near water or on moist ground. Often hawks flying insects (Bent 1958).

Cover: Dense emergent vegetation used for nesting, roosting, for cover during postbreeding molt, and other cover needs (Bent 1958).

Reproduction: Nesting colony located in dense emergent wetland of cattails, tules, other plants, often along border of lake or pond. Breeds only where large insects such as Odonata are abundant; nesting timed to coincide with maximum emergence of aquatic insects (Willson and Orians 1963). Nest placed in emergent vegetation (rarely willows), usually 0.2 to 0.9 m (0.5 to 3 ft) above water surface; typically near edge of emergent vegetation farthest from shore, above water 0.6 to 1.3 m (2-4 ft) deep (Bent 1958). Large wetlands preferred.

Water: Nest and roost always located over water, and most foraging takes place over water, near water, or on moist ground. Drinking water probably required, at least when seeds and grains are major foods.

Pattern: Nests, roosts, and does much foraging in fresh emergent wetland. Also feeds along shorelines and in nearby open fields, preferably on moist ground. Foraging ground may be as far as 1.6 km (1 mi) from nesting colony (Willson 1966), and probably considerably farther from winter roost.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong, diurnal activity.

Seasonal Movements/Migration: Much of California breeding population migrates south to winter. Uncommon as a winter resident in Central Valley, occurring mostly in southern portion; fairly common in Imperial Valley. Elsewhere, including coastal areas, rare and irregular in winter. Migrants occur outside breeding range in April, early May, and September, particularly in southern California deserts and coastal areas.

Home Range: Breeders in eastern Washington foraged up to 1.6 km (1 mi) from nesting territory (Willson 1966).

Territory: In scattered cattails in Imperial Co., Willson (1966) reported 24 territories averaging 116 m² (1250 ft²), and 75 territories varying from 37-46 m² (400-500 ft²). In eastern Washington, she found territories much larger, varying from an average of 455 m² (4900 ft²) for 13 territories in bulrush to 2800 m² (30,000 ft²) for 7 territories in scattered cattails. In Utah, 11 territories averaged 0.012 ha (0.03 ac) (Fautin 1940).

Reproduction: Breeding season lasts from mid-April to late July. Polygynous; each male may have 2-5 mates nesting on his territory (Willson 1966). Usually nests in a large colony with nests fairly closely spaced. Average clutch 4 eggs (range 2-5). Mostly raises a single brood per yr (Willson and Orians 1963). Incubation lasts 10-13 days. Altricial young tended by female or by both parents; leave nest at about 9-12 days, but do not fly until about 20 days. Probably breeds first at 1 yr (Harrison 1978).

Niche: Adults aggressively attack hawks, crows, and other large birds near territory. Probably the most important predators on eggs and young are mink, great horned owl, northern harrier, red fox, and muskrat (Bent 1958). Storms and changes in water level can be very destructive. Brood parasitism by brown-headed cowbird occurs occasionally (Friedmann 1963). Males may form flocks postbreeding, separate from females and young. May join very large mixed flocks in winter with other blackbirds, cowbirds, grackles (Ehrlich et al. 1988).

