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TWO LARGE BALD EAGLE COMMUNAL WINTER ROOSTS IN UTAH

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As migratory birds, many Bald Eagles (*Haliaeetus leucocephalus*) breed in the northern portions of the species' range, and winter in the southern portions (Stalmaster 1987). The location of a particular breeding range is a good predictor of the location of the winter range and the corresponding migratory route. Such associations of winter and summer ranges have been documented in Maine (McCollough 1989), central Canada and U.S. (Gerrard et al. 1978, Griffin et al. 1980, Harmata and Stahlecker 1993), Alaska (Hodges et al. 1987), and the Intermountain West (McClelland et al. 1994). Banding and tracking studies also discovered numerous examples of nesting area fidelity (Gerrard et al. 1978, Jenkins et al. 1999), and winter range fidelity (Gerrard et al. 1978, Harmata and Stahlecker 1993, McClelland et al. 1994). But such patterns are not rigid; nomadic behavior has also been documented (e.g., Postupalsky 1976, McClelland et al 1994, Jenkins et al. 1999).

Numerous studies have described interior populations of wintering Bald Eagles (e.g., Southern 1963, 1964, Knight and Knight 1983, Harmata and Stahlecker 1993, Restani 1997), and many focused on communal roosts (Edwards 1969, Keister and Anthony 1983, Harmata 1984, Isaacs and Anthony 1987, Crenshaw and McClelland 1989). But only a few studies (e.g., Swisher 1964, Edwards 1969) have examined communal roosts in Utah. The primary aim of this study is to provide occupancy dates, population estimates, locations, and habitat descriptions of two large (>200 eagles/night) communal roosts in northern Utah.

STUDY AREA

The Willard Canyon roost (WCR) is in the Willard Basin which expands to the southeast of the mouth of Willard Canyon (41°25′N, 112°00′W). Vegetation consists mostly of a Douglas-fir (*Pseudotsuga menziesii*) canopy, with an understory of ninebark (*Physocarpus malvaceus*), and some white fir (*Abies concolor*), subalpine fir (*A. lasiocarpa*), and limber pine (*Pinus flexilis*). This vegetation is consistent with the douglas-fir/ninebark community described by Mauk and Henderson (1984). The mouth of the canyon is 4 km from Willard Bay on the west shore of the Great Salt Lake, which has surface elevations near 1280 m. The Bear River delta is at or near the elevation of the Great Salt Lake and includes the Bear River Migratory Bird Refuge and surrounding area.

The Ogden Bay roost (OBR) is located in the Weber River delta (41°12′N, 112°9′W) on the west shore of the Great Salt Lake. The elevation of the delta is only slightly above the elevation of the Great Salt Lake. As a result of high water in the 1980s, numerous deciduous trees along the channels of the lower delta were killed by salt water invasion. Eagles roost in these snags, which are buffered by roadless wetlands nearly 1 km in radius. This site is ca. 23 km southwest of the WCR.

METHODS

The WCR had the highest occupancy of all roosts surveyed. Therefore, from the beginning of January to early April, 1998, and from the beginning of December 1998 to early April, 1999, we sampled this site systematically. We surveyed three times a week in the 1997–98 season and twice a week during the 1998–99 season; surveys were conducted from 1230 H until after sunset by one observer located near the mouth of the canyon. Early in the 1997–98 season, we also observed the site between first light and 1000 H. We used 10 × 42 binoculars and a 16–32 × 50 spotting scope to locate and identify eagles at a distance. The exact sampling location varied depending upon flight patterns, but the intersection of a private canal road with a gravel pit road was used most frequently. The roost itself could be observed from locations on the ridge north of the canyon from whence we could see the top of the West Fork drainage. When possible, eagles were classified by plumage, according to criteria described by Stalmaster (1987) and Wheeler and Clark (1995).

Because eagles that returned to the roost early in the afternoon would sometimes soar above the mouth of the canyon, we only counted eagles seen approaching from the direction of the daily activity centers (DACs). This reduced the chances of redundant counting of individuals.

