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Bald Eagle use of a communal roost.—In many areas where Bald Eagles (*Haliaeetus leucocephalus*) concentrate at seasonal food sources, they forage and roost at separate sites (Isaacs and Anthony 1987, Keister et al. 1987). Migrating Bald Eagles have congregated in Glacier National Park, Montana, each autumn since 1939 to feed on non-native kokanee salmon (*Oncorhynchus nerka*) spawning in the 4-km stretch of lower McDonald Creek. Peak censuses of Bald Eagles have ranged as high as 639 in 1981 (McClelland et al. 1982). Eagles at the concentration come from summering areas in the Northwest Territories, Alberta, and Saskatchewan, Canada, and winter in areas as distant as southern Utah and northern California (Young 1983). Most eagles at Glacier National Park roost nocturnally 3 to 7 km from the lower McDonald Creek foraging area (Shea 1973, McClelland 1973, Young 1983). During the autumns of 1980–85, we documented total numbers and arrival and departure times of Bald Eagles at the Fish Creek communal roost (FCR). On some nights, FCR was used by more than 400 Bald Eagles, the highest number recorded in any roost in the contiguous United States. This is the first detailed report of eagle use at a major roost composed primarily of western larch (*Larix occidentalis*). This paper reports correlations between patterns of roost use and total area census, eagle age class, time of sunrise and sunset, and cloud cover.

Methods.—Glacier National Park, in northwestern Montana, is bordered on the north by Canada. The primary study area encompassed lower McDonald Creek (the primary eagle foraging area), the southern end of Lake McDonald, and adjacent forest stands. Four roosts are composed of old-growth western larch, Douglas fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), and black cottonwood (*Populus trichocarpa*). Locations of roosts were verified by examining records of previous research (particularly Shea 1973), by tracking transmitter-equipped eagles to roost sites, and by observing flight paths to roosts (Crenshaw 1985). FCR is the largest roost, encompassing 42 ha. The adjacent Lakeshore Roost covers 25 ha. Both lie near the northwest shore of Lake McDonald. Two much smaller roosts located 1.3 km and 1.6 km from lower McDonald Creek were used by fewer eagles.

Eagles were counted from a location 200 m north of the creek as they flew to roost in the evenings (PM counts) and as they returned to the creek in the mornings (AM counts). Eagles flying to the Lakeshore Roost were incorporated in FCR counts because the Lakeshore Roost often is used as a staging site for eagles flying to FCR, and flight paths to both sites are similar. PM counts (1980–84) were made from 60 min before to 40 min after sunset. AM flights occurred over a shorter period and counts (1980–81, 1983–85) covered from 40 min before to 50 min after sunrise. All counts were divided into 10-min intervals in relation to sunrise and sunset times for Kalispell, Montana, 60 km to the southwest (U.S. Naval Observatory 1946). Percent cloud cover was estimated visually at the beginning of each count. Clear was considered <25% and cloudy >75% cloud cover. Eagles were classified as either adults (head and tail appeared fully white) or subadults (all other plumages).

Weekly systematic censuses of the Lake McDonald shoreline were conducted by foot and vehicle; lower McDonald Creek was censused by canoe (McClelland et al. 1982). Censuses represented an index of the number of eagles at the foraging areas and were compared with FCR counts from the prior morning or evening to calculate the percentage of eagles using FCR. On days when both AM and PM counts were conducted, the higher was used in comparing nightly fluctuations in roost use. Counts of <10 at the beginning or end of each autumn concentration were eliminated from the analyses to standardize annual cut-off dates.

Non-parametric tests were used in cases where we did not want to assume any underlying data distribution. Counts were standardized on the peak recorded for the year, paired with another year based on this peak, and tested for significant differences ($\alpha = 0.05$) in the location, dispersion, and skewness of the cumulative frequency distributions between years with a Kolmogorov-Smirnov test (SYSTAT, Inc. 1984). Pearson product-moment correlations (SYSTAT, Inc. 1984) were computed for corresponding pairs of census and roost-flight count totals to test the degree of linear association; *t*-tests were used to test the validity of the null hypothesis, i.e., the population correlation = 0 (Sokal and Rohlf 1981). For each 10-min interval of roost arrival and departure times, mean percentages and their variances were computed; significant differences ($\alpha = 0.05$) between eagle flight times, and age class and percent cloud cover were determined for proportions greater than 5% (proportions less

