

Raptors of John Day Fossil Beds  
National Monument

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## "Cry, The Beloved Country"

by Alan Paton

There is a lovely road that leads from Ixope into the hills. These hills are grass-covered and rolling, and they are lovely beyond any singing of it. The road climbs seven miles into them, to Carisbrooke; and from there, if there is no mist, you look down on one of the fairest valleys in Africa. About you there is grass and bracken and you may hear the forlorn cry of the titihoya, one of the birds of the veld. Below you is the valley of Umzimkulu, on its journey from the Drakensberg to the sea; and beyond them the mountains of Ingeli and East Griqualand.

The grass is rich and matted, you cannot see the soil. It holds the rain and the mist, and they seep into the ground, feeding the streams in every kloof. It is well-tended, and not too many cattle feed upon it; not too many fires burn it, laying bare the soil. Stand unshod upon it, for the ground is holy, being even as it came from the creator. Keep it, guard it, care for it, for it keeps men, guards men, cares for men. Destroy it and man is destroyed.

Where you stand the grass is rich and matted, you cannot see the soil. But the rich green hills break down. They fall into the valley below, and falling, change their nature. For they grow red and bare; they cannot hold the rain and mist, and the streams are dry in the kloofs. Too many cattle feed upon the grass, and too many fires have burned it. Stand shod upon it, for it is coarse and sharp, and the stones cut under the feet. It is not kept, or guarded, or cared for, it no longer keeps men, guards men, cares for men. The titihoya does not cry here any more.

The great red hills stand desolate, and the earth has torn away like flesh. The lightning flashes over them, the clouds pour down upon them, the dead streams come to life, full of the red blood of the earth. Down in the valleys women scratch the soil that is left, and the maize hardly reaches the height of a man. They are valleys of old men and old women, of mothers and children. The men are away, the young men and the girls are away. The soil cannot keep them any more.

## INTRODUCTION

This report deals with a look at the raptors of the John Day Fossil Beds National Monument at one point in time. Next year, the nesting pattern will undoubtedly change, and a few more or a few less birds will be present. Climate, prey, man, and natural variation combine to create changes (mostly subtle) each year. I have made an attempt to present management options that take into consideration the variance that will be encountered.

Management favoring raptors is a relatively new field. For so long, raptor management meant elimination to most people. Now with the realization they are beneficial to man and because of concern for their existence, this has changed. There exists on the Monument a definite potential for increasing the abundance and diversity of raptors, which will be discussed herein.

As far as the value of dealing with raptors in addition to that inferred above, birds of prey, at least to me, represent everything that is wild and free and deserve attention for that reason alone. On a more practical level, birds of prey occupy the top of the food chain and as a result are very sensitive to changes in anything below them on the food chain. Management for raptors turns out to be management for all wildlife and the general health of what Aldo Leopold refers to as the "land organism."

## METHODS

### Clarno Unit

Information dealing with the Clarno Unit stems from my five year raptor study on 100 square miles, 50 of which lie in the Clarno Basin. This spring

as in the past all previously known nest sites were checked. New nests were located by following the adults until they returned to the nest. To locate new pairs of owls and their nests, recorded calls were played for response. All pairs residing upon or utilizing the unit were felt to be located. Home ranges and food habits are well-documented. For a more complete view of raptors on the Clarno Unit and the adjacent Antelope Valley and of raptor biology in general, copies of my 1975 progress report can be made available. In addition, I am preparing a series of papers covering the five years of work on the area.

#### Sheep Rock - Painted Hills Unit

These areas had not been previously studied by me, so different methods were used to locate existing raptors. From aerial photographs, topographic maps, and general knowledge of raptors, all potential nest sites were systematically searched. These included all cliff lines, cottonwoods, riparian habitat in general, and juniper groves, particularly those with a potential association with springs.

It is not certain that 100% of the raptors utilizing the Painted Hills or Sheep Rock Units were located. Those missed would most likely include kestrels and possibly a pair of ravens or great horned owls on the Sheep Rock Unit. Also far-ranging prairie falcons and golden eagles may nest several miles away and only visit the Monument to hunt occasionally and may have been missed. No species of raptors were felt to have been missed except screech owls of which their existence is anticipated. This assessment is based on raptor populations in the Clarno Basin and Antelope Valley and the pattern of discovery over the five year period of the study.

Home ranges for the Sheep Rock and Painted Hills Units were mapped by a combination of actual sightings and assumed home ranges based on typical patterns observed in my study. Pellets were collected and analyzed from owls on both units to give an idea of the prey available and utilized by the raptor community as a whole.

Data were collected on the Sheep Rock and Painted Hills Units during April and May 1977. Each unit was searched intensively, and peripheral areas to each were searched as time and landowner permission allowed.

