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RELATIVE ABUNDANCE OF NESTING RAPTORS IN SOUTHERN IDAHO

by

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ABSTRACT. During 1975-76 raptor surveys were conducted on 12,473 km² of Great Basin desert in Idaho for the purpose of incorporating raptor baseline data and management programs into land-use plans. Over 970 occupied raptor nests of 18 species were located in the Bureau of Land Management planning units. Prairie Falcons (*Falco mexicaus*) were the most numerous large raptors. Raven (*Corvus corax*)—Prairie Falcon ratios changed with alterations in land use patterns. Ravens increased in desert lands that were converted to agriculture, crested wheatgrass, or cheatgrass pastures. Comparisons of numbers of raptor nests per 100 km² in different areas indicate that the Snake River Birds of Prey Natural Area has exceptionally high raptor populations (217.0 occupied raptor nests per 100 km²). All other areas surveyed averaged only 7.8 occupied raptor nests per 100 km².

Introduction

Since 1975 the Bureau of Land Management (BLM) has contracted for and undertaken raptor surveys on the public lands it administers in Idaho. The primary purposes of the surveys are to inventory raptor nesting habitat and to establish nesting densities. Such baseline data are incorporated into the bureau's land-use-planning and decision-making processes. Data resulting from these surveys are also used to fulfill

seven major objectives as follows:

1. *Comply with the Endangered Species Act of 1973.* The surveys are undertaken to determine the presence or absence of Peregrine Falcons (*Falco peregrinus*) to ensure that no land actions are proposed which would adversely affect this species or its critical habitat. In addition, the surveys involve rechecking historic Peregrine sites suitable for reintroduction.

2. *Identify nesting and hunting areas utilized by sensitive raptor species.* Sensitive raptors are those which could become threatened or endangered in the foreseeable future. Currently they include Bald Eagles (*Haliaeetus leucocephalus*), Ferruginous Hawks (*Buteo regalis*), Ospreys (*Pandion haliaetus*), Prairie Falcons (*Falco mexicanus*), Merlins (*Falco columbarius*), Spotted Owls (*Strix occidentalis*), Burrowing Owls (*Athene cunicularia*), possibly one or more eastern species, and several peripheral species. Identification and management of sensitive species is consistent with the intent of the Endangered Species Act in that habitats and numbers of nesting birds should not be diminished to a point that listing them as threatened or endangered becomes necessary.

3. *Identify important raptor wintering areas.* Bald Eagles, Gyrfalcons (*Falco rusticolus*), and Rough-legged Hawks (*Buteo lagopus*) are the major species considered in this effort in southern Idaho. All these species winter in specific habitats on BLM-administered lands in southern Idaho. It is important to maintain these wintering areas, which are often neglected by both researchers and land managers; much more effort has been and is focused on nesting habitats.

4. *Identify high density or key raptor areas.* Baseline data on key or crucial areas can provide justification for placing proper constraints on agricultural development; powerline corridors; power-plant siting; mineral exploration; livestock grazing; off-road vehicle use; and development of roads, campgrounds, and trails. High densities of nesting raptors may indicate especially high environmental quality, a resource value recognized in multiple-use land-management-planning and decision-making processes.

5. *Establish criteria for buffer zones to protect raptor nesting sites.* Protection for raptors is a matter of great importance both to land managers and to the general public. Without acceptable quantifiable criteria based on field studies such as those reported in this paper, the public's advocacy for more thorough consideration of raptors and other predatory animals by land managers will be largely ineffective.