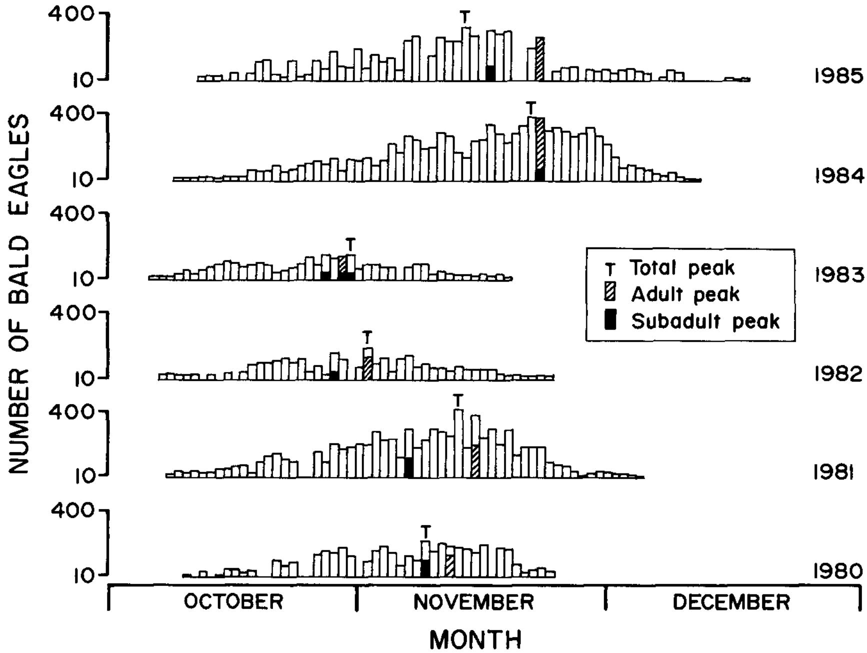


FIG. 1. Fish Creek Roost flight counts of Bald Eagles.

than 5% were considered too small for valid comparison) (Snedecor and Cochran 1980). Data from 1980 were omitted from these tests due to the small number of AM and PM counts.

Roost-flight counts.—During the six autumns, counts of ≥10 eagles were recorded on an average of 54 days. In 1983 the earliest count (7 October) and the lowest number of days between first and last counts (44 days) were recorded. The latest count occurred in 1985 (18 December), the same year in which the highest number of days (67) was recorded (Fig. 1).

Peak roost-flight counts ranged from 154 (1983) to 414 (1981); all occurred in early to mid-November (Table 1). The distributions of daily counts were significantly different between all years except 1981/1984 ($P = 0.100$), 1981/1985 ($P = 0.226$), and 1982/1983 ($P = 0.167$). Mean combined counts including highest AM or PM counts for all years averaged 112 eagles. Mean AM counts ($\bar{x} = 123.3$) averaged 14% higher than mean PM counts ($\bar{x} = 103.0$); however, there were some days on which PM counts were much higher than AM counts. Differences between PM and following AM counts probably resulted from: (1) atypical roost-flight paths due to high winds, (2) migrating eagles' first arrival into the roost during the day or by routes which bypassed the PM count location, (3) eagles' arrival at the roost prior to the beginning of the PM count because of human disturbance in the feeding area or an early end to a successful day of hunting, (4) migration departure after the AM count, or (5) limited observer visibility resulting from precipitation or fog.

Peak FCR counts aveaged 63% of the peak censuses of the foraging area (Table 1, Fig. 2). Annual variations in peak censuses were positively correlated ($r = 0.973$, $P \leq 0.05$, Pearson correlation) with peak kokanee salmon numbers (McClelland and McClelland 1986).

TABLE 1

ROOST-FLIGHT COUNTS (≥10 BALD EAGLES) FOR FCR AND PEAK CENSUSES, 1980–85[a]

Variables	Year 1980	1981	1982	1983	1984	1985
Roost-flight counts						
Peak count	211 [PM]	414 [AM]	191 [PM]	154 [AM]	387 [AM]	329 [AM]
Date of peak count	9 Nov.	14 Nov.	2 Nov.	1 Nov.	23 Nov.	15 Nov.
AM mean	[b] (18)	143 (47)	[c]	67 (39)	160 (57)	124 (53)
PM mean	[b] (29)	118 (52)	75 (44)	65 (41)	126 (60)	[c]
Combined mean (highest AM or PM)	113 (37)	142 (56)	75 (44)	72 (43)	151 (64)	124 (53)
Number of days >100	22	32	13	8	35	22
Area censuses						
Peak census	377	639	306	251	571	520
Date of peak	5 Nov.	11 Nov.	3 Nov.	26 Oct.	28 Nov.	5 Nov.
Peak count as % of peak census	56	65	62	61	68	63

[a] Values in parentheses refer to the number of counts conducted.
[b] Insufficient number of counts for representative mean.
[c] Counts not conducted.

