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CLIFF NESTING BY NORTHERN SPOTTED OWLS (*STRIX OCCIDENTALIS CAURINA*) IN OREGON

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In the southwestern United States, Mexican Spotted Owls (*Strix occidentalis lucida*) and California Spotted Owls (*S. o. occidentalis*) nest on ledges in cliffs or caves, especially in regions where they are associated with steep, rocky canyons (Gutiérrez et al. 1995, Seamans and Gutiérrez 1995, May et al. 2004). In contrast, Northern Spotted Owls (*S. o. caurina*) nest almost exclusively in cavities or platforms in trees (Gutiérrez et al. 1995). Between 1998 and 2005, we located three pairs of Northern Spotted Owls nesting on cliffs in Oregon. To determine the number of records of Northern Spotted Owls nesting on cliffs, we queried other Spotted Owl researchers. We discovered two additional records of successful cliff nesting by Northern Spotted Owls. Four of the nests were small caves embedded in cliffs and the fifth was a stick nest in a small cave. All five pairs successfully produced fledglings from the cave nests. No cave nest was used more than once in 10–18 yr of observation. Here we provide physical and geological descriptions of these five nest sites.

METHODS

We measured physical and physiographic characteristics of the cliffs, cave nests, and nest sites in the fall of 2005. Aspect was measured along the major slope axis with a compass. Slope was measured from the base of the cliff by clinometer. Cliff height and length and height to cave were measured by clinometer and tape measure or laser range finder. Cave dimensions at Skip Creek and Hubbard Trib were measured by rappelling down the cliff face and placing a ruler in the cave. Samples of the cave substrate were collected at this time. Dimensions at the other three sites were obtained by swinging a tape measure affixed to a long pole up to the cave and reading the values from a distance. Vertical depth of the stick nest (Tom Fool Creek) was measured by sticking a thin rod through the sticks to the underlying rock bottom. This depth was measured at the front edge and in the middle. Elevations were determined from topographic maps.

RESULTS AND DISCUSSION

All five cliff nests were in western Oregon: four in the southern Coast Range between Roseburg and Coos Bay and one in the foothills of the Cascade Mountains southeast of Roseburg. Nests were located on lands managed by Bureau of Land Management (two nests), Oregon Department of Forestry, United States Forest Service, and Weyerhaeuser Company (Table 1). Juvenile Spotted Owls fledged from all five cave nests. The four coastal sites were in the southern portion of the Oregon Coast Range physiographic province. Three of the coastal sites (Skip Creek, Hubbard Trib, and Tom Fool Creek) were underlain by the Tyee Basin, a series of sandstone formations created by deep marine deltaic or turbidite flows in the late to middle Eocene epoch. The fourth site (Lower Sandy Creek) was underlain by the Umpqua Basin, deformed turbidite sandstones and mudstones of the Paleocene to early Eocene. The fifth site, Hibbard Point, was in the southern Oregon Cascade Range southeast of Roseburg, Oregon. The underlying rock formations were undifferentiated volcanics, tuffaceous sedimentary rocks, and basalts of the Miocene and Oligocene.

All nests were located in sandstone rock outcrops or cliffs embedded in areas that were predominately covered by forests of Douglas-fir (*Pseudotsuga menziesii*) with variable amounts of western redcedar (*Thuja plicata*), big-leaf maple (*Acer macrophyllum*), golden chinquapin (*Chrysolepis chrysophylla*), red alder (*Alnus rubra*) and Pacific madrone (*Arbutus menziesii*). Approximate age of the surrounding forests ranged from 125–300+ yr (Table 1).

Few physical patterns emerge from the measurements we took (Table 1). Elevation of the four Coast Range sites was <460 m. There was no obvious pattern of aspect. Four nests were near the cliff middle or in the bottom half of the cliff. Caves similar to the nest caves were common at all heights on the cliffs. All nests were situated such that the openings were in the live upper canopy of the adjacent trees. The cave nest heights we observed were less than the average tree cavity nest height for Northern Spotted Owls (LaHaye and Gutiérrez 1999, Hershey et al. 1998), and were similar to California Spotted Owl tree nest

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Table 1. General, physiographic and physical characteristics of the Spotted Owl nests and surrounding areas. All measurements are in meters unless specified.

CHARACTERISTICS	NEST SITE				
	SKIP CREEK	HUBBARD TRIB	TOM FOOL ¹	HIBBARD POINT ²	LOWER SANDY CREEK
Stand age (yr)	123	226	126	300+	126
Elevation (m)	460	280	170	1160	370
Aspect	170°	160°	225°	300°	0°
Cliff					
Height (m)	20	23	40	42	55
Length (m)	25	50	180	32	45
Slope					
Base	42°	42°	70°	40°	35°
Cliff face	78°	85°	—	69°	90°
Nest height (m)	7.2	18	17	22	10
Opening					
Height (m)	0.3	0.3	0.4	0.3	0.3
Width (m)	0.7	0.3	0.7	0.2	0.6
Internal					
Height (m)	0.5	0.2	0.5	—	0.5
Width (m)	0.6	0.8	1.1	—	0.6
Depth (m)	0.8	0.5	0.6	—	0.5

¹ The cliff face was an overhanging slope of 10° from vertical.