REFERENCES

- Bent, A. C. 1958. Life histories of North American blackbirds, orioles, tanagers, and allies. U.S. Natl. Mus. Bull. 211. 549pp.
- Crane, F. T., and R. W. DeHaven. 1972. Current breeding status of the yellow-headed blackbird in California. *Calif. Birds* 3:39-42.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. *The birder's handbook*. Simon and Schuster, New York. 785pp.
- Fautin, R. W. 1940. The establishment and maintenance of territories by the yellow-headed blackbird in Utah. *Great Basin Nat.* 1:75-91.
- Friedmann, H. 1963. Host relations of the parasitic cowbirds. U.S. Natl. Mus. Bull. 233. 276pp.
- Garrett, K., and J. Dunn. 1981. *Birds of southern California*. Los Angeles Audubon Soc. 408pp.
- Grinnell, J., and A. H. Miller. 1944. *The distribution of the birds of California*. Pac. Coast Avifauna No. 27. 608pp.
- Harrison, C. 1978. *A field guide to the nests, eggs and nestlings of North American birds*. W. Collins Sons and Co., Cleveland, OH. 416pp.
- Harrison, C. J. O., ed. 1978. *Bird families of the world*. Harry N. Abrams, Inc., New York. 264pp.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. *Birds of northern California, an annotated field list*. 2nd ed. Golden Gate Audubon Soc., Berkeley. 84pp.
- Miller, R. S. 1968. Conditions of competition between red-winged and yellow-headed blackbirds. *J. Anim. Ecol.* 37:43-61.
- Orians, G. H., and H. S. Horn. 1969. Overlap in foods and foraging of four species of blackbirds in the Potholes of central Washington. *Ecology* 50:930-938.
- Willson, M. F. 1966. Breeding ecology of the yellow-headed blackbird. *Ecol. Monogr.* 36:51-77.

Willson, M. F., and G. H. Orians. 1963. Comparative ecology of red-winged and yellow-headed blackbirds during the breeding season. *Proc. 16th Int. Congr. Zool.* 3:342-346.

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Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. *California's Wildlife*. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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SAN DIEGO POCKET MOUSE

Chaetodipus fallax

Family: HETEROMYIDAE
M094

Order: RODENTIA

Class: MAMMALIA

Written by: P. Brylski
Reviewed by: H. Shellhammer
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common resident of sandy herbaceous areas, usually in association with rocks or coarse gravel (Grinnell 1933, Miller and Stebbins 1964) in southwestern California. In San Diego Co., occurs mainly in arid coastal and desert border areas. Range also includes portions of Riverside and San Bernardino cos. Elevational range is from sea level to 1350 m (4500 ft) (Santa Rosa Mts., Riverside Co.) and 1800 m (6000 ft) (Cactus Flat, north slope San Bernardino Mts.). Habitats of the San Diego pocket mouse include coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Forages on seeds of forbs, grasses, and shrubs. Meserve (1976b) reported a low to moderate preference for forb and shrub seeds, and a high preference for grass seeds. Seeds are transported in cheek pouches and stored in and around the burrow. Some insects are eaten.

Cover: Miller and Stebbins (1964) reported highest densities in rocky/gravelly areas with a yucca overstory, and in desert scrub near or in the pine-juniper belt. Burrows are excavated in gravelly or sandy soil and used for daytime resting, predator escape, and care of young.

Reproduction: No data found.

Water: Water is obtained metabolically from leafy vegetation, seeds, and probably also from insects.

Pattern: Moderate canopy coverage of arid shrubland or pinyon-juniper habitats on or near rocky slopes and sandy areas.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Active year-round although surface activity reduced during cold spells.

Seasonal Movements/Migration: None reported.

Home Range: Home range in southern California (Claremont) varied from 0.19 to 0.45 ha (0.5 to 1.12 ac), averaging 0.36 ha (0.9 ac) for males and 0.25 ha (0.62 ac) for females (MacMillen 1964).

Territory: Probably same size as home range.

Reproduction: Breeding occurs chiefly from March to May. An average of 4 young comprise a litter. Gestation 24-26 days (Hayden et al. 1966).

Niche: Nocturnal granivore in arid coastal and desert scrub areas, in association with rocky, gravelly, or sandy ground. Predators include foxes, coyotes, badgers, owls, and snakes.

REFERENCES

- Grinnell, J. 1933. Review of the recent mammal fauna of California. Univ. Calif. Publ. Zool. 40:71-234.
- Hayden, P., J. J. Gambino, and R. G. Lindberg. 1966. Laboratory breeding of the little pocket mouse, *Perognathus longimembris*. J. Mammal. 47:412-423.
- MacMillen, R. E. 1964. Population ecology, water relations and social behavior of a southern California semidesert rodent fauna. Univ. Calif. Publ. Zool. 71:1-59.
- Meserve, P. L. 1976b. Food relationships of a rodent fauna in a California coastal sage scrub community. J. Mammal. 57:300-319.
- Miller, A. H., and R. C. Stebbins. 1964. The lives of desert animals in Joshua Tree National Monument. Univ. California Press, Berkeley. 452pp.

