

*Habitat in the Coast Range and Southern California.* In the coast range, California spotted owls occupy redwood/California-laurel forests which consists of a mix of coast redwood (*Sequoia sempervirens*), California-laurel (*Umbellularia californica*), tanoak, Pacific madrone, red alder (*Alnus rubra*), and white alder (*Alnus rhombifolia*), coast live oak, Santa Lucia fir (*Abies bracteata*), and bigleaf maple (*Acer macrophyllum*) (Verner *et al.* 1992a). Spotted owls can be found at elevations below 305 m (1,000 ft) along the Monterey coast to approximately 8,500 ft (2,591 m) in the inland mountains (Stephenson and Calcarone 1999). Lower elevation (less than 3,000 ft (914 m)) birds can be found in pure oak stands and higher elevation (greater than 6,500 ft (1,981 m)) birds can be found in pure conifer stands.

Verner *et al.* (1992a) noted that California spotted owls also use riparian hardwood forest types (coast and canyon live oak, cottonwood, California sycamore, white alder, and California laurel) in southern California. Owls on Mount San Jacinto used conifer and riparian hardwood forests significantly more than would be expected based on their availability and owls on Palomar Mountain primarily used conifer or mixed forests of conifers and hardwoods. California spotted owl nest sites in the San Bernardino Mountains were more likely to be located in areas with steeper slopes and in the lower third of canyons and owl nest and roost sites in this area were more likely to be located in areas with higher canopy closure and higher basal area (the area of all trees at breast height) than random sites.

Spatial positions and vegetation types were compared between plots surrounding 144 California spotted owl territory centers and 144 random plots in the San Bernardino Mountains of southern California (Smith *et al.* 1999, Humboldt State University, *in litt.* 2002). Owl sites were significantly closer to one another than random sites, showing a clumped distribution. Owl sites contained more area of closed canopy forest, larger mean patch sizes of closed canopy forest, and lower habitat diversity than random sites. California spotted owl territories in this study were found in three vegetation types; canyon live oak/ big cone Douglas-fir (39 percent of territories), mixed conifer/hardwood (which includes canyon live oak, big cone Douglas-fir, sugar pine, white fir, Coulter pine (*P. coulteri*), incense cedar, and black oak) (28 percent of territories), and mixed conifer (which contains white fir, Jeffrey

pine, and incense cedar (33 percent of territories).

Stephenson and Calcarone (1999) estimated that there were approximately 473,473 ha (1,170,000 ac) of habitat types where spotted owls were known to reproduce (low-elevation oak/bigcone Douglas-fir, mid-elevation conifer/hardwood, and high elevation mixed conifer) within the range of the subspecies in southern California and the central Coast Ranges. The total amount of available suitable habitat in the analysis area is likely lower, because it is possible that not all habitat is currently in a condition suitable for reproduction, roosting or foraging.

*Nest Tree Characteristics.* California spotted owls nest in a variety of tree/snag species in pre-existing structures such as cavities, broken top trees, and platforms such as mistletoe brooms, debris platforms and old raptor or squirrel nests (Gutiérrez *et al.* 1992, 1995). Nest trees are often large, over 89 cm (35 in) average dbh (Gutiérrez *et al.* 1992, Steger *et al.* 1997, LaHaye *et al.* 1997), and larger than other trees in the same stand (Gutiérrez *et al.* 1992). Nest trees are also often greater than 200 years old (Gutiérrez *et al.* 1992, North *et al.* 2000). However, approximately 25 percent of nest trees out of a sample of over 250 were less than 76 cm (30 in) dbh (Gutiérrez *et al.* 1992). Although old, large trees are important to California spotted owls, intermediate-sized (28 to 61 cm (11 to 24 in)) trees were also selected by nesting (LaHaye *et al.* 1997; and trees 51 to 76 cm (20 to 30 in) dbh), roosting (Moen and Gutiérrez 1997), and foraging (Laymon 1988) owls.

*Prey and Foraging Habitat.* California spotted owls are considered prey specialists (Verner *et al.* 1992b) because they select a few key species (Verner *et al.* 1992b) among the variety of taxa on which they prey. In the upper elevations of the Sierra Nevada (about 1,200 to 1,525 m (4,000 to 5,000 ft)), the primary prey is the northern flying squirrel (*Glaucomys sabrinus*), which is most common in larger stands of mature forests (Verner *et al.* 1992b). In lower elevations of the Sierra Nevada and in southern California, the primary prey is the dusky-footed woodrat (*Neotoma fuscipes*) (Thraillkill and Bias 1989), which is most abundant in shrubby habitats and uncommon in pure conifer forests or forests with little shrub understory (Williams *et al.* 1992). Both flying squirrels and woodrats occur in the diets of owls in the central Sierra Nevada (Verner *et al.* 1992b). Home ranges of owls in areas where the primary prey is northern flying squirrels are consistently larger than those where

the primary prey is dusky-footed woodrats presumably because woodrats occur in greater densities and weigh more than flying squirrels (Zabel *et al.* 1992a). Verner *et al.* (1992b) reported that approximately 25 percent of known owl sites in the Sierra Nevada occur where woodrats are the primary prey species and 75 percent of sites occur where flying squirrels are the primary prey species.

Other prey items include gophers (*Thomomys* spp.), mice (*Peromyscus* spp.), diurnal squirrels (*Tamiasciurus douglasii*, *Sciurus griseus*, *Spermophilus beecheyi*, *Eutamias* spp.) and a variety of other rodents; shrews (*Sorex* spp.); moles (*Scapanus* spp); bats (*Myotis* spp.); birds; frogs; lizards; and insects (Verner *et al.* 1992b, Gutiérrez *et al.* 1995, Tibstra 1999). California spotted owls have low metabolic rates relative to other birds. Analysis of metabolic rates and the energy content of prey items indicates that an individual California spotted owl would need to eat one flying squirrel every 1.8 days or one woodrat every 3.7 days (Weathers *et al.* 2001).

California spotted owls in the Sierra Nevada forage most commonly in intermediate- to late-successional forests with greater than 40 percent canopy cover and a mixture of tree sizes, some larger than 61 cm (24 in) in dbh. The birds consistently use stands with significantly greater canopy cover, total live tree basal area, basal area of hardwoods and conifers, snag basal area, and dead and downed wood than are found at random locations within the forest. Studies on the Tahoe and Eldorado National Forests found that owls forage in stands with large diameter trees (defined as trees greater than 61 cm (24 in) in dbh in one study and trees 51 to 89 cm (20 to 35 in) in dbh in the other) significantly more than expected based on availability. Owls also forage in stands with trees between 30 and 61 cm (12 and 24 in) dbh and greater than 70 percent canopy cover significantly more than expected, based on the proportion of that forest type (USFS 2001a).

Stands suitable for owl foraging have: (1) At least two canopy layers; (2) dominant and codominant trees in the canopy averaging at least 28 cm (11 in) in dbh; (3) at least 40 percent canopy cover in overstory trees (30 percent canopy cover in red fir dominated forests); and (4) higher than average numbers of snags and downed woody material. California spotted owls forage in forests with ample open flying space within and beneath the canopy (Gutiérrez *et al.* 1995); therefore, extremely dense stands may not be used