The OBR was surveyed every other week during the 1997–98 season, and weekly during the 1998–99 season. However, no data were collected from OBR in March–April 1999. At the WCR, time of return was recorded in 30-min intervals before sunset.

RESULTS

Occupancy. During the winter of 1997–98, all sites except WCR had peak numbers in February (Figs. 1 and

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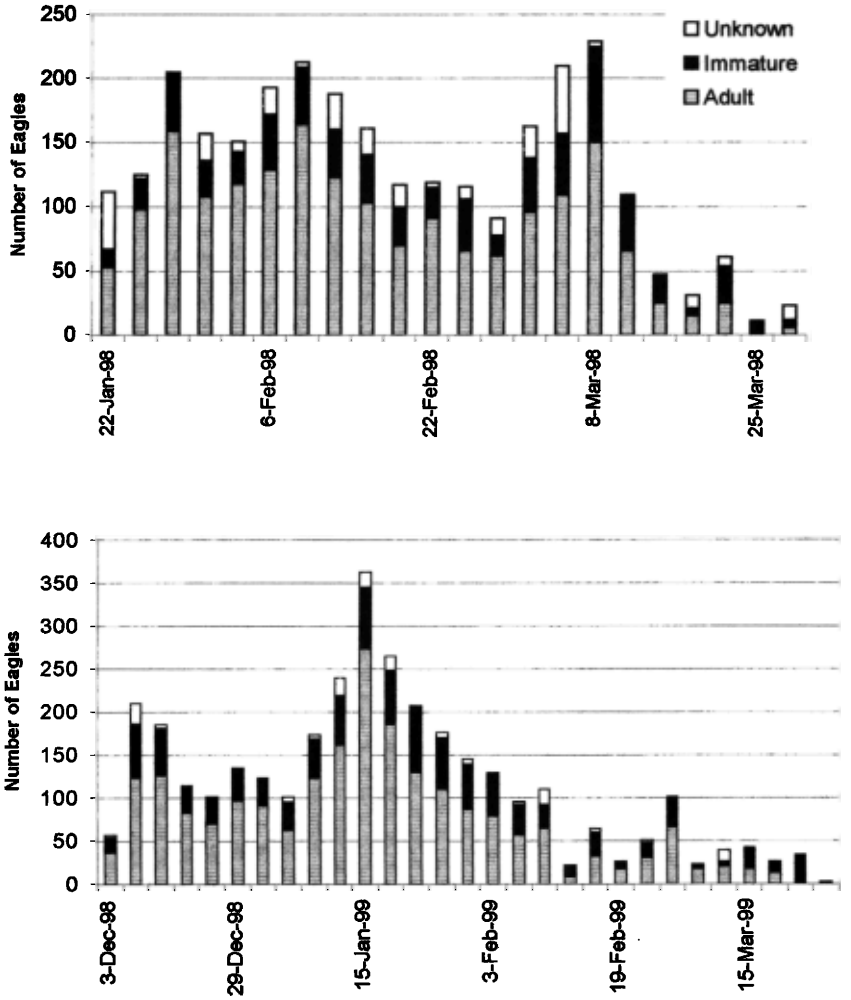

Figure 1. Number of Bald Eagles at Willard Canyon.

2), while the season high at the WCR of 227 eagles occurred 8 March. The mid-winter high of 212 occurred at the WCR on 8 February. This was followed by a decline to 91 preceding the brief influx of eagles in March, and then a sharp decline after the March peak (Fig. 1). Other roosts did not follow a bimodal pattern. The OBR had a season high of 153 eagles on 4 February, after which the number gradually declined to three on 18 April, the last sample (Fig. 2).

In the 1998–99 season surveys began 3 December. On this date 58 individuals were already present at WCR, and we saw two eagles enter the roost on 4 November. Numbers peaked to 211 individuals on 13 December, declined, and rose again to a season high on 15 January, when 363 occupied the roost (Fig. 1). Numbers then declined, with the exception of 3 March when 101 returned to the roost (Fig. 1).

Between 9 January and 18 February the number of eagles at the OBR increased from 48 to the season high of 264 (Fig. 2). Unlike the previous year, eagles appeared to shift from WCR to OBR (Fig. 3).