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Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

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BLACK-TAILED JACKRABBIT

Lepus californicus

Family: LEPORIDAE
M051

Order: LAGOMORPHA

Class: MAMMALIA

Written by: C. Polite
Reviewed by: M. White
Edited by: M. White

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common throughout the state, except at the highest elevations. Abundant at lower elevations in herbaceous and desert-shrub areas and open, early stages of forest and chaparral habitats.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Strictly herbivorous; graze and browse. They prefer grasses and forbs but will eat almost any vegetation that occurs in the area, up to about 51 cm (20 in) above the ground. Chew and Chew (1970) found 65% of the diet was shrub browse, and 30% was herbage. Diet changes with forage availability by season. Coprophagous (Flinders and Hansen 1972).

Cover: Uses shrubs for cover.

Reproduction: Young are born beneath vegetation that provides some overhead cover. As in other hares (Genus *Lepus*) no special nest structure is built.

Water: Water is not necessary, but it will be drunk if available.

Pattern: Intermediate canopy stages of shrub habitats, and open shrub/herbaceous and tree/herbaceous edges provide suitable habitat.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong diurnal and crepuscular activity.

Seasonal Movements/Migration: Non-migratory.

Home Range: Home ranges in California averaged 18.5 ha (45 ac) (Lechleitner 1958). In Kansas, Tiemeier (1965) estimated home ranges from 4-79 ha (10-194 ac). In Utah, densities have been calculated at 100 per km² (260/mi²) (Flinders and Hansen 1973).

Territory: Probably not territorial, at least in Kansas (Tiemeier 1965).

Reproduction: Breeds throughout the year, with greatest number of births occurring from April through May (Ingles 1965). Gestation period is 43 days. Up to 4 litters of 3-4 young (range 1-8) produced per yr. Young weaned at 3 wks. A yr-old female may produce 14, or more, young per yr (Ingles 1965). Populations may fluctuate in 3-6-yr intervals, and may increase up to 9-fold. This species mostly is solitary, except when mating and raising young.

Niche: Because of their great adaptability, and rapid rate of reproduction, black-tailed hares can become pests. Tularemia, plague, and skin diseases are carried by this species.

Predators include coyotes, eagles, northern harriers, barn owls, red-tailed hawks, great horned owls, rattlesnakes, and gopher snakes. Competitors for food primarily include other grazers and browsers. Also called black-tailed jackrabbit.

REFERENCES

- Chew, R. M., and A. E. Chew. 1970. Energy relationships of the mammals of a desert shrub
Flinders, J. T., and R. M. Hansen. 1972. Diets and habits of jackrabbits in northeastern
Colorado. Colorado State Univ., Range Sci. Dep. Sci. Ser. 12. 29pp.
Flinders, J. T., and R. M. Hansen. 1973. Abundance and dispersion of leporids within a
shortgrass ecosystem. *J. Mammal.* 54:287-291.
Ingles, L. G. 1965. Mammals of the Pacific states. Stanford Univ. Press, Stanford, CA.
506pp.
Lechleitner, R. R. 1958. Movements, density, and mortality in a black-tailed jackrabbit
population. *J. Wildl. Manage.* 22:371-384.
Lechleitner, R. R. 1959. Sex ratio, age classes and reproduction of the black-tailed
jackrabbit. *J. Mammal.* 40:63-81.
Orr, R. T. 1940. The rabbits of California. *Calif. Acad. Sci. Occas. Pap. No. 19.* 227pp.
Tiemeier, O. W. 1965. The black-tailed jackrabbit in Kansas. Kansas State Univ. Agric. Exp.
Sta., Manhattan. Contrib. No. 336. 75pp.