² Internal dimensions of Hibbard Point nest not measured because the cave was too difficult to access.

heights (LaHaye et al. 1997). The range of nest heights for Mexican Spotted Owls reported by May et al. (2004) overlaps the range of cave nest heights we observed. Cliff nest heights may be a function of position relative to the canopy. Nest locations may conceal entering and exiting, as well as provide easily accessible adult roosts and perches for fledglings.

In all cases, the caves appeared to have been formed by cavernous weathering, a poorly understood mechanism of cave formation (Matsukura and Tanaka 2000). Nest substrates at four sites consisted of accumulated fine sand and organic matter. Small mammal feces, small bone fragments, and moss were present in the substrate at Skip Creek, Hubbard Trib, and Hibbard Point. Horizontal depth of the stick nest at Tom Fool Creek was 0.18 m deep on the front edge and 0.09 m deep in the middle. Horizontal depth of the stick nest at the back of the cave appeared to be less than the depth at the middle, but could not be measured accurately. Nest diameter was identical to the cave's dimensions. The single stick nest's depth and diameter were similar to the values reported for the Mexican Spotted Owl nests (May et al. 2004).

The absence of nest structures in trees does not explain the selection of cave nests. Tree nests were used at four of the sites in other years. Distances from cave nest to tree nest ranged from 150–1600 m. The Hubbard Trib and Hibbard Point pairs both nested in a tree the year after nesting in the cave. Neither pair produced fledglings from their tree nest. Different pairs of Spotted Owls at the Tom Fool, Hibbard Point, and Lower Sandy Creek sites success-

fully nested in trees in at least 1 yr. The cave nest at Skip Creek was the only known nesting substrate at that site. Identity of adult owls at all sites was confirmed using colored leg bands and numbered U.S. Fish and Wildlife Service bands.

NIDIFICACIÓN EN ACANTILADOS DE *STRIX OCCIDENTALIS CAURINA* EN OREGÓN

RESUMEN.—El búho *Strix occidentalis lucida* nidifica ocasionalmente en acantilados o en cuevas, mientras que la subespecie *caurina* nidifica casi exclusivamente en árboles. Describimos las características físicas y geológicas de cinco nidos en cuevas de *S. occidentalis caurina*. Los cinco nidos estuvieron en el oeste de Oregon y todos se encontraron en afloramientos de rocas de arenisca o en acantilados. Las características fisiográficas de los sitios de los nidos en acantilados fueron similares a aquellas de los sitios de los nidos en árboles. La altura y dimensiones de los nidos de la subespecie *caurina* fueron similares a la de los nidos de las subespecies *lucida* y *occidentalis*.

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LITERATURE CITED

- GUTIÉRREZ, R.J., A.B. FRANKLIN, AND W.S. LAHAYE. 1995. Spotted Owl (*Strix occidentalis*). In A. Poole and F. Gill [EDS.], The birds of North America, No. 179. The Academy of Natural Sciences, Philadelphia, PA; and the American Ornithologists' Union, Washington, DC U.S.A.
- HERSHEY, K.T., E.C. MESLOW, AND F.L. RAMSEY. 1998. Characteristics of forests at Spotted Owl nest sites in the Pacific northwest. *J. Wildl. Manage.* 62:1398–1410.
- LAHAYE, W.S. AND R.J. GUTIÉRREZ. 1999. Nest sites and nesting habitat of the Northern Spotted Owl in northwestern California. *Condor* 101:324–330.
- , ———, AND D.R. CALL. 1997. Nest-site selection and reproductive success of California Spotted Owls. *Wilson Bull.* 109:42–51.
- MATSUKURA, Y. AND Y. TANAKA. 2000. Effect of rock hardness and moisture content on tafoni weathering in the granite of Mount Doeg-sung, Korea. *Geogr. Ann. Ser. A: Phys. Geogr.* 82:59–67.
- MAY, C.A., M.L. PETERSBURG, AND R.J. GUTIÉRREZ. 2004. Mexican Spotted Owl nest- and roost-site habitat in northern Arizona. *J. Wildl. Manage.* 68:1054–1064.
- SEAMANS, M.E. AND R.J. GUTIÉRREZ. 1995. Breeding habitat of the Mexican Spotted Owl in the Tularosa Mountains, New Mexico. *Condor* 97:944–952.

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