

California Ospreys Begin Incubation at a Frozen Mountain Lake.—

Three nesting Ospreys (*Pandion haliaetus*) in incubating position were noted at McCoy Flat Reservoir, Lassen County, on 15 May 1975, while the reservoir was still frozen. The 1,800-acre reservoir located at 5,555 foot elevation is the highest elevation in our northern California Osprey survey area (Henny et al. Ms.) where nesting Ospreys were observed. No mates to the incubating birds were observed in the vicinity and the nearest open water was about 3 miles away.

Ospreys begin nesting over most of their range after ice has melted. Why would Ospreys begin incubating under less than ideal conditions (i.e., cold temperatures and consequent increased energy expenditure required for adequate incubation of eggs) at high elevations? Part of the answer may be found in the time required to complete the nesting cycle for the species, coupled with the shorter nesting season at higher altitudes. Garber and Koplin (1972) report the Osprey incubation period as 38 days; Stotts and Henny (1975) report 54 days (range 48 to 59) from hatching until the first flight. Stinson (1977) reported post-fledging dependency ends by the time the young are about 93-103 days old. Thus, 131-141 days are required from beginning of incubation until the young are independent of the adults. Beebe (1974) stated that the postfledging association may endure for about 60 days in climates that permit it; however, the period is shortened to less than one half that time in the more northerly areas. He indicated that the degree of dependence by the young during this interval is not known with certainty, but the postfledging association may endure far past the period of actual dependence. If we use one half the postfledging period mentioned by Stinson (23 days), the period from beginning of incubation to independence is approximately 115 days—still a long period of time.

One can speculate about two types of strategies that nesting Ospreys can utilize in the parts of their breeding range where lakes and rivers freeze over: (1) begin egg laying after ice breakup, and risk having insufficient time for the young to fledge, or (2) begin egg laying under less than ideal conditions for the adult female. Lack (1968:304) stated, "the breeding season evolved by each species is that which results in its leaving most offspring, but it has been evolved in relation to the needs of the laying female as well as those of the young." Early nesting birds generally tend to lay the largest clutches and to raise the highest proportion of their young, and there is a growing body of evidence concerning reduced survival of late fledged birds (e.g., see Perrins, 1965). The 3-mile flight to open water may not be especially critical since some Ospreys, under normal conditions, select nesting sites 2 or 3 miles from water.

Unfortunately, the nest sites at McCoy Flat Reservoir were not revisited to determine if young fledged, but the birds at this elevation appear to be accommodating to the shorter nesting season by beginning to nest under less than ideal circumstances for the adults, hypothetically because of the higher recruitment potential. Wetmore and Gillespie (1976) recently reported sporadic Osprey nesting success at higher latitudes in Canada. They found a significant correlation between productivity and the date for "water clear of ice." The Osprey breeding strategy appears to be flexible; however, the data collected in Canada suggest that the nesting period cannot be accommodated under all conditions.

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