

RAPTOR MIGRATION IN AUTUMN THROUGH THE UPPER TANANA RIVER VALLEY, ALASKA

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Raptor migration in Alaska is not well documented (Swem 1982, Mindell and Mindell 1984). The upper Tanana River valley, in east-central Alaska, is a well-known migration route for many species of Alaska birds (Kessel 1984, Cooper et al. 1991). Ambrose's casual observations of migrating raptors from 1976 to 1986 suggested that the area also may be a major raptor-migration corridor in autumn.

We initiated autumn raptor-migration counts and banding in the upper Tanana River valley in September 1987. We developed the project in response to an environmental-impact statement prepared for the proposed construction of a receiving site for an "over-the-horizon backscatter" radar unit near Tok, Alaska. Information gathered for the statement suggested that the radar antennas associated with the unit posed a potential collision hazard to migrating birds, especially large ones such as geese, swans, cranes, and raptors (Cooper et al. 1991). The main objective of our raptor counts was to record the numbers and species of raptors migrating through the upper Tanana River valley in autumn. This paper summarizes results of raptor counts from 1987 to 1994 and discusses the potential of raptor-migration counts as tools for monitoring population trends of certain species of raptors in Alaska.

STUDY SITE

The count site, Dry Lake (63° 40' N, 141° 30' W), lies approximately 74 km southeast of Delta Junction and just north of milepost 1376 along the Alaska Highway. Dry Lake is an intermittently flooded 300-acre lake bed, located at one of the narrowest points of the upper Tanana River valley. At an elevation of 350 m, it is within 0.5 km of a major slough of the Tanana River. The Alaska Range, cresting in this area at 2000 to 3000 m, rises approximately 8 km south of Dry Lake and may be a barrier for migrating birds flying directly south. The Yukon-Tanana Uplands, a series of broad hills that crest at approximately 750 m elevation, begin 2 km to the north of Dry Lake. Dry Lake is surrounded by forests of Black Spruce (*Picea mariana*), White Spruce (*P. glauca*), and Balsam Poplar (*Populus balsamifera*). A 500-acre agricultural area lies 2 km to the west.

Temperatures during the count periods ranged from lows of -18°C in late September and October to highs of 31°C in early September. Prevailing winds during the count period in all years were from the south and southeast. South and southeast winds ≥ 30 mph were not uncommon during the count periods.

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METHODS

Our counts extended from late August until mid-October (Table 1). We did not make counts in 1989 or 1990. Observers equipped with binoculars (10 × 40) and a variable-power spotting scope made observations from or near a trapping blind on the eastern side of Dry Lake. The location provided unobstructed views to the southwest, west, and northwest. Counts usually began approximately 30 minutes after sunrise and ended at sunset. We did not count during heavy rain or snow. Two observers made observations in 1987 and 1988. In all other years, one observer made the count >60% of the time.

We identified the species of migrating raptors as they crossed an imaginary north/south plane extending from the observer. Raptors that could not be identified were categorized as large, small, or unidentified. We collected weather data hourly (temperature, surface wind direction and speed, and cloud cover) and recorded all data on standardized forms.

RESULTS

Raptor migration in the upper Tanana River valley was well under way by late August and early September each year of the count. The peak flights of most species, except the Rough-legged Hawk and Golden Eagle, occurred in mid-September in all years.

We counted raptors an average of 9.6 hours per count day for a total of 1926 hours over the six years. We counted a total of 7407 migrating raptors of 13 species from 1987 to 1994 (Table 2). Pooling data from all years, we counted 3.85 raptors per count hour and 1234 raptors per count year (Table 2).

Migrant raptors passed by Dry Lake over a broad front approximately 8 km wide and were moving southeast. Buteos generally migrated along a series of disconnected hilltops and mountains to the south and north of Dry Lake, usually flying at least 300 m above the ground. Other species flew at various altitudes. Many Northern Harriers and American Kestrels passed by at heights under 50 m and often stopped to hunt in the lake bed.

The Northern Harrier was the most commonly observed species annually, composing 35.3% of the total number of raptors observed in all years. The Rough-legged Hawk was the second commonest species, composing 18.3%

Table 1 Raptor Count Periods, Dry Lake, Alaska, 1987–1994

Year	Count Period	Count Days	Count Hours
1987	7 Sep–18 Oct	38	301
1988	27 Aug–15 Oct	43	460
1991	27 Aug–30 Sep	33	346
1992	27 Aug–30 Sep	32	286
1993	28 Aug–2 Oct	33	332
1994	8 Sep–1 Oct	22	201

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Table 2 Summary of Raptors Counted During Autumn Migration, Dry Lake, Alaska, 1987–1994

