IN RIM/SWEETGRASS HILLS RAPTOR SURVEY
BUREAU OF LAND MANAGEMENT
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I. INTRODUCTION

The Kevin Rim and Sweetgrass Hills, areas of BLM land within the West HiLine RMP, were known to contain high value raptor habitats as well as important oil, gas, and hardrock mineral resources. Currently, the Kevin Rim area is encompassed by a developed oil and gas field, and the East Butte of the Sweetgrass Hills is being explored for possible large-scale mineral extraction. Continued mineral activities of this nature could significantly affect these important raptor habitats. The degree of impact will be dependent on the mitigation applied. Activity planning, by which conflicts between raptors and minerals will be resolved, will depend on a base-level of raptor populations and habitat utilization which can result in sound management guidelines and a reasonable follow-up monitoring. This study was undertaken to establish a base-level of data on raptor nesting populations and habitat utilization.

II. METHODS

The Kevin Rim and Sweetgrass Hills study areas were searched on foot and by vehicle during the 1988 nesting season (April-July) to identify important raptor nesting habitat and locate nest sites. The Kevin Rim study area, 23.6 km^2 (5840 acres) was searched intensively on foot. Nearly the entire area was covered at least once. Important raptor habitats were delineated on 7.5 minute topographic maps. Active and alternate nest sites were mapped on topographic maps and photographed with a Polaroid SX-70 camera. Location information, nesting activity observations and nest site descriptions were recorded on Nest Data Sheets (Appendix 1). Active nests were re-visited when possible to obtain production or fledging data. Fifteen days of field work were spent in the Kevin Rim (4/16, 4/17, 5/8, 5/14, 5/15, 6/4, 6/5, 6/11, 6/12, 6/18, 6/19, 7/3, 7/4, 7/9, and 7/10).

The Sweetgrass Hills study area, 31.9 km^2 (7892 acres) was searched mostly from the public roads with a 10-30 power spotting scope. One day-hike was taken into the East Butte area to look at the site of the most recent hard-rock minerals exploration. Habitats were evaluated for their potential value for raptors, and important nesting habitats such as cliffs, were mapped on topographic maps. Two days were spent in the Sweetgrass Hills (7/16, 7/17). Observations of raptors and nests were recorded.

III. RESULTS/DISCUSSION

A. Important Raptor Habitat

Kevin Rim:

Major habitats on the BLM land along the Kevin Rim are shown in Appendix 2. The major habitats mapped were: grasslands, including shrub-lands such as sagebrush (72%), badlands (grasslands exhibiting rugged topography and sparse vegetative cover (21%), cliffs and very steep, eroded hillsides (4%), shrub wooded draws/riparian (2.5%), and tree riparian (0.5%). Their importance to raptors is summarized as follows:

Grasslands:
Grasslands were the dominant habitat along the Kevin Rim. They provided foraging areas for all the raptor species found along the Kevin Rim, and provided some nest sites for ferruginous hawks and northern harriers. Numerous ground squirrel colonies were found in grasslands along the Rim, providing possible nesting areas for burrowing owls. No burrowing owls were observed, however none of the ground squirrel colonies were surveyed for them. Much of the private land surrounding the Kevin Rim has been converted to strip-cropping for wheat and other small grains, reducing the foraging habitat for raptors in the surrounding areas.

Badlands:
Grasslands which visually exhibited rugged topography and sparse vegetation were mapped separately as "badlands." These areas were important nesting areas for ferruginous hawks, as well as foraging areas for other raptor species.

Cliffs and steep, eroded hillsides:
Sheer sandstone cliffs along the Kevin Rim were often interspersed with steep, eroded hillsides. They were mapped together as one type because they both provided important nesting areas for ferruginous hawks and golden eagles. Prairie falcons and kestrels used only the sheer cliffs for nesting.