M051

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in:
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SMALL-FOOTED MYOTIS

Myotis ciliolabrum

Family: VESPERTILIONIDAE
M029

Order: CHIROPTERA

Class: MAMMALIA

Written by: J. Harris

Reviewed by: P. Brown

Edited by: S. Granholm, R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The small-footed myotis is a common bat of arid uplands in California. In coastal California it occurs from Contra Costa Co. south to the Mexican border. It also occurs on the west and east sides of the Sierra Nevada, and in Great Basin and desert habitats from Modoc to Kern and San Bernardino cos. It occurs in a wide variety of habitats, primarily in relatively arid wooded and brushy uplands near water. The summer and winter ranges appear to coincide, but there are few records from winter. This species is found from sea level to at least 2700 m (8900 ft).

SPECIFIC HABITAT REQUIREMENTS

Feeding: This species feeds on a variety of small flying insects. Prey includes moths, flies, beetles, and bugs. Foraging flight is slow and maneuverable. The small-footed myotis often is seen foraging among trees and over water.

Cover: This bat seeks cover in caves, buildings, mines, crevices, and occasionally under bridges and under bark. Separate night roosts may be used, and have been found in buildings and caves. Groups of 50, or more, may inhabit a hibernation site.

Reproduction: Maternity colonies of females and young are found in buildings, caves, and mines. Such colonies usually contain 12-20 individuals.

Water: This species requires water, and often is seen to drink soon after emergence. Humid roost sites are preferred.

Pattern: The small-footed myotis is a bat of arid, upland habitats. It prefers open stands in forests and woodlands as well as brushy habitats. Streams, ponds, springs, and stock tanks are used for drinking and feeding.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Hibernates. Emerges at sunset. Reported activity peaks include 30 min after sunset and 2-3 hr after sunset (Cockrum and Cross 1964, Jones 1965). This species hibernates from November-March. It has a remarkable tolerance for cold, often hibernating in cold, drafty sites.

Seasonal Movements/Migration: Probably makes local movements to suitable hibernacula.

Home Range: No data found.

Territory: No data found.

Reproduction: Mates in the fall. The young are born from May through June, with a peak in late May. Usually there is a single young, but twins are common (Tuttle and Heaney 1974). Lactating females were found in June and July in New Mexico (Findley et al. 1975). Most young are flying by mid-August. Maximum recorded longevity is 12 yr (Paradiso and Greenhall 1967).

Niche: This species may be found feeding or roosting with other bat species.

REFERENCES

- Barbour, R. W., and W. H. Davis. 1969. Bats of America. Univ. of Kentucky Press, Lexington. 286pp.
- Black, H. L. 1974. A north temperate bat community: structure and prey populations. J. Mammal. 55:138-157.
- Cockrum, E. L. 1952. Mammals of Kansas. Univ. Kansas Publ. Mus. Nat. Hist. No. 7. 303pp.
- Cockrum, E. L., and S. P. Cross. 1964. Time of bat activity over waterholes. J. Mammal. 45:635-636.
- Davis, R., and E. L. Cockrum. 1963. Bridges utilized as day roosts by bats. J. Mammal. 44:428-430.
- Davis, W. H. 1955. *Myotis subulatus leibii* in unusual situations. J. Mammal. 36:130.
- Fenton, M. B. 1972. Distribution and overwintering of *Myotis leibii* and *Eptesicus fuscus* (Chiroptera:Vespertilionidae) in Ontario. Life Sci. Occas. Pap. R. Ont. Mus. 21:1-8.
- Findley, J. S., A. H. Harris, D. E. Wilson, and C. Jones. 1975. Mammals of New Mexico. Univ. New Mexico Press. Albuquerque. 360pp.
- Jones, C. 1965. Ecological distribution and activity records of bats of the Mogollon Mountains area of New Mexico and adjacent Arizona. Tulane Studies Zool. 12:93-100.
- Koford, C. B., and M. R. Koford. 1948. Breeding colonies of bats, *Pipistrellus hesperus* and *Myotis subulatus melanorhinus*. J. Mammal. 29:417-418.
- Martin, R. L., J. T. Pawluk, and T. B. Clancy. 1966. Observations on hibernation of *Myotis subulatus*. J. Mammal. 47:348-349.
- Paradiso, J. L., and A. M. Greenhall. 1967. Longevity records for American bats. Am. Midl. Nat. 78:251-252.
- Studier, E. H., J. W. Proctor, and D. J. Howell. 1970. Diurnal body weight loss and tolerance of weight loss in five species of *Myotis*. J. Mammal. 51:302-309.
- Tuttle, M. D., and L. R. Heaney. 1974. Maternity habits of *Myotis leibii* in South Dakota. South. Calif. Acad. Sci. Bull. 73:80-83.
- Whitaker, J. O., Jr., C. Maser, and S. P. Cross. 1981. Food habits of eastern Oregon bats, based on stomach and scat analyses. Northwest Sci. 55:281-292.

