mates were incubating. Again, this is not similar to the case reported here, because male A attended to both females at the same time and within full view of each.

Because we do not know whether or not male A succeeded in fertilizing female B nor do we know what the outcome of female B's nest would have been under better weather conditions, we cannot assess the effects of bigamy on reproductive success of male or female bee-eaters. In view of the apparent rarity of bigamy in this species, it is possible that bigamy is not adaptive but that it occasionally results by accident.

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A Large Concentration of Roosting Golden Eagles in Southeastern Idaho

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Communal roosting by Bald Eagles (*Haliaeetus leucocephalus*) is a common occurrence (Swisher 1964, Servheen 1975, Fitzner and Hanson 1979), but this behavior has not been reported for Golden Eagles (*Aquila chrysaetos*; Snow 1973). Thurow et al. (1980), however, observed six immature Golden Eagles roosting in the same canyon in southern Idaho, although not communally, and immature Golden Eagles have been known to share roost sites with Bald Eagles (Edwards 1969). In this paper we describe a large concentration of nocturnally roosting Golden Eagles, some of which roosted communally on power line structures.

The study site was located at the Idaho National Engineering Laboratory (INEL), which encompasses 231,600 ha and is administered by the U.S. Department of Energy. The INEL is located on the upper Snake River Plain (average elevation: 1,524 m) and is covered primarily by sagebrush-grass vegetation (Harniss and West 1973), big sagebrush (*Artemisia tridentata*) being the most conspicuous plant. Temperatures during the coldest and warmest months of this study ranged from a lowest daily minimum of −35.6°C in February and −13.9°C in April 1982 to a highest daily maximum of 9.4°C in February and 14.4°C in April (National Oceanic and Atmospheric Administration records for Central Facilities Area, CFA).

Evening inventories of roosting eagles were conducted periodically from early February through mid-April 1982. Four roads adjacent to power lines were selected as survey routes on the study area (Fig. 1). A total of 9 surveys were conducted along route 4, 7 surveys along route 3, and 1 survey each along routes 1 and 2.

Surveys were conducted from about 15 min before sunset until dark on calm evenings, because we observed that most eagles had arrived at their roost sites by this time. We inventoried the routes by driving along paved roads and recording every eagle sighted and the number of birds roosting per pole. The direction driven on the routes was reversed on consecutive survey days, and, in most cases, eagles remained perched as we passed them. The actual roosting places on the structures were recorded on 14 of the surveys. Data on roosting preferences of eagles perched on structures of atypical design, such as angle points or short distribution lines, were lumped with those of birds seen on common power-pole types (Fig. 2). Olendorff et al. (1981) have provided a description of power-pole dimensions and configurations like those found on the INEL. The distance from roads to the power lines varied, but we calculated eagle densities by assuming that we saw

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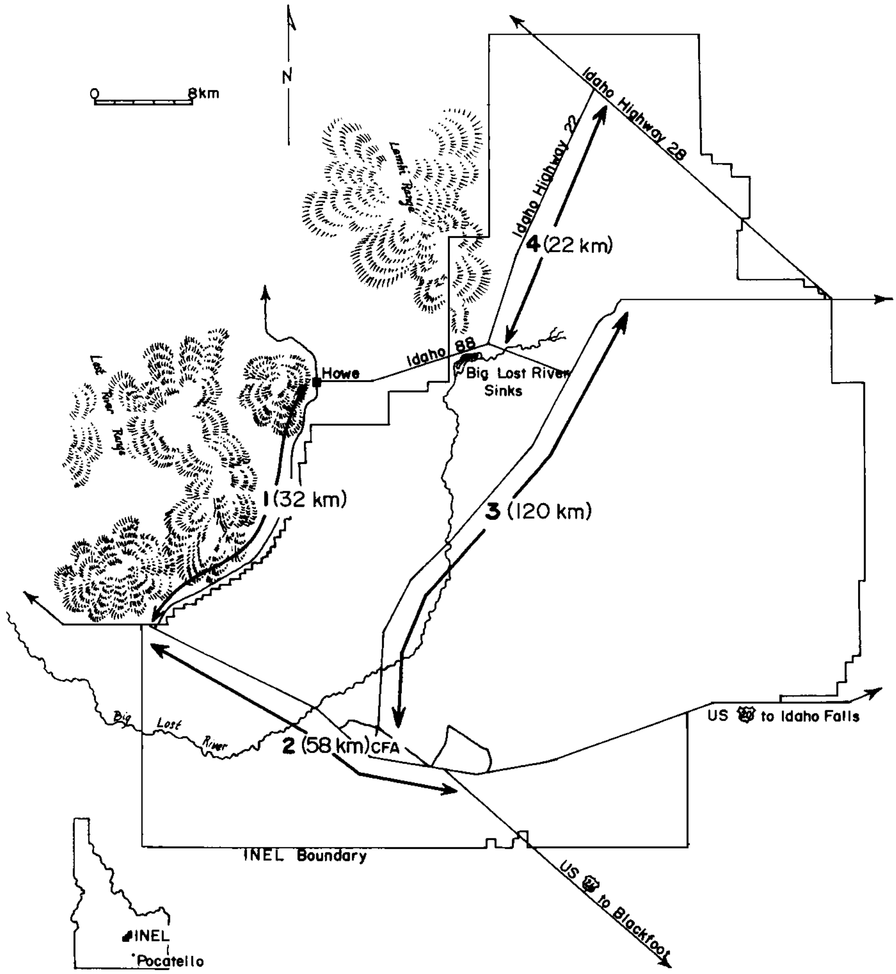