Shrub woody draw/riparian:
Very little surface water exists on the Kevin Rim, and many of the draws were too dry to support even small shrubs such as snowberry. Most of the shrubby draws consisted of snowberry (Symphoricarpos sp.), chokecherry (Prunus virginiana), juneberry (Amelanchier alnifolia), and wild rose (Rosa sp.). Several draws contained relict stands of water birch (Betula occidentalis). Shorter shrubs such as snowberry can provide nesting cover for northern harriers, and the taller shrubs are potential nesting areas for Swainson's hawks. The only Swainson's hawk nest found was located in a dense water birch stand in a north-facing draw.

Tree riparian:
Few trees are found along the Kevin Rim. Only two major stands of trees were located. One was a cottonwood stand located on state school trust land, and the other was a relict aspen stand located on BLM land. These areas provided potential nesting sites for red-tailed hawks, Swainson's hawks, golden eagles, merlins, kestrels, and a variety of owl species.

Sweetgrass Hills:

The major habitats are delineated in Appendix 3. The Sweetgrass Hills appeared to offer nesting sites for a greater diversity of raptor species than the Kevin Rim. The major habitat areas are:

Grasslands:
Grasslands in the Sweetgrass Hills potentially provided foraging areas for prairie falcons, golden eagles, merlins, red-tailed hawks, and northern harriers. They would also provide some nest sites for northern harriers.

Cliffs:
Most of the cliffs in the Sweetgrass Hills appeared to be marginal for raptor nest sites due to their small size and/or lack of secure ledges or holes. One very large cliff located on the southeast side of the West Butte was the exception. This cliff was an excellent nesting area, but its use would be limited by the territoriality of raptor species. A prairie falcon aerie was suspected to be located on this cliff. It appeared to be is an excellent site for golden eagles, red-tailed hawks, and kestrels.

Douglas fir/lodgepole pine forest:
This habitat in the Sweetgrass Hills appeared to be suitable for nesting red-tailed hawks, golden eagles, and accipiters (primarily sharp-shinned hawks and Coopers hawks). It was potential nesting habitat for several species of owls, including great horned owls, saw-whet owls, and pygmy owls. More intensive nesting surveys would be necessary to confirm the presence of these species.

Pine woodlands:
Many of the dry, rocky ridges were covered with scattered trees of several species of pine. These areas are potential nesting habitat for merlins, kestrels, and golden eagles (larger trees).

Cottonwood/Aspen riparian:
Riparian habitat in the Sweetgrass Hills appears to be good quality habitat with mature trees. Cottonwood habitat is potential nesting habitat for red-tailed hawks, golden eagles, Swainson's hawks, kestrels, and merlins. Possible owl species include the great horned owl, saw-whet owl, long-eared owl and screech owl. Aspen stands could provide nesting and foraging habitat for accipiters. Areas with interspersed aspen/conifer forest/grasslands could potentially support great gray owls. The west side of the West Butte had the largest aspen stands.

B. Nesting Surveys

Kevin Rim:

Appendix 4 summarizes the locations, species, land ownership, and production of the 55 nest sites that were active (displayed evidence of eggs or young) during 1988. An additional 50 sites, listed in Appendix 5, were alternate sites (obvious raptor nest sites such as "stick" nests, which showed no evidence of eggs or young during 1988). Forty of the active nest sites were located on BLM land. The remainder were located on adjacent private (8 sites) or state school trust land (7 sites).

Table 1 lists the breeding densities and percent composition of the 8 raptor species which were located on the Kevin Rim. Note that the breeding densities and species composition only included the 40 nests found on BLM land. Ferruginous hawks and prairie falcons were the most common species, together comprising 75 percent of the raptor population. Species such as the northern harrier which nest in well-concealed sites on the ground, are probably underestimated. No attempt was made to map locations of individual birds observed or territories of such species.

Table 1. Estimated species composition and breeding densities for 8 species of raptors in the 23.6 sq km Kevin Rim study area, 1988.