California Wildlife Habitat Relationships System
California Department of Fish and Wildlife
California Interagency Wildlife Task Group

YUMA MYOTIS

Myotis yumanensis

Family: VESPERTILIONIDAE
M023

Order: CHIROPTERA

Class: MAMMALIA

Written by: J. Harris

Reviewed by: P. Brown

Edited by: S. Granhom, R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The Yuma myotis is common and widespread in California. It is uncommon in the Mojave and Colorado Desert regions, except for the mountain ranges bordering the Colorado River Valley. Found in a wide variety of habitats ranging from sea level to 3300 m (11,000 ft), but it is uncommon to rare above 2560 m (8000 ft). Optimal habitats are open forests and woodlands with sources of water over which to feed.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Feeds on a wide variety of small flying insects found by echolocation. This species usually feeds over water sources such as ponds, streams, and stock tanks. Prey includes moths, midges, flies, termites, ants, homopterans, and caddisflies (Easterla and Whitaker 1972, Black 1974, Whitaker et al. 1977, 1981). The Yuma myotis is an efficient forager, sometimes returning to the roost with a full stomach 15 min after dusk (Barbour and Davis 1969). These bats respond to temporary patches of prey, such as ant swarms (Vaughan 1980), although many authors report that regular foraging routes are followed.

Cover: The Yuma myotis roosts in buildings, mines, caves, or crevices. The species also has been seen roosting in abandoned swallow nests and under bridges. Separate, often more open, night roosts may be used.

Reproduction: Maternity colonies of several thousand females and young may be found in buildings, caves, mines, and under bridges. Warm, dark sites are preferred. Individuals are clustered tightly in the warmest sites when temperatures are low. If temperatures exceed 40°C, bats seek cooler locations, and individuals roost farther apart.

Water: The Yuma myotis has a relatively poor urine concentrating ability, and frequently is observed drinking.

Pattern: Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water. Open forests and woodlands are optimal habitat.

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Hibernates. This species emerges soon after sunset in many areas (Barbour and Davis 1969), but Jones (1965) reported that peak activity was 1-2.5 hr after sunset. Warm temperatures are preferred, and activity may be extended on warm nights. Winter habits are poorly known, but this species apparently hibernates.

Seasonal Movements/Migration: Probably makes local or short migrations to suitable hibernacula. Individuals that spend the summer at high elevations probably move downslope.

Home Range: No data found.

Territory: Territoriality has not been reported. Probably not territorial at feeding or roosting sites; roosts in large groups.

Reproduction: The Yuma myotis, like other California bats, mates in the fall. Dalquest (1947) reported that the season of births lasted from late May to mid-June with a peak in early June. It is likely that some young are born in July in some areas. A single litter of 1 young is produced yearly. The species may live up to 8.8 years (Cockrum 1973).