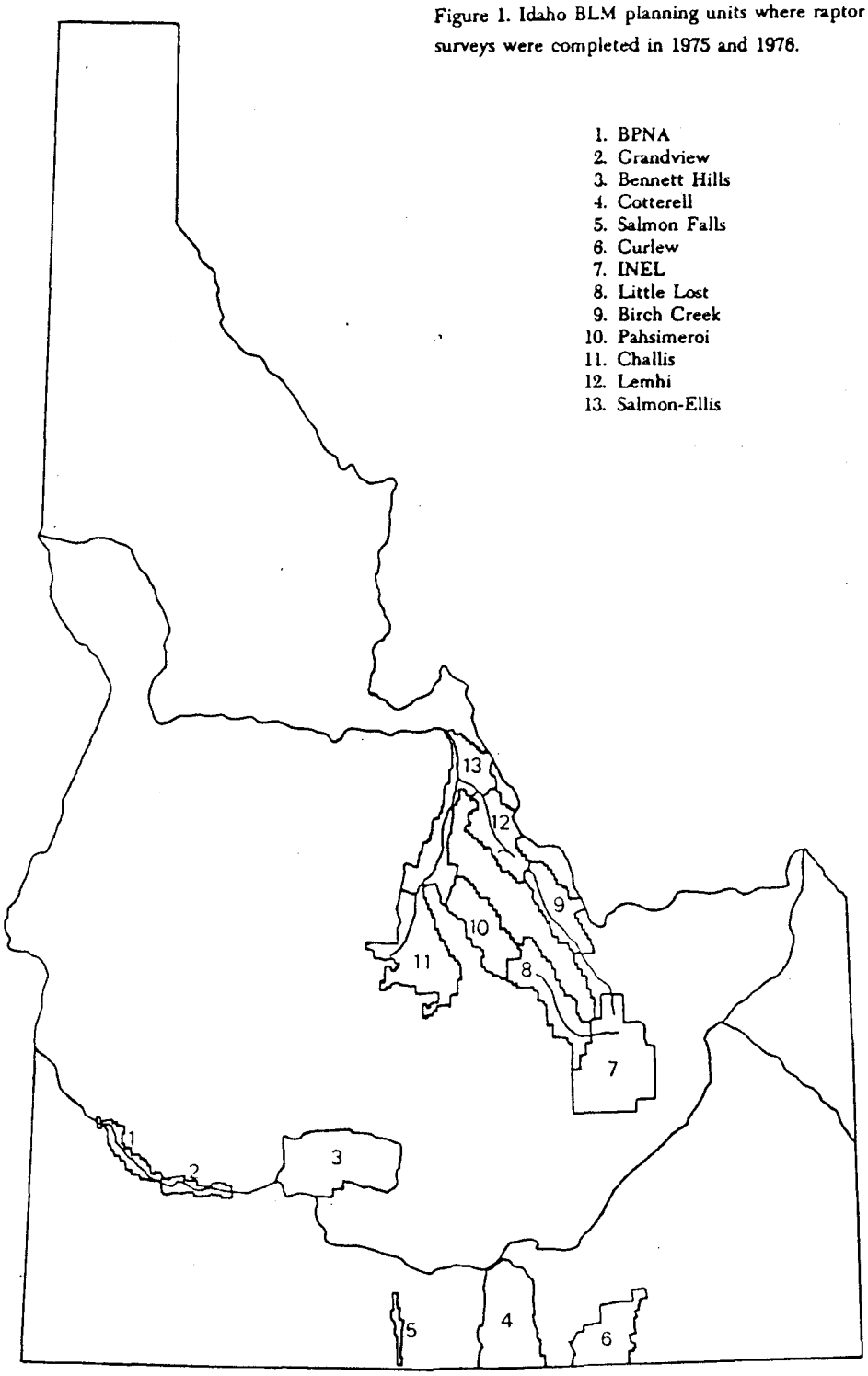
6. *Identify areas that may be suitable for raptor nesting structures or other management.* Raptor management should be conducted only when and if it is needed. As with wildlife management of any kind, there must be a thorough analysis of the advantages and disadvantages of a particular management action, such as providing raptor perching and nesting structures where the birds have not been able to perch or nest in the past. This analysis requires data of the type being collected by the BLM and reported here.

7. *Establish baseline data on raptor nesting populations.* Comparison of data to follow in this report to future survey data may give an indication of general wildlife habitat condition and/or stability. Raptor densities are proportional to the availability of suitable nesting sites and prey. Therefore, significant change in raptor nesting composition and/or density may be an indicator of prey species composition and abundance, as well as a rough measure of habitat conditions.

Figure 1 is a synthesis of raptor nesting surveys conducted on thirteen BLM planning units in Idaho during 1975-76. Focus is on efficiency of surveying methods, comparative raptor density and species diversity, and identification of nesting habitat.

Figure 1. Idaho BLM planning units where raptor surveys were completed in 1975 and 1978.

1. BPNA
2. Grandview
3. Bennett Hills
4. Cotterell
5. Salmon Falls
6. Curlew
7. INEL
8. Little Lost
9. Birch Creek
10. Pahsimeroi
11. Challis
12. Lemhi
13. Salmon-Ellis



Survey Area

Southern Idaho deserts lie within the Upper Sonoran or "cool desert" region of the United States (Odum 1959). Beginning in the mountain valleys of the Little Lost and Birch Creek valleys to the north and Raft River-Salmon Falls Creek to the south, streams here flow into the vast expanse of the Snake River plain. The plain is bisected by the sickle-curve shape of the Snake River. Within the canyons of the Snake and its tributaries are found numerous concentrations of nesting raptors.