Age Composition. From January–March 1998, the maximum percentage of adults (87.5%) was recorded on 18 January and immatures (88.4%) on 4 March 1998 (Fig. 1). A decline in the percentage of adults began after 8 March. The maximum number of 167 adults was observed on 8 February and 119 immatures on 4 March. From December 1998–April 1999, the maximum percentage of adults (75.5%) was recorded on 15 January and immatures (94.1%) on 30 March (Fig. 1). The maximum number of 274 adults was observed on 15 January and 72 immatures on 15 January.

At the OBR, percentages between December 1997 and April 1998 peaked at 86.9% adults on 4 February and

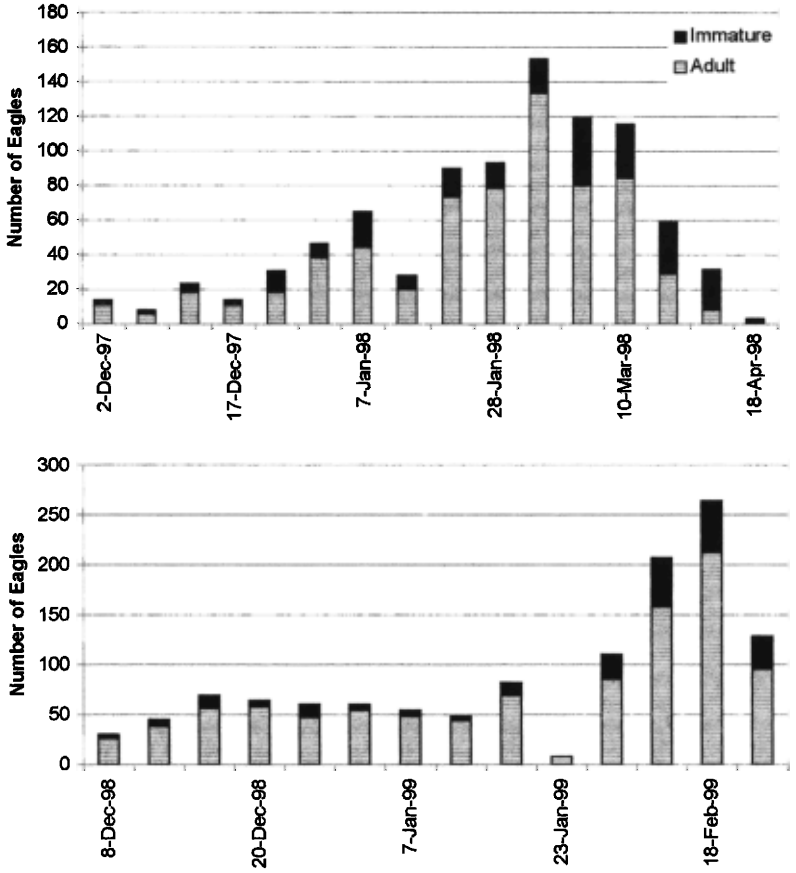

Figure 2. Number of Bald Eagles at Ogden Bay.

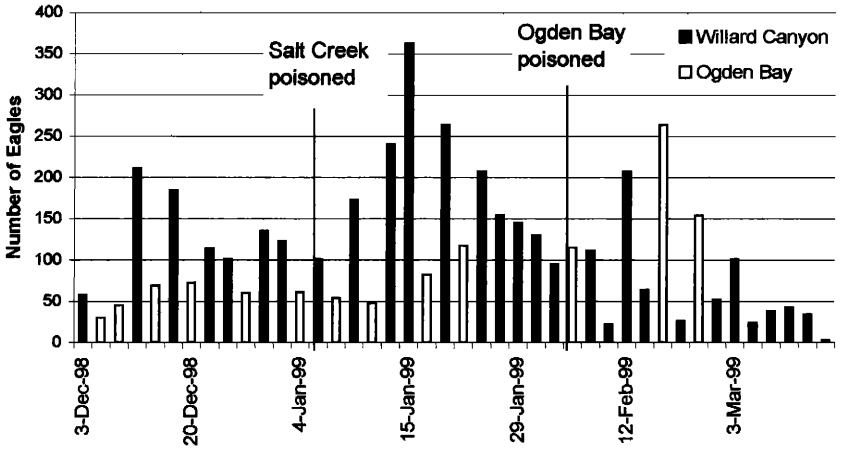

Figure 3. Comparison of eagle numbers using Willard Canyon and Ogden Bay (December 1998–March 1999).