Niche: The Yuma myotis may be found feeding and roosting with other bat species, such as *Tadarida brasiliensis* and *Antrozous pallidus*.

Comments: This species is difficult to distinguish from *M. lucifugus*, with which it may occasionally hybridize (Harris 1974, Parkinson 1979).

REFERENCES

- Barbour, R. W., and W. H. Davis. 1969. *Bats of America*. Univ. of Kentucky Press, Lexington. 286pp.
- Black, H. L. 1974. A north temperate bat community: structure and prey populations. *J. Mammal.* 55:138-157.
- Cockrum, E. L. 1973. Additional longevity records for American bats. *J. Ariz. Acad. Sci.* 8:108-110.
- Dalquest, W. W. 1947. Notes on the natural history of the bat *Corynorhinus rafinesquii* in California. *J. Mammal.* 28:17-30.
- Easterla, D. A., and J. O. Whitaker, Jr. 1972. Food habits of some bats from Big Bend National Park, Texas. *J. Mammal.* 53:997-890.
- Findley, J. S., A. H. Harris, D. E. Wilson, and C. Jones. 1975. *Mammals of New Mexico*. Univ. New Mexico Press, Albuquerque. 360pp.
- Geluso, K. N. 1978. Urine concentrating ability and renal structure of insectivorous bats. *J. Mammal.* 59:312-323.
- Harris, A. H. 1974. *Myotis yumanensis* in interior southwestern North America, with comments on *Myotis lucifugus*. *J. Mammal.* 55:589-607.
- Jones, C. 1965. Ecological distribution and activity records of bats of the Mogollon Mountains area of New Mexico and adjacent Arizona. *Tulane Studies Zool.* 12:93-100.
- Licht, P., and P. Leitner. 1967. Behavioral responses to high temperatures in three species of California bats. *J. Mammal.* 48:52-61.
- Maser, C., B. R. Mate, J. F. Franklin, and C. T. Dyrness. 1981. *Natural history of Oregon coast mammals*. Pac. Northwest For. And Range Exp. Sta., USDA, For. Serv., Gen. Tech. Rep., PNW-133. 496pp.
- Parkinson, A. 1979. Morphologic variation and hybridization on *Myotis yumanensis sociabilis* and *Myotis lucifugus carissima*. *J. Mammal.* 60:489-504.
- Sumner, L., and J. S. Dixon. 1953. *Birds and mammals of the Sierra Nevada*. Univ. California Press, Berkeley. 484pp.
- Vaughan, T. A. 1980. Opportunistic feeding in two species of *Myotis*. *J. Mammal.* 61:118-119.
- Whitaker, J. O., Jr., C. Maser, and L. E. Keller. 1977. Food habits of bats of western Oregon. *Northwest Sci.* 51:46-55.
- Whitaker, J. O., Jr., C. Maser, and S. P. Cross. 1981. Food habits of eastern Oregon bats, based on stomach and scat analyses. *Northwest Sci.* 55:281-292.

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DESERT WOODRAT

Neotoma lepida

Family: MURIDAE
M126

Order: RODENTIA

Class: MAMMALIA

Written by: P. Brylski

Reviewed by: H. Shellhammer

Edited by: R. Duke

Updated by: CWHR Program Staff, February 2008

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The desert woodrat occurs in California in 2 disjunct areas. It is found in northeastern California in Great Basin areas of eastern Modoc Co. to southeastern Lassen Co. Inhabits virtually all of southern California, with range extending northward along the coast to Monterey Co., and along the Coast Range to San Francisco Bay. In southeastern California, found from southern Mono Co. south throughout the Mojave Desert and from north-central Tulare Co. south through the Tehachapi and San Bernardino Mts. Common to abundant in Joshua tree, pinyon-juniper, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats. Also found in a variety of other habitats. Most abundant in rocky areas with Joshua trees. Elevational range from sea level to 2600 m (8500 ft). Northern and elevational distribution may be limited by temperature (Lee 1963, MacMillen 1964).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Eats buds, fruits, seeds, bark, leaves, and young shoots of many plant species. In coastal scrub, prefers live oak, chamise, and buckwheat as food plants (Meserve 1974). Creosote, cholla, and prickly-pear are eaten in the Mojave Desert (MacMillen 1964, Cameron and Rainey 1972). In juniper/sagebrush habitats, ate Mormon-tea, rattlesnake weed, mustard, sagebrush, and buckwheat (Stones and Hayward 1968).

