

HIGH INCIDENCE OF SNAKES IN THE DIET OF NESTING RED-TAILED HAWKS

by

Richard L. Knight* and **Albert W. Erickson**

Wildlife Science Group

College of Fisheries

University of Washington

Seattle, Washington 98195

*Current Address: Washington Department of Game, 509 Fairview N., Seattle, Washington 98109.

The summer food of Red-tailed Hawks (*Buteo jamaicensis*) usually consists of ground squirrels, lagomorphs, and/or upland game birds (Craighead and Craighead 1969, Seidensticker 1970, Gates 1972, Smith and Murphy 1973, McInville and Keith 1974), although Fitch et al. (1946), Beebe (1974), and Kochert (1975) indicate that Red-tailed Hawks prey on reptiles for summer food along the Pacific Coast and in the Western deserts. This paper presents quantitative data for one nesting season on the food habits of Red-tailed Hawks along the Columbia River in north-central Washington, particularly with regard to the high occurrence of snakes in their diet.

Study Area and Methods

Field studies were conducted from 14 July 1974 through 1 August 1975 on 6669 ha paralleling a 72 km stretch of the Columbia River between Chief Joseph and Grand Coulee dams. The vegetation is characteristic of the Upper Sonoran Life Zone with sagebrush (*Artemisia* spp.) and cheat grass (*Bromus tectorum*) the principal plants. Scattered stands of coniferous and deciduous trees occur infrequently.

Six active Red-tailed Hawk nests were visited every 3 days for identification of prey remains. Average weights of mammalian and avian prey species were determined from specimens at the Burke Memorial Washington State Museum, University of Washington, Seattle, and from Poole (1938) and Christensen (1970). Weights of reptiles were obtained from Walter English of the Seattle Woodland Park Zoo.

Results and Discussion

Mammals (table 1) constituted 40.6 percent of the individual prey items found in Red-tailed Hawk nests. Birds made up 18.1 percent of the diet, four species of snakes comprised 41.3 percent of all prey items. On a biomass basis, snakes were the principal prey item, making up 49.2 percent of the total. Mammals and birds comprised 32.9 and 17.8 percent, respectively. Snakes were evenly represented in all nests. Apparently, this is the highest recorded percentage of reptiles in the diet of a Red-tailed Hawk population.

Olendorff (1973) suggests that snakes are not a preferred food item of the Red-tailed Hawk in south central Washington. Beebe (1974) states that whenever ground squirrels are available, they are a favored food during the breeding season. No species of ground squirrel occurs on the study area. Two species of lagomorphs (*Sylvilagus nuttalli* and *Lepus californicus*) occur but were present in very low numbers (Erickson et al 1977). Pocket gophers (*Thomomys talpoies*) were present only in limited numbers during the study. They are available to Red-tailed Hawks for only a short time when the young leave their natal burrows (Ingles 1965). Small mammal trapping

on representative habitat types on the study area gave 0.05 mammals per trap night of effort (1,654 trap nights), indicating a very low small mammal population (Erickson et al. op cit.).

Without a multi-year study and an accurate idea of reptile populations, it is impossible to assert that this high level of reptiles in the Red-tailed Hawk summer diet is a usual occurrence. It may be a response to a periodic decline in rabbit and other small mammal populations. Nevertheless, this study illustrates that Red-tailed Hawks will rely heavily on snakes as suitable prey under certain conditions.

Acknowledgments

This study was supported by the U.S. Army Corps of Engineers. It would not have been possible without the Colville Confederated Tribes who generously made their land and facilities available. R. R. Olendorff, C. W. Servheen, D. R. Paulson, G. Munger, and J. B. Athearn were kind enough to read drafts of this manuscript and offer helpful criticisms.

Literature Cited

- Beebe, F. L. 1974. Field studies of the Falconiformes of British Columbia. *Occas. Pap. Brit. Col. Prov. Mus. No. 17.*
- Christensen, G. C. 1970. The chukar partridge: its introduction, life history, and management. *Nev. Dep. Fish and Game. Biol. Bull. No. 4.*
- Craighead, J. J., and F. C. Craighead, Jr. 1969. *Hawks, owls and wildlife.* Dover Publications, New York.
- Erickson, A. W., Q. J. Stober, J. J. Brueggeman, and R. L. Knight. 1977. An assessment of the impact on the wildlife and fisheries resource of Rufus Woods Reservoir expected from the rising of Chief Joseph Dam from 946 to 956 m.s.l. U.S. Army Corps of Engineers, Seattle, Washington.
- Fitch, H. S., F. Swenson, and D. F. Tillotson. 1946. Behavior and food habits of the Red-tailed Hawk. *Condor* 48:205-237.
- Gates, J. M. 1972. Red-tailed Hawk populations and ecology in east-central Wisconsin. *Wilson Bull.* 84:421-433.
- Ingles, L. G. 1965. *Mammals of the Pacific states.* Stanford University Press, Stanford, California.
- Kochert, M. N. 1975. Reproductive performance, food habits, and population dynamics of raptors in the Snake River Birds of Prey Natural Area. In Snake River Birds of Prey Research Project. Bureau of Land Management. Boise, Idaho, pp. 1-50.
- McInville, W. B., Jr., and L. B. Keith. 1974. Predator-prey relations and breeding biology of the Great Horned Owl and Red-tailed Hawk in central Alberta. *Can. Field-Natur.* 88:1-20.
- Olendorff, R. R. 1973. Raptorial birds of the USAEC Hanford Reservation. USAEC Rep. BNWL-(1790) UC-11.
- Poole, E. L. 1938. Weights and wing areas in North American birds. *Auk* 55:511-517.
- Seidensticker, J. C., IV. 1970. Food of nesting Red-tailed Hawks in south-central Montana. *Murrelet* 51:38-40.
- Smith, D. G., and J. R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. *Brigham Young Univ. Sci. Bull., Biol. Ser.* 18:1-76.

