

PERCHING AND ROOSTING PATTERNS OF RAPTORS ON POWER TRANSMISSION TOWERS IN SOUTHEAST IDAHO AND SOUTHWEST WYOMING

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ABSTRACT — As part of an ongoing raptor management program, 45 km of 345 kilovolt (kv) transmission lines were surveyed from 5 June to 31 September 1983 to determine diurnal and nocturnal raptor use patterns. The Golden Eagle (*Aquila chrysaetos*) and Red-tailed Hawk (*Buteo jamaicensis*) perched mostly on upper, outer sections of transmission towers during the day and roosted on lower, inner sections at night. Daytime surveys alone may not accurately represent raptor use of these structures.

In many treeless areas where availability of nest, perch and roost sites may limit raptor populations, electrical powerline structures are readily utilized by many raptor species (Stahlecker 1979; Olen-dorff et al. 1981). In recent years utility companies have become more aware that the raptor/powerline association is sometimes detrimental to both man and bird, and have initiated studies to examine raptor use of powerlines. The most commonly used technique is daytime aerial surveying (e.g., Wilder 1981; Hansen 1982). Relatively little information has been gathered concerning raptor roosting behavior on powerlines and how it may compare to perching behavior (Craig and Craig 1984). This

paper presents results of a study funded by Idaho Power Company in spring and summer of 1983 (Smith 1983), which was designed to collect information on nocturnal and diurnal behavior of raptors on electrical transmission towers in southeast Idaho and southwest Wyoming.

STUDY AREA AND METHODS

The study area is located 30 km north of the convergence of the Idaho/Wyoming/Utah borders (Fig. 1). Three 345 kv transmission lines transmit electrical power through the study area from a coal-fired generating plant near Rock Springs, Wyoming to 3 separate substations bordering the Snake River plain in southern Idaho.

The 45 km study section is situated on the Idaho/Wyoming border and traverses mostly rolling, arid, treeless terrain 1800-2100 m in

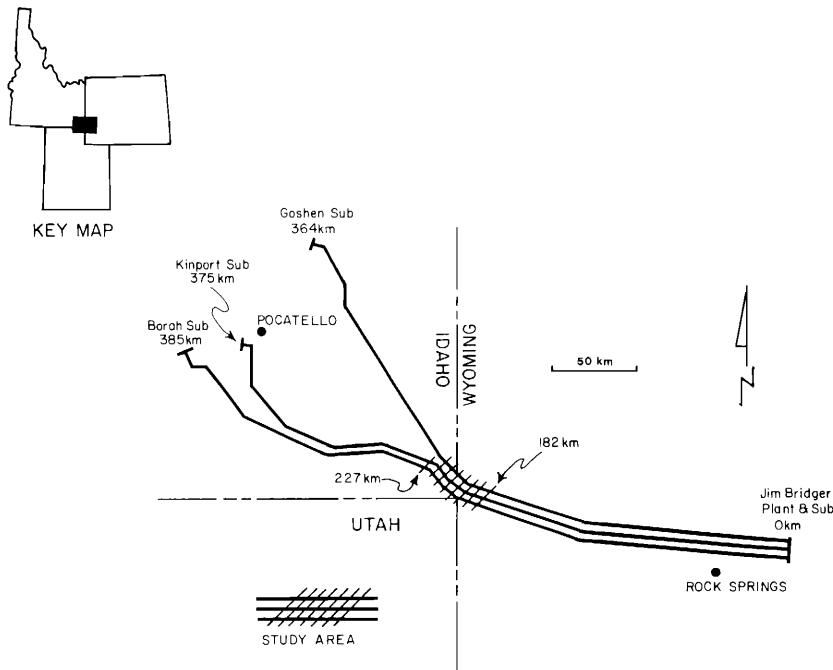


Figure 1. Transmission line route and study area.

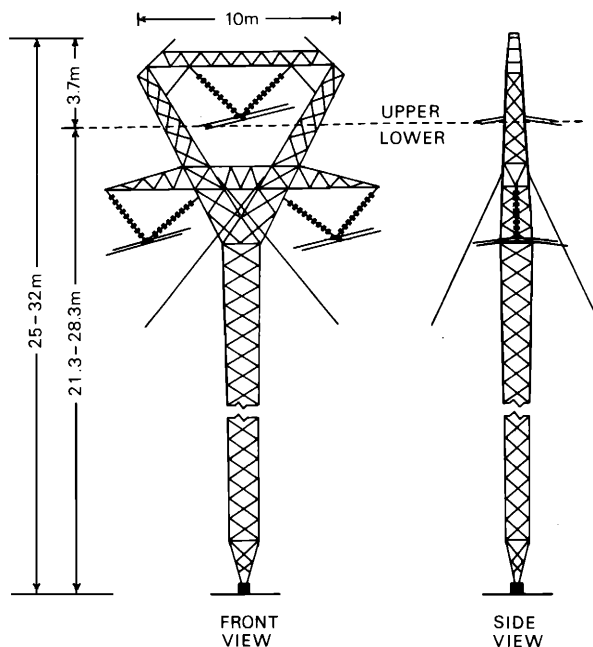


Figure 2. Configuration of 345kv transmission tower.

elevation. Three lines in the study area contain a total of 348 guyed aluminum towers, 25-32 m in height (Fig. 2). Dominant plant species for most of the area is big sagebrush (*Artemisia tridentata*).

Raptors most commonly sighted on towers were the Red-tailed Hawk (*Buteo jamaicensis*) and Golden Eagle (*Aquila chrysaetos*). During the post-fledging period (10 July to 31 September), an observed maximum of 28 fledgling and adult Red-tailed Hawks and 8 fledgling and adult Golden Eagles used the towers in this area for roost and/or perch sites. Seven Red-tailed Hawk nests and 2 Golden Eagle nests were the only occupied raptor nests present on transmission towers within the study area in 1983.