Cover: Houses are constructed with twigs, sticks, cactus parts, rocks, depending on availability of building materials. The house usually is built against a rock crevice, at the base of creosote or cactus, or in the lower branches of trees. Rock crevices appear preferred where available, but woodrats generally adapt to virtually any situation. Houses are used for nesting, food caching, and predator escape.

Reproduction: Nests of dried vegetation, usually fibrous grass parts or shredded stems, are located within the stick house. Suitable nesting sites or nesting materials may limit distribution.

Water: Largely dependent upon prickly pear for water balance in desert habitats, although can be sustained on creosote year-round (Lee 1963, MacMillen 1964).

Pattern: Moderate to dense canopies preferred. Desert woodrats are particularly abundant in rock outcrops and rocky cliffs and slopes (Hall 1946, Miller and Stebbins 1964).

SPECIES LIFE HISTORY

Activity Patterns: Active yearlong. Mainly nocturnal, but also crepuscular and occasionally diurnal (Stones and Hayward 1968, Miller and Stebbins 1964).

Seasonal Movements/Migration: None.

Home Range: In coastal sage scrub, home range was about 0.04 to 0.2 ha (0.10 to 0.5 ac) (MacMillen 1964, Bleich and Schwartz 1975). Average linear movements in same habitat were about 14 m (46 ft)/night. In sagebrush-juniper habitat, males moved 80 m (262 ft)/night, and females 45 m (147 ft) (Stones and Hayward 1968). In coastal sage habitat, density averaged 3.5 to 12.3/ha (1.4 to 4.9/ac) in one study (MacMillen 1964) and 30/ha (12/ac) in another (Bleich and Schwartz 1975). In jumping cholla cactus habitat, density averaged 38/ha (15/ac) (Brown et al. 1972). In sagebrush-juniper habitat densities averaged 2.8/ha (1.1/ac) (Stones and Hayward 1968).

Territory: Aggressively solitary. Territory probably equals home range. Woodrats may defend succulent plants (water sources) against other species, and perhaps prevent other species from obtaining water during droughts (MacMillen 1964).

Reproduction: Breeds from October to May, depending on the habitat. Nesting is solitary. Gestation period is 30-36 days (Egoscue 1957). Litter size averages 2.7 (range 1-5) (Egoscue 1957, MacMillen 1964). Polyestrous in lab, but probably breeds once/yr in wild (Egoscue 1957). Weaning is at 27-40 days (Egoscue 1957, Cameron 1973). Females may breed at 2-3 mo of age.

Niche: The desert woodrat is a moderate-sized folivore/granivore. Competitors include cricetid and heteromyid rodents. Woodrat houses provide shelter for a variety of small vertebrates. Predators include snakes, owls, and predatory mammals. This woodrat is commonly parasitized by bot fly larvae.

