

---

## Osprey Surveys in the Flathead Valley, Montana, 1977 to 1980

R. W. KLAVER, J. M. SMITH, J. J. CLAAR,  
B. L. BETTS, AND L. C. PETERSON

**ABSTRACT.**—The Osprey nesting population was monitored in the Flathead Valley between 1977 and 1980 by initiating data collection for the lower Flathead River and continuing surveys on Flathead Lake. Results indicate a 'healthy' population with an average of 2.25 young per successful nest (2.18 young per active nest) on the lower Flathead River between 1978 and 1980, an average of 1.94 young per successful nest on the south half of Flathead Lake in 1979 and 1980, and 2.48 young per successful nest in the North Valley in 1979. The Flathead Valley, as a whole, produced 2.24 fledglings per successful nest. These data and other observations indicate a continuing upward trend in the Osprey population. The lower breeding rate for Ospreys nesting on Flathead Lake compared with those along the river may be due to the lake's oligotrophic nature and the longer time the birds spend traveling between fishing and nest sites.

Ospreys (*Pandion haliaetus*) have been intensively studied since Ames and Mersereau (1964) documented the dramatic crash of the Connecticut River population. Ospreys along the Atlantic Coast and in the Great Lakes Region declined between 1940 and 1970 and began to recover slightly after 1970 (Henny 1977). Pesticides, specifically DDT and its metabolites, were implicated for the low productivity and declining numbers (Ames 1966, Hickey and Anderson 1968, Anderson and Hickey 1972, Wiemeyer et al. 1975, Henny 1977). Few baseline data were available for western Ospreys prior to the late 1960's, but Henny (1977) believed that they were not as seriously affected as the eastern populations.

Ospreys were studied at Flathead Lake between 1966 and 1977 by the MacCarters (D. L. MacCarter 1972, D. S. MacCarter 1972, MacCarter and MacCarter 1978 and 1979). They gathered data on reproductive performance, nest site characteristics, pesticide contamination, and food habits. Peterson (unpublished data) flew surveys to map Osprey nest locations from 1973 to 1975 in the Flathead Basin. The objective of this study was to monitor the reproductive success of Ospreys in the Flathead Valley by initiating data collection on the lower Flathead River and by continuing the surveillance of Flathead Lake begun by the MacCarters. As part of the U.S. Army Corps of Engineer's Lower Flathead Hydropower Study, we (RWK and JMS) collected data on the river's Osprey population between 1977 and 1979. A cooperative Bureau of Indian Affairs and U.S. Fish and Wildlife Service survey in 1979 included Flathead Lake and 61 km of the upper Flathead River. In 1980, we (RWK and JJC) surveyed the south half of Flathead Lake and the lower Flathead River.

The study area occupied the Flathead Valley in Flathead, Lake, and Sanders counties of northwestern Montana and is located 150 km north of Missoula (Fig. 1). MacCarter and MacCarter's (1979) study area included Flathead Lake and 7 km of the upper Flathead River (Fig. 1). The distribution of Osprey nests on Flathead Lake indicates a natural break between the south and north halves. For convenience we divided our study area into the lower Flathead River (Polson to Paradise), the south half of Flat-