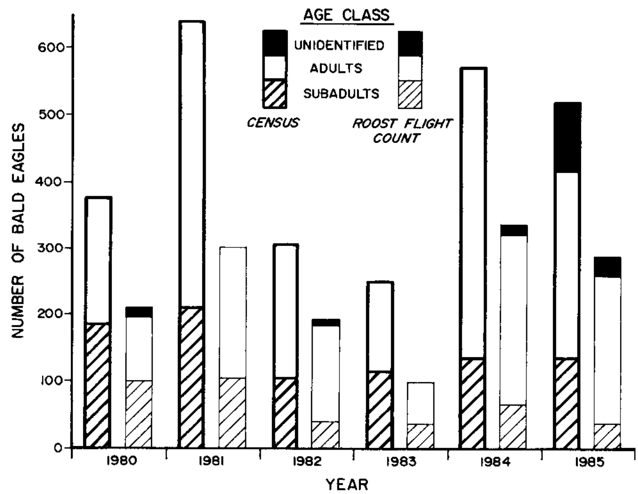


FIG. 2. Peaks of roost-flight counts and total study area censuses.

The percentage of the weekly census represented by the FCR count averaged 48% for the six years (range: 42–55%); corresponding counts and censuses were highly correlated (r = 0.911, $P < 0.01$, range: 0.824–0.977). Count totals were lower than census totals primarily because eagles used the other two roosts and scattered locations along lower McDonald Creek and adjacent areas. The mean peak count of subadults at FCR was 51% of the mean peak census of subadults. The corresponding mean for adults was 63%. This suggests that a higher percentage of subadults than adults roosted along the creek close to the food source. This is similar to the pattern described for the Klamath Basin, Oregon, where the proximity of food to roosts influenced use by subadults (Keister et al. 1987).

Peak numbers of subadults in FCR counts occurred earlier than adult peaks in all years except 1984 ($\bar{x}$ = 3.5 days, range: 0–7 days). In censuses, subadult numbers peaked earlier in 1980 (8 days) and 1985 (7 days), but on the same date as adults from 1981–84 (overall range: 26 October–28 November). The highest percentage of subadults in FCR counts (range: 38–87%) occurred early in the autumn in all years (range: 10–26 October) and then declined. Peak censuses of subadults from 1965–80 occurred earlier than for adults in 10 of 16 years and peaked on the same date in the other 6 years (McClelland et al. 1982).

Roost arrival and departure times.—The timing of roost flights appeared to be influenced by cloud cover. From 1981–84, PM counts on clear evenings peaked 10 min later and were higher (20%) than on cloudy evenings (16%) (Fig. 3). Flights before sunset on clear and cloudy evenings were 53% and 71%, respectively. Within each time interval, clear and cloudy PM counts were significantly different ($P \leq 0.05$).

More eagles departed FCR before sunrise on clear (84%) than on cloudy mornings (77%). On clear mornings peak counts (28% of total) occurred 30–40 min before sunrise, 10 min earlier than peaks on cloudy mornings (26% of total). Clear and cloudy AM counts were significantly different ($P \leq 0.05$) within all time intervals except 10–20 min before sunrise.

Lish (1973) found that Bald Eagles in Oklahoma generally arrived at roosts earlier on clear days than on overcast days. Roost-flight counts of Bald Eagles along the Nooksack River, Washington, also were influenced by the presence of cloud cover (Knight 1981). However, on average, counts in Glacier National Park peaked 30 min later on clear evenings