SPECIES	TOTAL NO. OF NESTS	NO. PAIRS ON BLM LAND	NO. PAIRS PER 100 SQ KM	PERCENT OF TOTAL PAIRS
Ferruginous Hawk	24	14	59.3	35.0
Prairie Falcon	18	16	67.8	40.0
Great Horned Owl	6	5	21.2	12.5
Golden Eagle	2	1	4.2	2.5
American Kestrel	2	2	8.5	5.0
Red-tailed Hawk	1	0	0.0	0.0
Northern Harrier	1	1	4.2	2.5
Swainson's Hawk	1	1	4.2	2.5
TOTAL	55	40	169.5	100.0

Nesting density for the BLM lands was estimated at 169.5 pairs per 100 square kilometers (438.4 pairs per 100 square miles). Comparison with other nesting studies indicate that the Kevin Rim has one of the most dense nesting raptor populations in the Western U.S. (Table 2). This nesting density estimate is probably underestimated because: 1) some nests of species which conceal their nests in cliff holes or on the ground were probably missed, 2) some nests may have failed before being located, resulting in their being classified incorrectly as inactive nests, and 3) a small portion of the study area was not covered, or was only "glassed" from a distance, leaving the chance of overlooking nests.

Table 2. Comparison of the raptor nesting density in the Kevin Rim study area, Montana, with areas in other western states.

STUDY AREA	STUDY AREA SIZE (KM^2)	NO. PAIRS	NO. PAIRS PER 100 KM^2
BPNA, Idaho (Howard et al. 1976)	135.0	294	217.8
Kevin Rim, Montana	**23.6**	**40**	**169.5**
Grandview, Idaho (Howard et al. 1976)	117.0	163	139.3
Moose, Wyoming (Craighead and Mindell 1981)	31.1	24.7	79.3
Cedar Valley, Utah (Smith and Murphy 1973)	207.0	35.0	16.9
Rocky Mountain Front, Montana (DuBois 1984)	4700.0	446.0	9.5
Pawnee, Colorado (Olendorff 1975)	2590.0	159.0	6.1
Hanford, Washington (Olendorff 1973)	1036.0	44.0	4.2
Southern Idaho (Howard et al. 1976)	12437.0	464.0	3.7
Medicine Bow, Wyoming (Oakleaf 1978)	3626.0	111.0	3.1
TOTAL FOR ALL AREAS	21276.7	1780.7	8.4

The high nesting density is suspected to be due largely to an abundant prey base consisting primarily of Richardson's ground squirrels (Spermophilus richardsonii) and white-tailed jackrabbits (Lepus townsendii), although no food habits or prey base studies were conducted to confirm this hypothesis.

At least 37 of the 55 active nests were known to have produced young during 1988 (Appendix 2). Two nests apparently failed to produce young, and no information

was obtained for the remaining 16 nests. Young which survived to be nearly fully covered with feathers were assumed to have fledged. Twenty-nine nests fledged young. Average brood sizes at fledging were: ferruginous hawk - 2.8 (18 nests), golden eagle - 2.0 (2 nests), great horned owl - 2.5 (4 nests), and prairie falcon - 2.0 (6 nests). The fledging brood size for prairie falcons was probably underestimated due to the limited observation time and the difficulty in observing prairie falcon nestlings in nests.

Sweetgrass Hills:

Only one suspected nest site was located in the Sweetgrass Hills. A prairie falcon was observed on a cliff on the West Butte. A merlin and two golden eagles were observed on the East Butte, and no raptors were observed on the Middle (Gold) Butte. The rugged topography, thick timber, and limited time available for nesting surveys in the Sweetgrass Hills contributed to the lack of nests located. More intensive surveys will probably result in more nests being located.