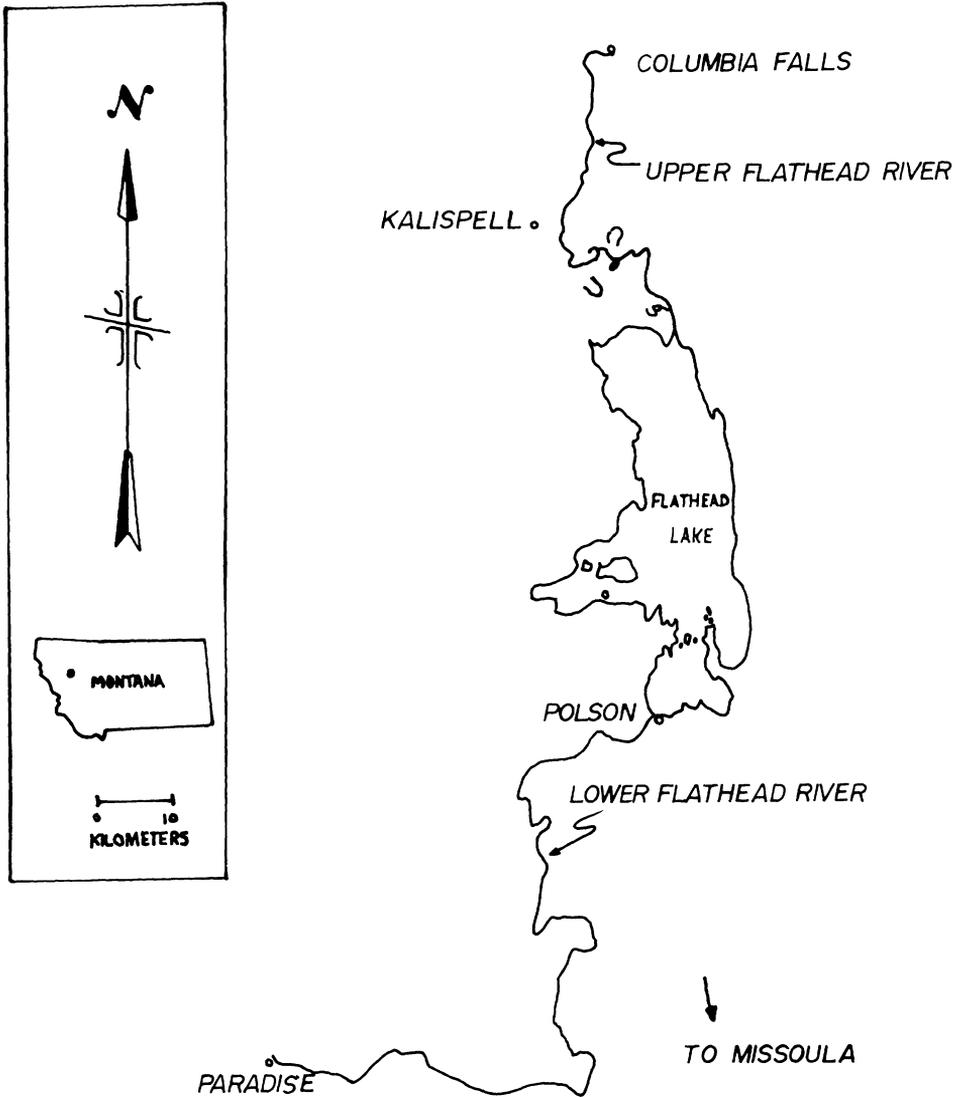


FIGURE 1. Location of study areas. North Valley includes the upper Flathead River to Columbia Falls and the north half of Flathead Lake (A). South half of Flathead Lake ends at Polson (B). MacCarter and MacCarter study area included all of Flathead Lake and 7 km of the upper Flathead River (C). The lower Flathead River flows from Polson to Paradise, Montana.

head Lake, and the North Valley (the few nests on the north end of Flathead Lake and the nest along the upper Flathead River to Columbia Falls) (Fig. 1).

## METHODS

Most nest surveys were conducted from a helicopter with two observers as described by Carrier and Melquist (1976). A Bell 47G3B-2 helicopter was used in 1978 and 1979; an Aerospatial Astar AS350D was used in 1980. Because of other study objectives in 1978 and 1979, we were unable to take advantage of Carrier and Melquist's (1976) suggestion of checking occupancy of nest

sites from a fixed-wing aircraft. In 1977 and 1980, however, occupied nests were located with a Cessna 210. On flights in mid-April, early May, and mid-July, we collected data on nest occupancy, number of eggs laid, and number of fledglings produced, respectively. Three flights per year were made during 1978 and 1979; so data on the number of occupied nests, active nests, and the success of those nests were gathered (Table 1). In 1980, flights determined only nest occupancy and success (Table 1). Occasionally, adults refused to leave the nest and we could not view its contents; such nests were excluded from our calculations.

TABLE 1. Osprey reproductive parameters for the lower Flathead River from 1978 through 1980.

Reproductive parameters	1977 <sup>a</sup>	1978	1979	1980
<b>Number of Nests</b>				
Occupied	7	7	9	12
Active		6	9	
Successful		5	6	6
<b>Number of Eggs</b>				
Total		13.(5) <sup>b</sup>	13(5)	
Per Occupied Nest		2.17(6)	2.17(6)	
Per Active Nest		2.60(5)	2.17(6)	
Per Successful Nest		2.60(5)	2.50(4)	
<b>Number of Fledglings</b>				
Total		12(5)	12(8)	12(12)
Per Egg		0.92(5)	0.83(5)	
Per Occupied Nest		2.00(6)	1.50(8)	1.00(12)
Per Active Nest		2.40(5)	2.00(6)	
Per Successful Nest		2.40(5)	2.40(5)	2.00(12)
<b>Percent Occupied Nests</b>				
Producing Fledglings		83.3	62.5	50

<sup>a</sup>Survey only for number of occupied nests.

<sup>b</sup>( ) = Number of nests with complete data.

Terminology describing reproductive success follows Postupalsky (1974): occupied nests indicate the presence of a pair of birds; active nests have eggs; and successful nests fledge one or more young. Although we concur that the most useful data are the numbers of young fledged per occupied nest and per active nest, time and budget constraints precluded the determination of nest occupancy on the lake and upper Flathead River in 1979. We define fledglings as the large young observed during the mid-July flights.