TABLE 1
FOOD REMAINS FOUND IN RED-TAILED HAWK NESTS
ALONG THE COLUMBIA RIVER, 1 MAY-18 JUNE 1975.

Food Species	No. Indv.	Percent Indv.	Approx. Biomass (gm)	Percent Biomass
Mammals				
Mountain cottontail (<i>Sylvilagus nuttalli</i>)	14	9.3	8400.0	25.9
Northern pocket gopher (<i>Thomomys talpoides</i>)	16	10.6	1633.6	5.0
Great Basin pocket mouse (<i>Perognathus parvus</i>)	8	5.3	132.8	.4
Western harvest mouse (<i>Reithrodontomys megalotis</i>)	1	.7	13.3	tr.
Deer mouse (<i>Peromyscus maniculatus</i>)	1	.7	21.1	.1
Sagebrush vole (<i>Lagurus curtatus</i>)	14	9.3	267.4	.8
Mountain vole (<i>Microtus montanus</i>)	4	2.7	227.2	.7
House mouse (<i>Mus musculus</i>)	1	.7	10.2	tr.
Unidentified mammals	2	1.3	—	—
Subtotal	61	40.6	10705.6	32.9
Birds				
California quail (<i>Lophortyx californicus</i>)	3	2.0	486.0	1.5
Chukar (<i>Alectoris graeca</i>)	4	2.7	2284.0	7.0
Ring-necked pheasant (<i>Phasianus colchicus</i>)	1	.7	1304.0	4.0
Common flicker (<i>Colaptes auratus</i>)	2	1.3	378.0	1.2
Cliff swallow (young) (<i>Petrochelidon pyrrhonota</i>)	2	1.3	30.0	.1
Black-billed magpie (<i>Pica pica</i>)	4	2.7	692.0	2.1

Table 1 cont.

Food Species	No. Indv.	Percent Indv.	Approx. Biomass (gm)	Percent Biomass
Western meadowlark (<i>Sturnella neglecta</i>)	4	2.7	580.0	1.8
Vesper sparrow (<i>Pooecetes gramineus</i>)	1	.7	27.0	.1
Unidentified birds	6	4.0	—	—
Subtotal	27	18.1	5781.0	17.8
Reptiles				
Yellow-bellied racer (<i>Coluber constrictor</i>)	32	21.3	5456.0	16.8
Gopher snake (<i>Pituophis melanoleucus</i>)	27	18.0	10044.0	30.9
Garter snake (<i>Thamnophis</i> sp.)	1	.7	141.8	.4
Western rattlesnake (<i>Crotalus viridis</i>)	2	1.3	341.0	1.1
Subtotal	62	41.3	15982.8	49.2
Total	150	100.0	32469.4	99.9

1977 ANNUAL MEETING—PRELIMINARY ANNOUNCEMENT

The annual meeting of the Raptor Research Foundation will be held in Tempe, Arizona, on November 11, 12, and 13 (not in Canada as tentatively announced at the Ithaca meeting). Sessions will be held in the Student Union Building at Arizona State University, with accommodation headquarters at the nearby Howard Johnson's Motor Lodge (225 E. Apache Blvd., Tempe, AZ 85281). Local committee chairman is John Russo of Arizona Game and Fish Department, with Dr. Robert Ohmart of ASU as co-chairman. Dr. David Ellis will serve as program chairman. Paper sessions will be held on Friday, Saturday, and Sunday mornings, with workshops, panels, and discussion groups on Friday and Saturday afternoons. An optional field trip to Harris Hawk country on Sunday afternoon is being planned by the local committee. Because of the limited time for paper presentations, it may not be possible to accept all manuscripts that are submitted. Anyone desiring to present a paper should send the manuscript (or an abstract) to Dr. David Ellis, Box 95A-1, Sasabe Star Rt., Tucson AZ 85736. Further details regarding the meetings will be circulated in the near future.