C. Peregrine Falcon Habitat

Potential hack sites for peregrine falcons are shown in Appendix 6. Both the Sweetgrass Hills and Kevin Rim have cliffs which are suitable for peregrines. Neither area appears to have a good prey base for peregrines, which prey only on birds, and are usually found in association with concentrations of birds such as marshes or major rivers. The prey base along the Kevin Rim could possibly be enhanced by wetland developments such as additional dams along the creeks. To provide sufficient populations of birds, these dams would have to be fenced to keep cattle from damaging shoreline vegetation. Nesting cover would probably have to be planted and fenced, to enhance bird production on the limited wetland areas. Several large stockponds were located below the potential nesting cliff in the West Butte of the Sweetgrass Hills. To provide a suitable prey base for peregrines, these stockponds would have to be fenced from cattle. Other habitat manipulation might be necessary to provide more shallow-water habitat for shorebirds and waterfowl, and more vegetative cover for songbirds.

The Kevin Rim currently supports dense populations of other raptor species. Competition and predation from prairie falcons, golden eagles and great horned owls could potentially cause problems for peregrine re-introduction. The Kevin Rim and Sweetgrass Hills should probably be considered low priority areas for peregrine re-introduction, until further studies on prey populations are conducted.

D. Oil and Gas Impacts

Quantification of the impacts of oil and gas development on the birds of prey of the Kevin Rim was not within the scope of this study. A casual observer might conclude that oil and gas development does not significantly impact raptors, due to the close proximity of the nesting area to an actively-producing oil field. Some direct observations indicated that further study would be necessary to conclude that no significant impact is occurring.

Although the primary nesting areas were fairly close to the oil fields, most active nests were at least 1/2 mile from actively pumping oil wells. Many nests close to wells had visual barriers between them and the wells. One nest, Number

KD 105, was a notable exception. It was in full view and within 1/2 mile of at least 3 pumping oil wells, and had a non-pumping oil well and its associated oil spill directly below the nest. This nest successfully fledged 2 young.

A complete evaluation of the impacts of the oil and gas field would require a comparison of nest production and feeding behavior between nests close to oil wells and nests far from them. The high nesting populations of birds of prey is probably in response to high prey populations. Raptors will sometimes use less desirable nest sites in order to take advantage of high prey populations (Bent 1938), resulting in birds nesting closer to development than they would normally.

The Kevin/Sunburst Oil Field has been in production at least since the 1930's. Wildlife will sometimes develop tolerance to development over a long period of time, if the development does not result in direct mortality (Ellis 1981). A classic example is the peregrine falcon that nested on the Sun Life Building in Montreal (Hickey 1969).

Other studies have shown that raptors may become "sensitized" to disturbance, becoming less tolerant after repeated disturbances (Thurow et al. 1980). One pair of ferruginous hawks on the Kevin Rim appeared to exhibit this type of response, becoming more violently aggressive with successive nest checks. This particular pair (KD 20) was not nesting near or in view of any oil wells.

Indirect impacts of development may become more significant over the long run. Road-building can result in easier public access, which can result in more disturbance to the birds and higher poaching mortality. During the short duration of this study, one illegally-killed golden eagle was found near a jeep trail, directly below an active golden eagle nest. The eagle was an immature which was not associated with the nest. The carcass showed evidence of being shot with a high-powered rifle. The head, feet, and tail were missing. The eagle nest in the area contained young that were within a couple of weeks of fledging.

Another possible impact of roads is loss of habitat, resulting in lower prey populations. Oil fields in the Kevin Rim often had numerous unneeded roads, forming a spider-web like network between oil wells. No apparent attempt has been made to reclaim roads going to abandoned wells. Many of the roads were damaged severely by being used during wet weather. This resulted in the roads being wider than necessary, further increasing the amount of damaged land. Private land surrounding the Rim has been extensively converted to small grain production, increasing the importance of the public lands in providing sufficient prey populations.

Many of the wells in the Kevin/Sunburst Field had associated oil spills. An enormous oil spill is located at the old refinery at Kevin. Pits at pumping sites to collect water separated from the oil were poorly fenced or not fenced at all. Oil was observed to be leaking into surface water (creeks) at two different sites. The scarcity of surface water on the Kevin Rim increases the value of the existing water to wildlife. This oil contamination must be eliminated if the wetlands in the area are to support sufficient water bird populations for peregrine falcons.

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