## RESULTS

Data on Ospreys for the lower Flathead River were most complete. The number of occupied nests increased during the study from 7 in 1977 and 1978 to 12 in 1980. The number of successful nests were essentially constant at 5 to 6 each year.

Data on Ospreys on the south half of Flathead Lake and the North Valley are less complete. Only one survey was made during 1979. It provided information on the number of successful nests and the number of young produced. In 1980, however, we also determined the number of occupied nests and their success for the south half of Flathead Lake. These surveys (Table 2) show a number of fledglings per successful nest similar, but slightly lower, to that in the lower Flathead River region (Table 1).

The frequency distribution of the number of successful nests with 1 and 2 young versus successful nests with 3 and 4 young was statistically different between study areas ( $X^2 = 4.62$ ,  $df = 2$ ,  $P < 0.10$ ); all years were combined after rejecting dependence with time ( $P > 0.50$ ). There was no difference between the frequency distributions

TABLE 2. Osprey reproductive parameters for the south half of Flathead Lake and North Valley study area in 1979 and 1980.

Reproductive parameters	North Valley	South Half Flathead Lake	
	1979	1979	1980
<b>Number of Nests</b>			
Occupied			20
Successful	21	16	15
<b>Number of Fledglings</b>			
Total	52	30	30
Per Occupied Nest			1.50
Per Successful Nest	2.48	1.88	2.00
<b>Percent of Occupied Nests</b>			
Producing Fledglings			75

from the two river study areas ( $P > 0.75$ ), and both of these distributions were different than the lake's ( $P < 0.10$ ).

## DISCUSSION

Henny and his co-workers (Henny and Wight 1969, Henny and Ogden 1970, Henny and VanVelzen 1972, Henny 1977) determined that eastern Ospreys need to recruit between 0.95 and 1.30 young per active nest for populations to remain stable. If this recruitment standard also applies to western populations, then the observed 2.18 young per active nest for the lower Flathead River between 1978 and 1979 indicates a robust population. The production of 1.38 young per occupied nest in 1978 to 1980 is also above the recruitment standard. The number of occupied nests increased on the lower Flathead River from 7 to 12 between 1977 and 1980. The Osprey population on MacCarter and MacCarter's study area fledged 14 to 31 young annually from 8 to 17 successful nests between 1967 and 1970 and fledged 34 to 40 young from 15 to 19 successful nests annually between 1974 and 1977 (MacCarter and MacCarter 1978). This area produced 56 fledglings from 16 nests in 1979. The number of young fledged from Flathead Lake in 1979 was 36 from 18 nests. Forty-six nests were found in 1979 compared with 34 when the upper Flathead River was surveyed in 1975; undoubtedly some are second nests within a single territory. These data indicate a healthy Osprey population in the Flathead Basin.

The number of fledglings per occupied nest for the lower Flathead River decreased between 1978 and 1980 because the number of occupied nests increased while the number of young produced remained constant (Table 1). This decrease may reflect an increase in the number of 2-year-olds in the population. Some birds in this age class occupy nests but neither lay eggs nor exhibit brooding behavior (Osterlof 1951, Henny and Wight 1969, Henny and VanVelzen 1972). For an increasing population the proportion of 2-year-old Ospreys occupying nests would be expected to increase, thus lowering the statistic for number of fledglings per occupied nest.

The lower breeding rate of lake Ospreys was observed only from limited data and may be spurious (Tables 1 and 2), but there are some biological reasons why this variation may be real. Ospreys on the south half of Flathead Lake generally move to the lower Flathead River between Polson and Kerr Dam to fish, approximately 10 km from where most Ospreys nest, while Ospreys on the northern portion of the lake and along the rivers fish adjacent to their nest (D. S. MacCarter 1972, pers. ob.). Fishing

success may be higher along the rivers because of either more prey or higher prey vulnerability (Swenson 1979). The combined effects of the longer time spent traveling between fishing and nest sites and the deep, oligotrophic nature of Flathead Lake may be factors in the lower productivity. D. S. MacCarter (1972) believed that limited food availability at Flathead Lake influenced the reduced success of larger broods. We suggest that data be gathered in future years to determine if the difference in Osprey reproductive success between river and lake populations is real or an artifact.

We recommend that the Osprey population in the Flathead Basin be monitored by aerial surveys biannually and as concluded by Henny (1977), such surveys are best done basin- or region-wide. The data presented in this paper could not have been obtained without the cooperation and close working relationship of four agencies. We encourage all state and federal agencies to coordinate their efforts to obtain maximum coverage and eliminate duplication. By combining efforts, regional surveys can be conducted with a minimum expense. The techniques of Carrier and Melquist (1976) are economical and efficient, especially when fixed-wing aircraft are used.