Two other valley systems which have been surveyed integrate with the Birch Creek and Little Lost valleys in low, topographically gentle passes to form the Lemhi and Pahsimeroi rivers flowing north into the Salmon River. Altitude varies from 705 m at the Snake River Birds of Prey Natural Area (BPNA) to 2194 m at the Gilmore Summit, Birch Creek. Annual precipitation ranges from 20 cm to 65 cm, much of it occurring as snow in winter. Annual temperatures range from -32° C in January to 38° C in July.

Vegetation in the Snake and upper Salmon River drainages is characteristic of the northern desert shrub biome comprising three altitudinal delineations (Cronquist et al. 1972). The Shadscale (*Atriplex confertifolia*) Zone occurs in saline valley soils. In association with shadscale, greasewood (*Sarcobatus vermiculatus*) is found around recently flooded mud flats and in dry streambeds. Big sage (*Artemisia tridentata*), which occurs in the second major zone, the Sage Zone, is often found as a monotypic stand. Other dominant shrubs in this zone may include black sage (*Artemisia nova*) and rabbitbrush (*Chrysothamnus nauseous*). Utah juniper (*Juniperus osteosperma*) and, at higher elevations, mountain mahogany (*Cercocarpus ledifolius*) occur in the third major zone, the Juniper Zone. Extensive crested wheatgrass (*Agropyron cristatum*) seedings (486,235 ha) for livestock are found throughout the Snake and Salmon River drainages. Agricultural crops include alfalfa (*medicago sativa*), cereal grains, and tubers. Most of the farms are located in the Sage Zone.

Methods

Three survey methods were utilized in various combinations. Ground surveys were conducted on foot and with vehicles. Fixed-wing and rotary-wing aircraft were used in the most inaccessible areas.

Our primary focus was locating nest sites of large raptors, but whenever possible nest sites of small raptors were noted. Nest sites were plotted on U.S. Geological Survey 7.5-minute (1:250,000) quadrangle maps. Nests were located prior to, during, and after the breeding season. When possible, data were collected on the species, number, sex, and age of the raptors present at the nesting sites.

Results and Discussion

Data from raptor inventories can be affected by the time of year, resolution of maps, and experience of personnel. Where manpower and funding permit, a combination of fixed-wing and rotary-wing air surveys and ground surveys yields the most complete data. Comparative results of these survey methods are found in table 1. Rotorcraft are the most efficient tools; however, all three methods have limitations (White and Sherrod 1974). The optimal period for conducting surveys was mid-April through June. Nest sites were easier to locate during this period because of the presence of adults in or near the nest. Young were readily observable and were counted during the surveys, and nest desertion was kept to a minimum (Fyfe and Olendorff 1976).

Table 1. Number of raptor nests found by using ground, fixed wing, and rotary-wing survey methods (G—ground survey; F-W—fixed wing; R-W—rotary wing).

Location (planning unit)	Survey method	Season	Raptor nests/month	Survey
BPNA	G	6 Feb-July	49	Kochert et al. 1976
Grandview	G	6 Feb-July	27	Kochert et al. 1976
Bennett Hills	G, F-W, R-W	2 May-June	72	Snow 1976
Little Lost	G	3 May-July	30	Renn 1976
Salmon Falls	G	5 Feb-June	8	Trost 1976
INEL	G	5 Mar-July	9	Craig 1976
Curlew	G	6 Feb-July	7	Howard 1976
Salmon-Ellis	F-W, R-W	1 May	58	Howard 1976
Lemhi	F-W, R-W	1 May	30	Howard 1976
Cotterell	G	6 Feb-July	7	Howard 1976
Pahsimeroi	F-W, R-W	1 May	18	Howard 1976
Birch Creek	G	3 May-July	5	Renn 1976
Challis	G, F-W, R-W	1 August	11	Platt 1976

Within the thirteen BLM planning units, 972 occupied raptor nests were found during surveys conducted in 1975-76 (table 2). Many more inactive nest sites of large raptors were located on the thirteen planning units. Some were probably alternate nests, but others may have been unused because of the low density of black-tailed jackrabbits (*Lepus californicus*) (Kochert et al. 1975). For example, in 1975 in the Curlew Planning Unit, twelve nesting attempts were made by Ferruginous Hawks, a species that relies heavily on jackrabbits in many areas of the West (Howard 1975, Woffinden 1975). Eighteen successful nests were located in the same area in 1972, a year of high jackrabbit density (Howard 1975).