100% immatures on 18 April. The percentage of adult birds at the OBR declined steadily after 10 March. The maximum numbers were 133 adults on 4 February and 39 immatures on 20 February (Fig. 2). During the 1998–99 season the maximum percentages at the OBR were 91.7% adults on 9 January and 23.6% immatures on 12 February. Numbers peaked at 212 adults and 52 immatures on 18 February (Fig. 2).

DISCUSSION

The roost habitat most likely to deteriorate in the near future is that of the OBR. No living trees exist in the roost area, and we detected no evidence of regeneration. Water management in the upper Weber drainage, in addition to fluctuating water and salt levels of the Great Salt Lake, result in unfavorable growing conditions for trees. Though riparian corridors with living trees exist upstream of the roost area, they are outside of the Ogden Bay Waterfowl Management Area boundaries, and subject to higher levels of disturbance.

The Willard Canyon roost is both the most heavily used and the most sheltered from human disturbance. We detected no evidence of habitat degeneration at this site, nor any threat of encroachment. This site is currently on U.S. Forest Service property and, because such large numbers of eagles use this roost consistently, its protection and maintenance should be ensured by Forest Service policy.

Changes in forage abundance also influence roost site selection. Both Edwards (1969) and Keister et al. (1987) observed that eagles tend to use the roost nearest the areas with highest prey densities, and that when prey densities changed, eagles selected different roosts accordingly. Shifts from WCR to OBR or elsewhere were not apparent during the 1997–98 season, but probably occurred during the 1998–99 season. Between 5 and 15 January 1999 the population of the WCR went from 191 to the season high of 363 eagles, then dropped to 22 by 11 February 1999. Conversely, between 9 January and 18 February the number of eagles at OBR increased from 48 to the season high of 264. Thus, the eagles appeared to shift from WCR to OBR. We suggest that water management at the eagles' daily-activity centers was the likely explanation for this change. The Bear River Migratory Bird Refuge drained its inner units during the first and second weeks of January trapping and exposing fish in shallow ponds and mudflats. Ponds at Salt Creek Waterfowl Management Area were drained in early January and rotenone was applied on 5 and 6 January (Fig. 3). These events corresponded with the influx of eagles into the WCR. This explanation is supported by the fact that eagles approached the roost mainly from the direction of Bear River Migratory Bird Refuge and Salt Creek Waterfowl Management Area. Water levels at Ogden Bay Wildlife Management Area were lowered during the first week of February, and on or near 8 February rotenone was applied to kill carp. Between 6 February and 18 February the number of eagles jumped at OBR from 115–264. This evidence strongly suggests a migration from one locally-abundant food source to another.

Availability of suitable habitat, such as that of the roosts described by Keister and Anthony (1983), Harmata (1984), and Restani (1997) probably explains the location of observed roosting habitat in northern Utah. The scarcity of roost habitat in close proximity to Bear River Migratory Bird Refuge and other suitable foraging habitat is apparent from the geography of the region. The mouth of Willard Canyon, 4 km from Willard Bay and the Great Salt Lake, is the closest portion of the Wasatch Mountains to suitable eagle foraging habitat. Furthermore, the top of Willard Basin is the largest basin in that portion of the Wasatch front. Canyons to the south have jagged, rocky sides, and do not open up into sub-alpine basins. Canyons to the north have origins in higher basins, but lack extensive evergreen cover. The canyons on the west slope of the Wellsville mountains (a ridge of the Wasatch beginning 12 km north of Willard Canyon) are steep, narrow, and lacking extensive evergreen coverage. The steep and rocky qualities of the lower portions of Willard Canyon make it difficult for human access when snow and ice are absent, and this canyon is essentially not accessible by people when winter conditions exist. We suggest that eagles would not make a 25 km daily commute to Bear River Migratory Bird Refuge (one way) if suitable roost sites existed closer to the foraging areas.