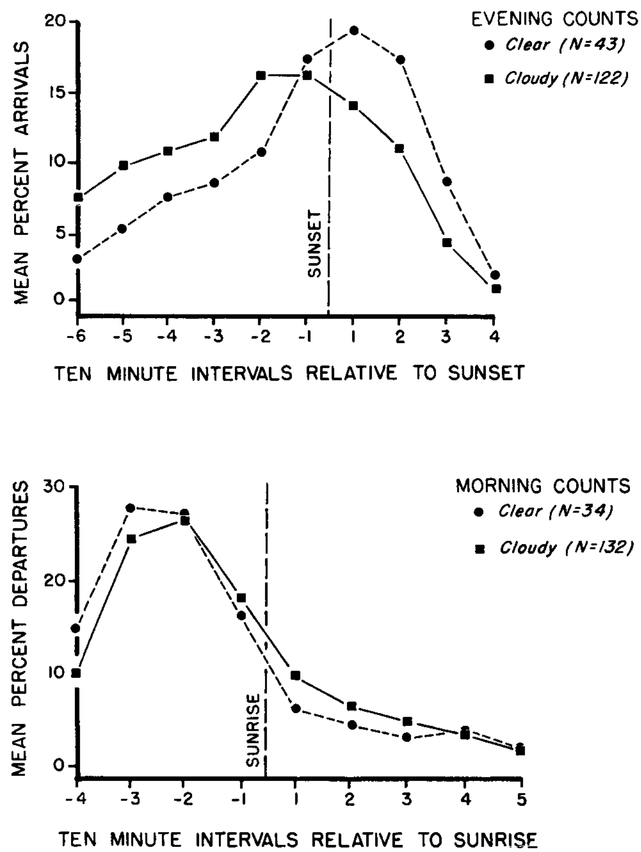
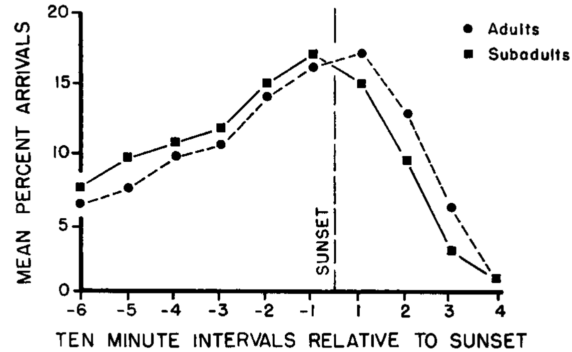


FIG. 3. Mean arrival times (above) and departure times (below) of Bald Eagles on clear and cloudy days.

and 40 min earlier on cloudy mornings than at the Nooksack. These variations may have resulted from differences in study area terrain or from contrasts in the areas' relationships to standard sunrise and sunset times.

Subadults tended to fly to FCR earlier than did adults. The peak (mean percentage per 10-min interval) of subadults (17%) enroute to FCR during PM counts occurred just before sunset; the adult peak (17%) occurred 10 min later (Fig. 4). Most subadults (72%) and adults (62%) arrived in the roost before sunset. Percent subadult arrivals were significantly different ($P \leq 0.05$) from adult percentages within all time intervals except 50–60 min before sunset.

During AM counts, subadults peaked at 27% during the time interval 20–30 min before sunrise, 10 min earlier than for adults (27%). More subadults (82%) than adults (76%) departed the roost before sunrise. Percent departures within all but the interval 10–20 min before sunrise differed significantly ($P \leq 0.05$) between adults and subadults. Differences in roost arrival and departure times between adults and subadults may be related to subadults'



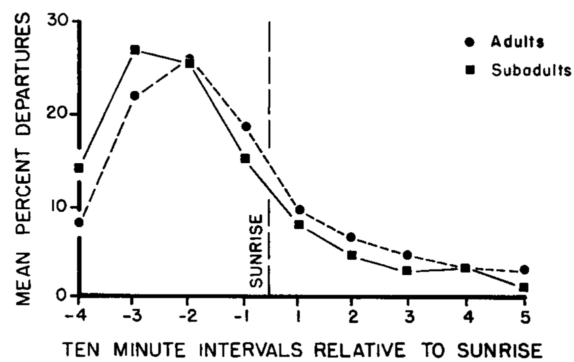


FIG. 4. Mean arrival times (above) and departure times (below) of Bald Eagles.

poorer hunting skills and to food availability. Spawned-out salmon wash onto the gravel bars along lower McDonald Creek at night and are readily available to eagles arriving first in the morning. Adults obtain prey by stooping on fish in water more often than do subadults (Bennetts 1986) and may not need to compete for the more accessible fish. Stalmaster and Gessaman (1984) and Knight (1981) recorded subadult Bald Eagles arriving at food sources earlier than adults, possibly due to subadults' greater food stress and motivation to feed. The lack of fish carcasses late in the afternoon at lower McDonald Creek and increased competition with adults may explain subadults' earlier flight to FCR.

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The original description and author of the genus *Dumetella* (Mimidae).—The "Cat Bird" of Mark Catesby (1731–1743), now known as the "Gray Catbird," served as the type of the *Muscicapa carolinensis* of Linnaeus (1766). When the species was first segregated in its own monotypic genus (as opposed to *Mimus*), it received the name *Galeoscoptes* Cabanis (1850), under which it was widely known until 1907 as *Galeoscoptes carolinensis* (see Ridgway