Comparison of the various planning units was made possible by caluculating the number of raptors per 100 km^2 (table 2). Data indicate that the BPNA has exceptionally high raptor populations, 217.0 occupied raptor nests per 100 km^2. Two major requirements for nesting raptors are present in and around the BPNA: an abundant prey base and 64 km of potential nesting cliffs. Though the Challis Unit showed the lowest raptor populations (1.0/100 km^2), these data are not a true reflection of the area, which was not surveyed until August 1975. Extrapolations were made as to raptor occupancy (Platt 1976).

Table 2. Number of occupied raptor nests per 100 km² in 13 planning units in southern Idaho, 1975-76.

Planning unit	Year	Size (km²)	No. of nests	No. of nests/ 100 km²
BPNA	1976	135	294	217.8
Grandview	1976	117	163	139.3
Bennett Hills	1976	1,147	145	12.6
Little Lost	1976	1,235	91	7.4
Salmon Falls	1975	83	58	69.9
INEL	1975	2,315	44	1.9
Curlew	1975	1,212	42	3.5
Salmon-Ellis	1976	1,352	40	3.0
Lemhi	1976	671	30	4.5
Cotterell	1975	1,585	22	1.4
Pahsimeroi	1976	878	18	2.1
Birch Creek	1976	593	14	2.4
Challis	1974	1,114	11	1.0
Totals		12,473	972	7.8

The mean number of 7.8 occupied nests/100 km² in southern Idaho is reduced to 3.7 when the BPNA and Grandview, a proposed extension of the BPNA, are excluded from the calculations (table 3). Comparison was made of the BPNA-Grandview extension to other southern Idaho planning units and study areas in Colorado (Olendorff 1975), Washington (Olendorff 1973), and Utah (Smith and Murphy 1973). Study areas in these states show a similarity in nesting density when compared to southern and north central Idaho. However, these surveys were done prior to 1975, so no direct comparison should be made. They do provide some comparative measurements of nesting densities and reflect the uniqueness of the BPNA and its proposed extension with regard to raptor productivity.

Table 3. Comparative density of raptor nests per 100 km² within the western United States.

Location	Size km²	No. of raptor nests	No. of nests/100 km²
BPNA-GV, Idaho	252	456	181.0
Southern Idaho	12,437	464	3.7
Hanford, Washington	1,036	44	4.2
Pawnee, Colorado	2,590	159	6.1
Cedar Valley, Utah	207	$\bar{x}$ = 35	16.9

Analysis of species composition indicates that the Prairie Falcon is the most numerous large raptor (table 4). Of 972 occupied nest sites, 268 (27.6 percent) were of Prairie Falcons. However, only 70 of these nests were found in eleven of the planning units; the remaining 198 (72.4 percent of the Prairie Falcons) were found in the BPNA-Grandview area. The BPNA-Grandview area may have the highest density of nesting Prairie Falcons in North America (Ogden 1972).

Table 4. Species composition of raptors found nesting in southern Idaho, 1975-76.