#### ACKNOWLEDGMENTS

Funds for these surveys were provided by the Confederated Salish and Kootenai Tribes; Flathead Agency, Bureau of Indian Affairs; Billings Area Office, U.S. Fish and Wildlife Service; and Seattle District, U.S. Army Corps of Engineers. The 1978 and 1979 flights could not have been made without the able assistance of Ron Gipe, owner and pilot of Flathead Helicopters. Jay Gillmartin, Helicopter Associates, capably flew the survey in 1980. The fixed-wing flights in 1977 and 1980 were skillfully flown by Clyde Fredrickson, owner and pilot of Fredrickson Aviation.

We thank I. J. Ball, W. D. Carrier, C. Henny, D. Manuwal, D. L. MacCarter, B. R. McClelland, B. W. O'Bara, and C. W. Servheen for their helpful comments which improved earlier drafts of this manuscript.

#### LITERATURE CITED

- AMES, P. L. 1966. DDT residues in the eggs of the Osprey in the northeastern United States and their relations to nesting success. *J. Appl. Ecol.* 3:87-97.
- AMES, P. L., AND G. S. MERSERAU. 1964. Some factors in the decline of the Osprey in Connecticut. *Auk* 81:173-185.
- ANDERSON, D. W., AND J. J. HICKEY. 1972. Eggshell changes in certain North American birds. *Proc. Internatl. Ornith. Cong.* 15:514-540.
- CARRIER, W. D., AND W. E. MELQUIST. 1976. The use of rotor-winged aircraft in conducting nesting surveys of Ospreys in northern Idaho. *Raptor Res.* 10:77-83.
- HENNY, C. J. 1977. Research, management, and status of the Osprey in North America. Pp. 199-222 *in* R. D. Chancellor, ed., *World Conference on Birds of Prey, Vienna, 1975*. Proc., ICBP, London.
- HENNY, C. J., AND J. C. OGDEN. 1970. Estimated status of Osprey populations in the United States. *J. Wildl. Manage.* 34:214-217.
- HENNY, C. J., AND W. T. VANVELZEN. 1972. Migration patterns and wintering localities of American Ospreys. *J. Wildl. Manage.* 36:1133-1141.
- HENNY, C. J., AND H. M. WIGHT. 1969. An endangered Osprey population: Estimates of mortality and production. *Auk* 86:188-198.
- HICKEY, J. J., AND D. W. ANDERSON. 1969. Chlorinated hydrocarbons and eggshell changes in raptorial and fish-eating birds. *Science* 162:271-273.
- MACCARTER, D. L. 1972. Reproductive performance and population trends of Ospreys at Flathead Lake, Montana. M.S. Thesis, Humboldt State College, Arcata, California.
- MACCARTER, D. L., AND D. S. MACCARTER. 1978. Ten year nesting success of Ospreys at Flathead Lake, Montana. Unpubl. rept., Univ. of Montana Biological Station, Bigfork.
- MACCARTER, D. L., AND D. S. MACCARTER. 1979. Ten year nesting success of Ospreys at Flathead Lake, Montana. *Murrelet* 60:42-49.
- MACCARTER, D. L. 1972. Food habits of Ospreys at Flathead Lake, Montana. M.S. Thesis, Humboldt State College, Arcata, California.

- OSTERLOF, S. 1951. Fiskjusens, *Pandion haliaetus* (L.), Flggtning. Var Fagelvarld. 10:1-15. (In Swedish, English Summary.)
- POSTUPALSKY, S. 1974. Raptor reproductive success: Some problems with methods, criteria, and terminology. Raptor Res. Rep. 2:9-20.
- SWENSON, J. E. 1979. The relationship between prey species ecology and dive success in Ospreys. Auk 96:408-412.
- WIEMEYER, S. N., P. R. SPITZER, W. C. KRANTZ, T. G. LAMONT, AND E. CROMARTIE. 1975. Effects of environmental pollutants on Connecticut and Maryland Ospreys. J. Wildl. Manage. 39:124-139.

*Bureau of Indian Affairs, Flathead Agency, Drawer A, Ronan, MT 59864 (RWK and JJC); U.S. Fish and Wildlife Service: Billings Area Office, Room 3035, 316 N. 26th Street, Billings, MT 59101, Ecological Services (JMS)<sup>1</sup> and Technical Assistance (BLB)<sup>2</sup>; Kalispell Field Station, P.O. Box 567, Kalispell, MT 59901 (LCP)<sup>3</sup>. Accepted 10 February 1982.*

---

<sup>1</sup>Present Address: USFWS, Division of Ecological Service—Federal Projects, 18th and C Street NW, Washington, D.C. 20240.

<sup>2</sup>Present Address: BIA, Division of Fish, Wildlife and Recreation, Mail Code 215, Washington, D.C. 20240.

<sup>3</sup>Present Address: USFWS, Northwest Montana Fishery Center, 780 Creston Hatchery Road, Kalispell, MT 59901.