The study area was surveyed from a vehicle on 45 nights between 5 June and 31 September 1983. Surveys began at dusk and usually terminated 1-2 h before dawn. Each tower was examined using a hand-held spotlight and binoculars. The reflective property of the raptors' retinæ aided in locating birds at night. A light amplification device, or nightscope, was found to be unsuitable for this task due to inadequate magnification when used alone and poor resolution when used in conjunction with binoculars or spotting scope. Observations of birds at specific roost sites were made on 24 nights between 24 June and 9 September, to determine if movement to and from roost sites took place during the night. In all cases, Golden Eagles ($n = 19$ nights at 14 locations) and Red-tailed Hawks ($N=5$ nights at 5 locations) did not move from their roost towers at any time during the night.

Lines were also surveyed from the ground on 15 d between 21 July and 31 September. Day surveys began at 0700 H and were completed by 1400 H.

Perching/roosting observations were classified according to time of day, species, and position on tower. "Inside" refers to any position on the tower that is surrounded on at least 4 sides by tower members (referring to the 6 sides of a cube). Upper/lower position

designation used in data analysis (Fig. 2) was chosen because very little perching/roosting occurred in the slanted portions of the towers (Red-tailed Hawks — less than 10% of all observations, Golden Eagles — zero observations). Birds were observed perched mainly in 2 regions of the transmission towers, the uppermost horizontal crossbridge area and the lower horizontal crossarm area (Fig. 2).

RESULTS AND DISCUSSION

Most significant observed differences between diurnal and nocturnal use patterns were as follows:

1. Eagles and hawks showed a significant shift from using *outer* tower sections during the day to using *inner* tower sections at night.
2. Both species exhibited a shift from using *upper* sections of the towers during the day to using *lower* sections at night.

Data for Red-tailed Hawks consisted of 99 perch and 236 roost observations. Data for Golden Eagles consisted of 46 perch and 124 roost observations. Frequencies of observations in each category were used to generate 2x2 chi-square contingency tables to test the null hypothesis that time of day was independent of observed perch/roost location on the towers. Chi-square values (Fig. 3) indicate that

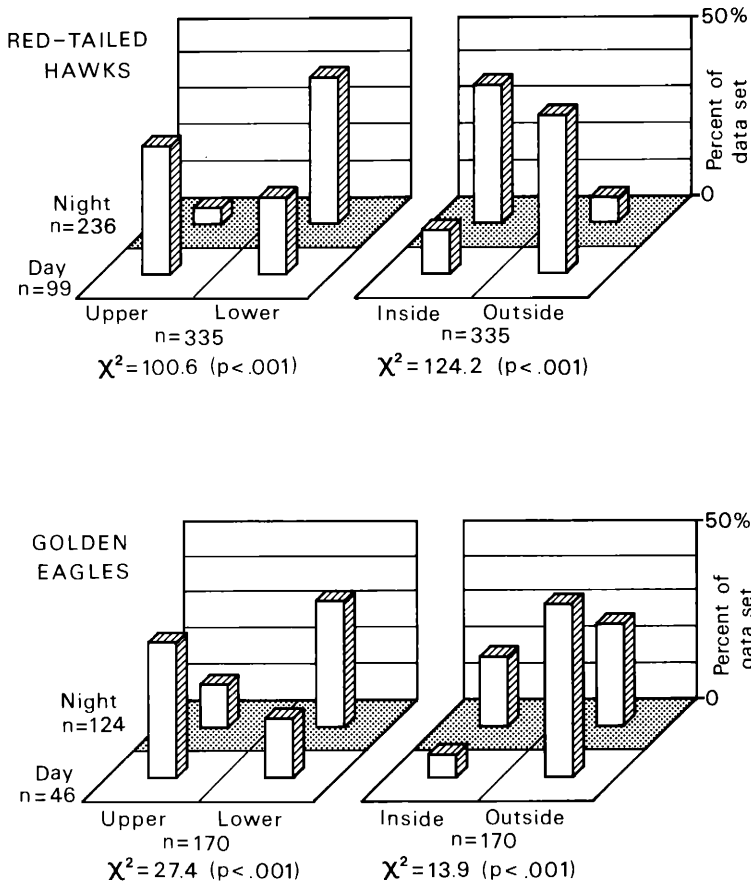


Figure 3. Relative frequencies of perch and roost observations on transmission towers in southeast Idaho and southwest Wyoming for the period 5 June to 31 September 1983. Chi-square (χ^2) values were generated from observed frequencies in each category. Day = 0700-1959 H. Night = 2000-0659 H.

diurnal use patterns differed significantly from nocturnal use patterns for both species. Results indicate that daytime surveys alone may not accurately represent overall use of towers as perch/roost structures, and should be supplemented by nocturnal observations.

Red-tailed Hawks exhibited larger day-outside/night-inside differences than did Golden Eagles ($\chi^2 = 78.8, P < 0.001$), possibly due to differences in body size and mobility. The hawks could land and take off directly from inner tower members, whereas eagles were required by girder spacing to walk and hop into and out of some inner locations.

Both Red-tailed Hawks and Golden Eagles ap-

peared to react behaviorally to transmission towers much as they do to natural substrates such as trees or cliffs. Upper, outer portions of the towers, used for diurnal hunting and resting perches, provided the advantages of an elevated viewpoint and unobstructed takeoff and landing flight paths. Lower, inner portions of the towers afforded what little cover there was in the area and were used for roost sites.

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