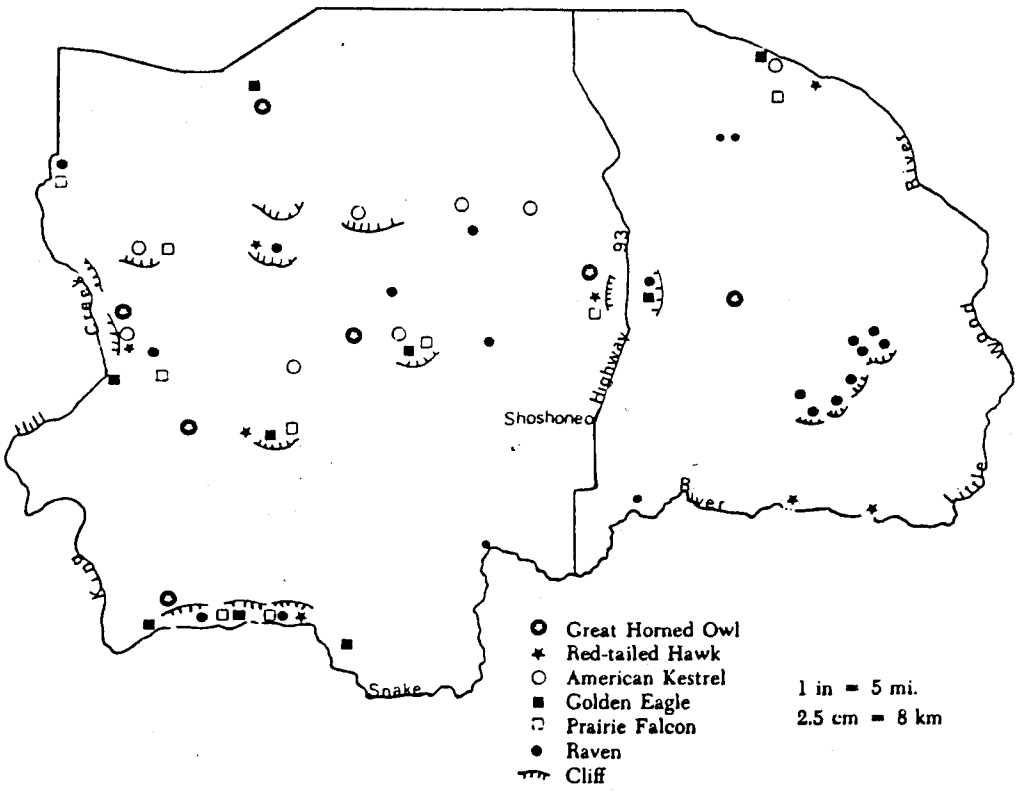
Species	Number	Percent
Golden Eagle (*Aquila chrysretos*)	101	10.4
Peregrine Falcon (*Falco peregrinus*)	1	0.1
Prairie Falcon (*Falco mexicanus*)	268	27.6
Merlin (*Falco columbarius*)	1	0.1
American Kestrel (*Falco sparverius*)	105	10.8
Ferruginous Hawk (*Buteo regalis*)	34	3.5
Red-tailed Hawk (*Buteo jamaicensis*)	140	14.4
Swainson's Hawk (*Buteo swainsoni*)	16	1.6.
Sharp-shinned Hawk (*Accipiter striatus*)	1	0.1
Marsh Hawk (*Circus cyaneus*)	37	3.8
Great Horned Owl (*Bubo virginianus*)	51	5.2
Long-eared Owl (*Asio otus*)	7	0.7
Short-eared Owl (*Asio flamneus*)	6	0.6
Screech Owl (*Otus asio*)	3	0.3
Barn Owl (*Tyto alba*)	15	1.5
Burrowing Owl (*Speotyto cunicularia*)	40	4.1
Raven (*Corvus corax*)	138	14.2
Turkey Vulture (*Cathartes aura*)	8	0.8
Total of 18 species	972	99.8

Red-tailed Hawks (*Buteo jamaicensis*) were the second most abundant raptor, comprising 14.4 percent, and were found in every planning unit. This fact seems to reflect the nesting versatility of this species.

Ravens (*Corvus corax*) were the third most numerous raptor (14.2 percent) if one assumes, as did the Craigheads (1956), that Ravens function as a raptor in an ecological framework. There seems to be a relationsip between undisturbed habitat (i.e., areas not treated extensively with crested wheatgrass) and the ratio of nesting Ravens and Prairie Falcons. From the combined surveys Ravens represented 14.2 percent of the nesting raptors, and Prairie Falcons represented 27.6 percent. This pattern—more Prairie Falcons than Ravens—held true in most of the western planning units. In areas where farming was intensive or where an abundance of cheatgrass or crested wheatgrass was found, Ravens equaled or reversed the ratio.

The dependence of nesting patterns on substrate becomes evident when a composite is developed from a survey. For example, in the Bennett Planning Unit, nests showed a distribution along canyons and rock outcrops (fig. 2). Only a few nests were discovered in trees and on power poles, and none were on the ground. Some clumping of nests was found, probably because of prominent rock outcrops, or simply, under other circumstances, because the canyon rock was the only nesting substrate available. When nesting distributions are analyzed in this way, the land manager has better justification for protecting nest sites with buffer zones or other management considerations.

Figure 2. Raptor nest sites in the Bennett Hills Planning Unit.



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