REFERENCES

- Bleich, V. C., and O. A. Schwartz. 1975. Observations on the home range of the desert woodrat, *Neotoma lepida intermedia*. *J. Mammal.* 56:518-519.
- Brown, J. H., G. A. Lieberman, and W. F. Dengler. 1972. Woodrats and cholla: dependence of a small mammal population on the density of cacti. *Ecology* 53:310-313.
- Cameron, G. N. 1973. Effect of litter size on postnatal growth and survival in the desert woodrat. *J. Mammal.* 54:251-256.
- Cameron, G. N., and D. G. Rainey. 1972. Habitat utilization by *Neotoma lepida* in the Mohave Desert. *J. Mammal.* 53:251-266.
- Egoscue, H. J. 1957. The desert woodrat: a laboratory colony. *J. Mammal.* 38:472-481.
- Hall, E. R. 1946. *Mammals of Nevada*. Univ. California Press, Berkeley. 710pp.
- Lee, A. K. 1963. The adaptations to arid environments in woodrats of the genus *Neotoma*. *Univ. Calif. Publ. Zool.* 64:57-96.
- MacMillen, R. E. 1964. Population ecology, water relations and social behavior of a southern California semidesert rodent fauna. *Univ. Calif. Publ. Zool.* 71:1-59.
- Meserve, P. L. 1974. Ecological relationships of two sympatric woodrats in a California coastal sage scrub community. *J. Mammal.* 55:442-447.
- Miller, A. H., and R. C. Stebbins. 1964. *The lives of desert animals in Joshua Tree National Monument*. Univ. California Press, Berkeley. 452pp.
- Stones, R. C., and C. L. Hayward. 1968. Natural history of the desert woodrat, *Neotoma lepida*. *Am. Midl. Nat.* 80:458-476. tions and their impact on desert rangelands. *New Mexico State Univ. Agric. Exp. Stat. Bull. No. 555.* 17pp. sites. *Southwest. Nat.* 23:401-407.
- Schnell, J. H. 1968. The limiting effects of natural predation on experimental cotton rat populations. *J. Wildl. Manage.* 32:698-711.
- World Health Organizaton. 1974. Ecology and control of rodents of public health importance. *World Health Organ. Tech. Rep. Ser.* 533. 42pp.

California Wildlife Habitat Relationships System
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California Interagency Wildlife Task Group

MULE DEER

Odocoileus hemionus

Family: CERVIDAE
M181

Order: ARTIODACTYLA

Class: MAMMALIA

Written by: G. Ahlborn

Reviewed by: M. White

Edited by: M. White, G. Ahlborn

Updated by: CWHR Program, February 2006

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 along major river corridors in the Central Valley, and in scattered desert mountain areas. 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 north-facing 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 2.81 (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

- Anderson, A. E., and O. C. Wallmo. 1984. *Odocoileus hemionus*. Mammal. Species No. 219. 9pp.
- Brown, E. R. 1961. The black-tailed deer of western Washington. Wash. State Game Dep. Bull No. 13. 124pp.
- Dasmann, R. F., and R. D. Taber. 1956. Behavior of Columbian black-tailed deer with reference to population ecology. J. Mammal. 37:143-164.
- Hall, E. R. 1981. The mammals of North America. Second ed. 2 Vols. John Wiley and Sons, New York. 1271pp.
- Ingles, L. G. 1965. Mammals of the Pacific states. Stanford Univ. Press, Stanford, CA. 506pp.
- Longhurst, W. M., A. S. Leopold, and R. F. Dasmann. 1952. A survey of California deer herds, their ranges and management problems. Calif. Dept. Fish and Game Bull. No. 6. 136pp.
- Miller, F. L. 1970. Distribution patterns of black-tailed deer (*Odocoileus hemionus columbianus*) in relation to environment. J. Mammal. 51:248-260.
- Taber, R. D., and R. F. Dasmann. 1958. The black-tailed deer of the chaparral. Calif. Dept.

- Fish and Game, Game Bull. No. 8. 163pp.
- Taylor, W. P., ed. 1956. The deer of North America. Stackpole Books, Harrisburg, PA. 668pp.
- Wallmo, O. C. 1978. Mule and black-tailed deer. Pages 31-41 in J. L. Schimdt, and D. L. Gilbert, eds. Big game of North America. Stackpole Books. Harrisburg, PA. 494pp.
- Wallmo, O. C. ed. 1981. Mule and black-tailed deer of North America. Univ., Nebraska Press, Lincoln. 605pp.

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