Fig. 1. Four routes driven during an inventory of Golden Eagles roosting at the Idaho National Engineering Laboratory in 1982. Approximate lengths of the inventoried power lines along each route are indicated in parentheses.

all birds perched on power poles within 4 km of the survey routes.

We were not able to identify all eagles to species during inventories, but all identifiable birds were Golden Eagles, and the rest were dark-headed eagles (not adult Bald Eagles). Although Bald Eagles used the study area, they roosted communally in a grove of cottonwood trees (*Populus* sp.) near Howe, Idaho. Therefore, we are confident that most of the birds we observed were Golden Eagles.

Peak numbers of roosting eagles occurred at the INEL in the first half of February and decreased sharply in mid-February (Table 1). The large number of eagles were probably attracted to the INEL by the abundance of black-tailed jackrabbits (*Lepus californicus*) that occurred there in 1982 (Craig et al. 1983). Significantly more eagles per kilometer were observed along route 4 than along routes 1, 2, or 3 in surveys conducted before 21 February (t-test, $P < 0.05$). In one survey of route 4, 124 birds (5.6 eagles/km) used the highest proportion of available poles of any survey (56 of 85 poles). Because considerably fewer Golden Eagles (≤ 20) were observed during two daytime car surveys of this route in late January and early February (Craig et al. 1983), it appears that roosting eagles dispersed from favored roost sites in this area each morning to forage elsewhere. The pole design of structures on route 4 probably was not responsible for this area being chosen as a favored roosting site, because route 1 had the same type of pole-line structures. There are two possible reasons why eagles preferred this area as a roost site, however. First, the mountains west of the area shelter the roost site by acting as a barrier to the predominant

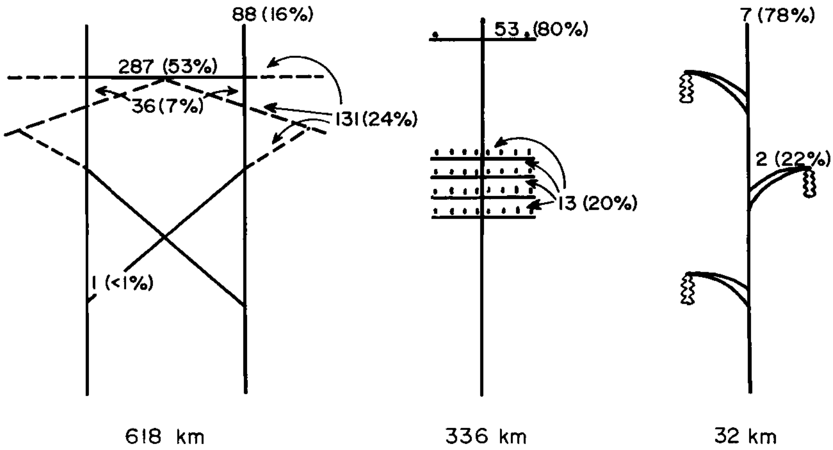

Fig. 2. Number (percentage) of eagles observed roosting on various parts of power line structures (insulators are included in drawings of distribution lines) at the Idaho National Engineering Laboratory, 1982. The total length of each power-line type inventoried is provided below the configurations. Dotted lines indicate a composite drawing of H- and K-frame power poles, but poles are not drawn to scale.

western winds. Second, the nearby eastern-facing mountains receive light from the rising sun, which creates good early-morning thermals near route 4. It is known that Golden Eagles tend to seek these updraft areas (Snow 1973). The cause of the reduction in the number of roosting eagles on routes 3 and 4 between 11 and 21 February is unknown but may have been due to migration from wintering to nesting areas.