Species	1987	1988	1991	1992	1993	1994	Total
Osprey (<i>Pandion haliaetus</i>)	2	13	3	1	21	13	53
Northern Harrier (<i>Circus cyaneus</i>)	329	802	524	366	435	138	2594
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	113	114	110	103	185	76	701
Northern Goshawk (<i>Accipiter gentilis</i>)	39	38	18	5	12	5	117
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	81	153	58	36	213	39	580
Rough-legged Hawk (<i>Buteo lagopus</i>)	315	457	79	160	265	277	1553
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	28	55	17	35	19	8	162
Golden Eagle (<i>Aquila chrysaetos</i>)	31	21	8	20	10	12	102
American Kestrel (<i>Falco sparverius</i>)	30	82	104	93	53	25	387
Merlin (<i>Falco columbarius</i>)	79	79	74	52	59	13	356
Peregrine Falcon (<i>Falco peregrinus</i>)	11	21	5	15	3	0	55
Gyr Falcon (<i>Falco rusticolus</i>)	2	0	1	2	0	0	5
Short-eared Owl (<i>Asio flammeus</i>)	8	26	7	2	1	2	46
Large raptor	12	234	4	23	26	18	317
Small raptor	15	123	6	34	36	16	230
Unidentified raptor	12	73	11	21	38	8	163
Total	1107	2291	1029	0968	1376	0636	7407

of the total number of raptors seen over all years. We counted more Rough-legged Hawks in 1987 and 1988 when the count period extended into mid-October. In several years, we observed small movements of Short-eared Owls. Owls were usually seen at dusk or dawn and often hunted in the lake bed.

We did not identify 10% of the total number of migrants observed. Most of the unidentified raptors were seen at distances >4 km and could not be identified to species. From their size and behavior we believe that most of the large raptors were Red-tailed or Rough-legged Hawks and most of the small raptors were Sharp-shinned Hawks or American Kestrels.

DISCUSSION

Results from our counts suggest that many raptors migrate through the upper Tanana River valley in autumn. The number of migrating raptors

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observed at Dry Lake are far less than those recorded annually at well-known raptor migration sites farther south such as Hawk Mountain, Pennsylvania, Cape May, New Jersey, the Goshute Mountains, Nevada, and Golden Gate National Recreation Area, California. We expect fewer migrants to pass by Dry Lake than by concentration points farther south because migrants observed at Dry Lake are departing their northwestern terminus of range; at lower latitudes such passage includes not only departure of local birds but the movements of those drawn from enormous areas farther north (including birds that may pass Dry Lake). Interestingly, our annual counts of Northern Harriers are similar to or higher than counts of this species made at count sites at lower latitudes in North America. Northern Harriers often hunted in Dry Lake; the large number of harriers observed may be a result of this behavior.

We probably underestimated numbers of raptors migrating by Dry Lake each autumn because counts were made simultaneously with trapping. Instead of constantly searching the skies for migrants, our efforts were often focused on trapping, banding, and measuring birds. Additionally, our counts were biased toward species using the lake bed for hunting and toward species we were trying to capture. Because of this we probably missed many raptors migrating along ridges to the north and south of Dry Lake. Finally, our count periods were not equal every year and were not long enough to include early and late migrants. Despite these shortcomings, our counts indicate that raptors concentrate in this area in autumn and that this is an important migration corridor for raptors leaving Alaska.

Migrants observed at Dry Lake most likely come from breeding areas in interior, western, and northern Alaska. This area encompasses millions of acres of boreal forest, taiga, and alpine and arctic tundra. Population trends of many raptors in these areas are unknown because of the logistical difficulty and expense associated with working in remote areas of Alaska. We suggest that migration counts, in association with increased sampling on breeding grounds, may be a useful technique for monitoring population trends of certain species of raptors in Alaska (Titus et al. 1989).

Dry Lake is a logical site to conduct raptor counts in eastern Alaska because it is located at one of the narrowest points in the upper Tanana River valley where migrating raptors tend to concentrate within a relatively narrow area. Equally important, Dry Lake is easily accessible by vehicle from the Alaska Highway, keeping logistical costs down. Because data from migration counts maybe useful for monitoring population trends of raptors, we need to continue to search for new raptor-concentration sites in Alaska and other northern areas. These general areas include the upper Yukon River valley, the upper Tanana River valley, southeast Alaska (including coastal areas), and western Canada (Yukon and British Columbia). The only other raptor migration count in Alaska is in the Matanuska Valley in south-central Alaska (B. Dittrock and T. Swem pers. comm.). Counts at the Matanuska site are also made simultaneously with trapping. The numbers of raptors passing through the Matanuska Valley are similar to those at Dry Lake, but the species composition of the flight is slightly different (T. Swem unpubl. data). Efforts are also underway to find monitoring sites for raptors in Yukon, and raptor monitoring is well established in Alberta, Canada (Sherrington 1998).

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We plan to continue our raptor counts at Dry Lake, and we encourage others to establish new raptor counts in Alaska and western Canada. In the future we plan to standardize annual count periods to provide data consistent from year to year and to run the count separately from the trapping. We also plan to experiment with sampling designs to provide estimates of numbers of raptors migrating through the upper Tanana River valley in autumn. Finally, we need to assess the usefulness of count data from Dry Lake for monitoring population trends of selected species of raptors (such as the Northern Harrier) breeding in Alaska.

SUMMARY

We counted migrating raptors in the upper Tanana River valley in eastern central Alaska from 1987 to 1994. Over the study period we counted migrating raptors on 201 days, averaging 33.5 count days per year. On average we counted 1234 migrating raptors each autumn. The Northern Harrier and Rough-legged Hawk were the most numerous species observed during the counts. We recorded peak numbers of most species, except the Rough-legged Hawk and Golden Eagle, from early to mid-September each year. Our results indicate that the upper Tanana River valley is an important migration corridor for raptors in autumn. We suggest that migration counts have high potential as a technique for monitoring of population trends of certain species of raptors in Alaska. However, more such sites and data collected on breeding grounds are needed to test the potential of using raptor counts to monitor trends in Alaska breeding populations.

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