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Osprey Nest Site Characteristics in Yellowstone National Park.—Osprey (*Pandion haliaetus*) nest site characteristics have changed in some areas due to silvicultural practices and the introduction of artificial structures (Reese 1969, Henny et al. 1974). In eastern North America, the proportion of Osprey nest sites that is located on artificial structures varies from about 70% in portions of Nova Scotia and on the Atlantic coast from New Jersey through Virginia (Henny et al. 1974, Henny et al. 1977, Prévost et al. 1978) to 6% in the coastal Carolinas (Henny and Noltemeier 1975). Nesting by Ospreys on artificial structures is uncommon in Florida, but may be increasing in some areas (Schreiber and Schreiber 1977). In the western United States, it varies from 16% in northern Idaho and northeastern Washington (Melquist and Johnson 1975) to <10% in northern California and Oregon (Henny et al. 1978a; Henny et al. 1978b). Because of the changes occurring in the use of nest sites by Ospreys, it is of interest to document the nest site characteristics of Ospreys nesting in nearly pristine environments. Also, few published studies quantitatively describe natural Osprey nest sites (Mathisen 1968, Szaro 1978). Here I present data from Yellowstone National Park, where little development and no logging has occurred.

The study area encompassed Yellowstone National Park, which occupies 8,995 km^2 in the northwestern corner of Wyoming and adjacent Montana and Idaho. Almost all of the tree nests occurred in the Engelmann spruce (*Picea engelmanni*)–subalpine fir (*Abies lasiocarpa*) or the lodgepole pine (*Pinus contorta*) vegetative zones (Despain 1973). The following characteristics were measured or described for tree nests: height of nest using a Stratex Stratolevel, tree height, diameter at breast height (dbh), condition and species of the nest tree, distance to water, relationship of the nest tree to surrounding trees, and general habitat type. The study was conducted during the summers of 1972 through 1974.

Of 55 nests examined, 45 (82%) were in trees. Osprey nests were generally placed at or near the apex of the nest tree (Table 1). Of the 45 tree nests examined, 40 (89%) were

TABLE 1.

Characteristics of Osprey tree nest sites in Yellowstone National Park.

Parameter	Mean or percent	Range	*n*
Nest height (m)	22.8	6–33	45
Tree height (m)	23.1	10–33	45
Tree dbh (cm)	58.9	28.2–136.4	45
Distance to water (m)	121	2–1,430	45
Species of tree:			
Lodgepole pine	39%		13
Engelmann spruce	30%		10
Subalpine fir	30%		10
Relationship of nest tree to surrounding trees[1]:			
Larger	73%		33
Similar	16%		7
Smaller	11%		5

[1] Comparing height, or dbh if of similar height.

TABLE 2.

Relationship between burns and the condition of Osprey nest trees.

Nest location	Tree condition					
	Living		Dead		Total	
	n	Percent	*n*	Percent	*n*	Percent
In a burn	0	0	13	100	13	29
Not in a burn	18	56	14	44	32	71
Totals	18	40	27	60	45	100

located in trees with broken tops. Apparently tree morphology was more important than tree species, because in only two instances (6%) did the Ospreys nest in a tree that was not one of the common tree species in the immediate area. Mathisen (1968), however, noted selection for tree species by nesting Ospreys in Minnesota. Most Osprey nests were placed in a tree that was taller than the surrounding trees (Table 1).

Fire is an integral part of Yellowstone Park. Of the Osprey tree nests examined, 29% occurred in burns, all of which were in dead trees. Other nests were divided among dead and living trees (Table 2), suggesting overall selection for dead trees because they were far less common than living trees. Mathisen (1968) reported that 80% of the Osprey nests he observed in Minnesota were in dead trees, and Reese (1977) found that 69% of Osprey nests in trees in the Chesapeake Bay area were in dead trees. Fires may produce nesting sites for Ospreys by creating snags, but burns did not seem to influence nesting distribution on lakes where 12% of 32 nests were in burns. However, 69% of the 13 tree nests located along rivers and streams were in burns. This difference is significant ($\chi^2_c = 11.85$, $P < 0.01$) and may be due to a preference to nest near openings, or because trees with broken tops may have been common near the lake shores, where winds sweeping across the lakes would probably strike the trees with greater force than in continuous forest areas. In areas of continuous forest, broken trees might be uncommon except in burns.

Ten pinnacle nests (18% of the total nests) were occupied during this study. All were located in the Grand Canyon of the Yellowstone. This canyon, the largest in the Park, is 300–450 m deep and 32 km long. It contains many rhyolite pinnacles, especially in the upper 8 km.

In areas where pinnacles were present, no Osprey nests were located in trees although trees were abundant there. Ospreys nesting on pinnacles in the Grand Canyon foraged primarily on the Yellowstone River at the mouth of Alum Creek above the Canyon and at Grebe Lake, 4.5 and 6.5 km from the nests, respectively. In contrast, Ospreys nesting on Yellowstone Lake foraged near their nests (Swenson 1978). This suggests that pinnacles were selected over trees for nest sites, perhaps as an expression of the same behavior exhibited by Ospreys nesting on artificial structures in other areas. Ospreys nesting on artificial nesting structures in Michigan were more productive than Ospreys nesting in trees due to fewer blow-downs (Postupalsky 1978), and Ospreys nesting on offshore structures in the Chesapeake Bay area were more productive than those using terrestrial sites due to reduced predation (Reese 1977). However, the productivity of Ospreys nesting in the Grand Canyon of the Yellowstone was not statistically different from that of other stream-nesting Ospreys, and only 5 (4%) of the 130 active nests observed in Yellowstone National Park from 1972–1977 were destroyed by wind (Swenson 1979).

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A Technique For Vasectomizing Birds.—The Masked Bobwhite (*Colinus virginianus ridgwayi*) was once common over much of northern Sonora, Mexico, and southcentral Arizona. Because of extensive habitat alteration, the bird was reduced to a few remnant populations in Sonora (Tomlinson, 1972), and until recently, reintroduction efforts, begun as early as 1937, were largely unsuccessful (Ellis et al., 1978). Vasectomized wild-caught Texas Bobwhite (*C. v. texanus*) males were used as surrogate parents for the Masked Bobwhite chicks. In our program, it was essential that there be no possibility that the foster parents interbreed with the endangered birds in subsequent years. Although Bray et al. (1975) vasectomized Red-winged Blackbirds (*Agelaius phoeniceus*) by precloacal ligation, we used laparotomy and surgical removal of a segment of the vas deferens to assure permanent sterility.

The procedures used in restraining and surgically opening the quail are much like