Thus, Willard Canyon has the appropriate suite of characteristics including location, altitude, topography, vegetation, and isolation that make it suitable as Bald Eagle roosting habitat. Likewise, the OBR is in the grove of trees closest to the foraging areas, and is insulated from human disturbance. Harmata (1984) cited the absence of disturbance as the primary factor in roost site suitability.

Eagles commuted to and from the roost daily, departing from the roost at first light, and returning from late morning until just after sunset, with rates of return increasing later in the afternoon. These patterns are similar to those described by McClelland (1973), Crenshaw and McClelland (1989), and others.

Unlike communal roosts in western Montana which are migratory stopovers used during early- and mid-autumn (Crenshaw and McClelland 1989, McClelland et al 1994), the Great Salt Lake is a migratory stopover for some individuals, and a southern terminus for others. This is evidenced by population spikes that suggest the passage of birds that winter farther south as well as continuous occupation by some birds between fall and spring migration. Crenshaw and McClelland (1989) observed that peak numbers and percentages of immatures occurred earlier than those of adults. We observed opposite patterns: maximum adult numbers and percentages occurred in mid-winter, while maximum immature numbers occurred later (except in March 1998 when maximum numbers of both adults and immatures occurred

on the same dates at WCR). Maximum immature percentages always occurred later than those of adults. Often small numbers of immatures were the last eagles to vacate a roost in the spring. Harmata (1984) documented similar patterns in the San Luis Valley, Colorado. McClelland et al. (1994) speculated that immatures delay spring migration into colder, northern breeding ranges because they cannot breed, and thus, have nothing to gain by migrating early in spring.

Occupation dates from early November to early April were very similar to those of winter-range communal roosts in central Utah (Edwards 1969, Platt 1976), in the San Luis Valley (Harmata 1984), and in the Klamath Basin (Keister et al. 1987). The numbers of eagles occupying either WCR or the OBR exceeded all other communal roosts documented in Utah. Occupation of roosts in northern Utah begins in early November, at the same time that eagles are vacating roosts in western Montana (Crenshaw and McClelland 1989, McClelland et al. 1994). Furthermore, McClelland et al. (1994) tracked more eagles to Utah from fall concentrations in western Montana, than to any state other than Montana. Many were tracked to the Great Salt Lake area, including Willard Bay. The correspondence of departure and arrival dates between western Montana roosts and northern Utah roosts, and the corroborating radiotelemetry information, provide evidence that northern Utah is a stopover or southern terminus for eagles in the "McKenzie-Intermountain Flyway" (McClelland et al. 1994). Furthermore, Harmata and Stahlecker (1993) and McClelland et al. (1994) documented multiple examples of winter site fidelity, including some in central Utah. The Willard Canyon and Ogden Bay roosts are among the largest known communal roosts in the lower 48 states, and the largest documented winter roosts within the McKenzie-Intermountain Flyway. They and their associated wetlands provide key habitat for Bald Eagles in interior-western North America.

RESUMEN.—Grandes números de águilas calvas (*Haliaeetus leucocephalus*) invernantes ocupan dos perchas comunales en el norte de Utah: la percha del cañón Willard y la percha de la bahía Ogden. Estas están entre las más grandes perchas comunales conocidas en los 48 estados inferiores, y es la más grande percha invernal documentada dentro de la vía de vuelo ínter montañosa McKenzie. Durante los inviernos de 1997–98 y 1998–99, estudiamos estos sitios- percha documentando su localización geográfica, hábitat, y ocupación. El Cañón Willard tuvo un numero máximo anual de 227 águilas en marzo de 1998 y 363 el 15 de enero de 1999. La percha de la Bahía Ogden tuvo un máximo de 153 águilas el 2 de febrero de 1998 y 264 hacia el 18 de febrero de 1999. Las águilas usaron estas perchas regularmente dentro de las estaciones y entre años.

[Traducción de César Márquez]

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