Most (98%) of the eagles observed during the inventories were perched. The low number of flying birds suggests that the eagles had made final roost-site selections by the time we initiated our surveys. Although observations of 2–3 birds roosting per pole were common, 53% of the birds roosted singly. More than three birds per pole were observed only during the early February surveys and usually along route 4. At this time, birds often perched close together,

Table 1. Number of eagles observed roosting per power pole at the Idaho National Engineering Laboratory, southeastern Idaho, 1982.

Route	Date	Number of eagles roosting per pole							Other[a]	Total birds (birds/km)
		1	2	3	4	5	6	7		
4	02/05/82	22	12	8	5	0	0	0	0	90 (4.1)
4	02/08/82	23	13	12	4	2	1	1	0	124 (5.6)
3	02/08/82	54	3	1	0	0	0	0	0	63 (0.5)
4	02/09/82	28	8	3	4	1	0	0	0	74 (3.7)
3	02/09/82	61	7	3	0	0	1	0	2	92 (0.8)
4	02/11/82	25	14	5	0	2	2	0	0	90 (4.1)
3	02/11/82	61	6	4	0	0	0	0	3	87 (0.7)
1	02/12/82	8	0	0	0	0	0	0	0	8 (0.3)
2	02/12/82	21	1	0	0	0	0	0	0	23 (0.4)
4	02/21/82	13	1	1	0	0	0	0	0	18 (0.8)
4	03/07/82	12	2	0	0	0	0	0	1	17 (0.8)
3	03/07/82	20	0	0	0	0	0	0	0	20 (0.2)
4	03/21/82	12	1	0	0	0	0	0	1	14 (0.6)
3	03/21/82	27	0	0	0	0	0	0	1	27 (0.2)
4	04/04/82	4	0	0	0	0	0	0	0	4 (0.2)
3	04/04/82	19	1	0	0	0	0	0	3	22 (0.2)
4	04/19/82	3	0	0	0	0	0	0	0	3 (0.1)
3	04/19/82	8	0	0	0	0	0	0	3	11 (0.1)
Total birds		416	69	37	13	5	4	1	14	787 (1.6)

[a] Flying, tree, ground.

with no visible space between them. When roosting concentrations were highest, 33% of the available power poles were not used. This suggests that the communal roosting behavior was probably a result of choice rather than a lack of roosting space. Low overnight temperatures may have caused these Golden Eagles to roost close together on the same structure so they could share warmth and thus change the microclimate of their roost site. Welty (1962) reported a similar phenomenon in some passerines, which huddled close together on cold nights to keep warm.

We were not able to determine whether or not eagles preferred a certain pole design for roosting along a given route because of the locations of the different types of structures (H- and K-frame transmission lines and distribution lines along routes 2 and 3; K-frame transmission structures along route 4, and K-frame transmission lines and distribution lines along route 1). The roost-site selection of birds on H- or K-frame power poles, however, was not evenly distributed (Chi-squared goodness of fit; $P < 0.001$). Generally, eagles perched on the most level and spacious parts of the structures. Most birds were seen on level cross braces or side arms; there were fewer on pole tops and inside braces (Fig. 2). On distribution lines, the topmost cross arms were used significantly more than the lower cross arms, which supported communication lines (Chi-squared goodness of fit with Yates correction for continuity; $P < 0.001$). No birds were observed on the tops of cross-arm distribution lines. The presence of an insulator and conductor on the pole tops probably prevented their use for perches, as noted by Olendorff et al. (1981). The use of the lower cross arms on poles where communication lines were present was unusual, as the numerous insulators and wires they supported appeared to make landing difficult. This perch, however, may also have offered more reradiated heat and protection from the wind than the top cross arm.

In conclusion, the dense concentration of Golden Eagles at the INEL probably resulted from high jackrabbit densities during the winter of 1982. Many of these eagles roosted on power-line structures during the night. The roosting Golden Eagles appeared to concentrate more in areas that were comparatively sheltered, probably in response to extremely cold temperatures. Some of these birds perched communally on the same power-pole, perhaps to share body heat.

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