Table 1. Raptor pairs nesting on the Monument, 1977.

	Sheep Rock	Painted Hills	Clarno
Red-tailed Hawk	4	0	0
Golden Eagle	1	0	0
Prairie Falcon	1	0	0
American Kestrel	11	5	4
Great Horned Owl	2	1	1
Barn Owl	1	0	0
Long-eared Owl	0	1	0*
Screech Owl	(1)**	0	1
Common Raven	0	1	0
	20	8	6

\*Nested as recently as 1976.

\*\*Suspected presence.

Table 2. Raptor pairs using the Monument, April and May 1977.

	Sheep Rock	Painted Hills	Clarno
Red-tailed Hawk	7	1	2
Golden Eagle	1	1	3
Prairie Falcon	1	0	1
American Kestrel	12	6	6
Great Horned Owl	2	1	3
Barn Owl	1	0	1
Long-eared Owl	0	1	0
Screech Owl	(1)**	0	1
Common Raven	1	1	4
	25	11	21

\*\*Suspected presence.

Figure 1. Red-tailed Hawk territories and nest sites on the Sheep Rock Unit 1977.

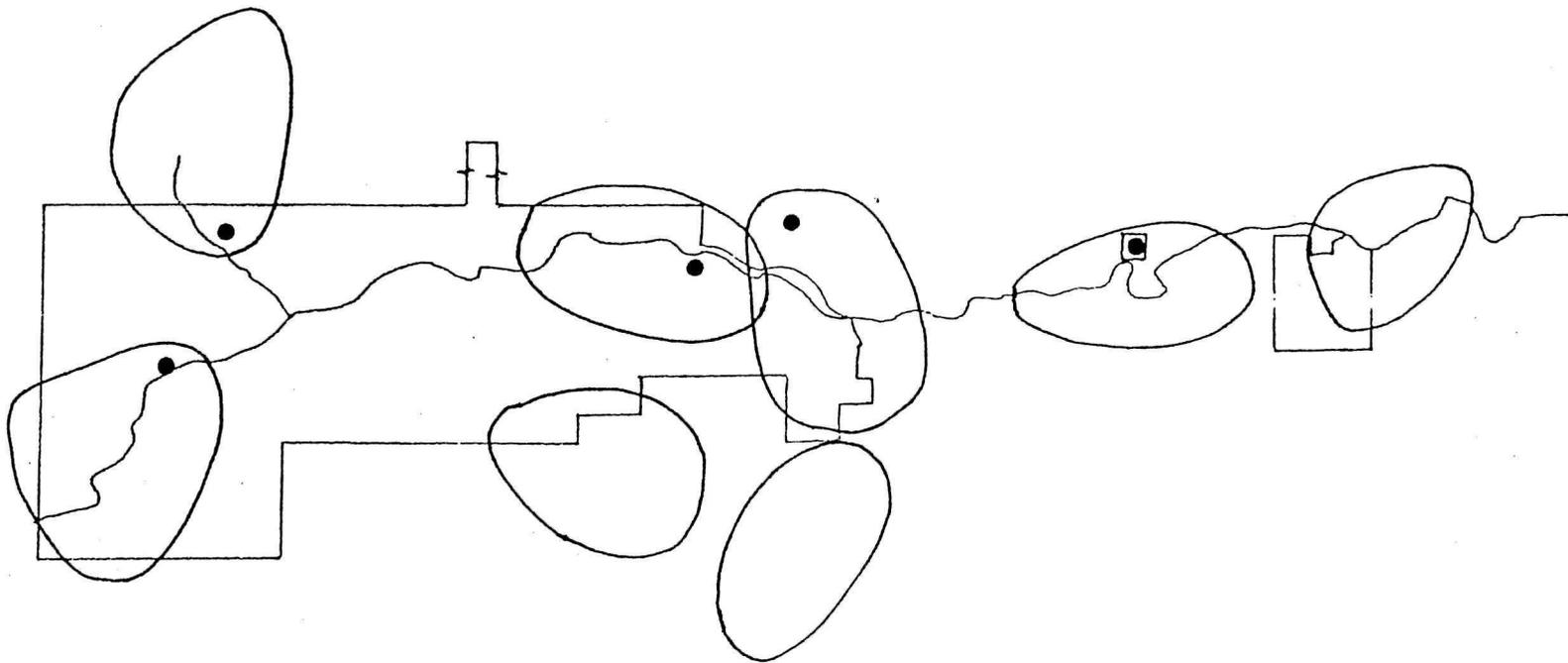


Figure 2. Golden Eagle, Prairie Falcon, and Raven territories and nest sites on the Sheep Rock Unit 1977.

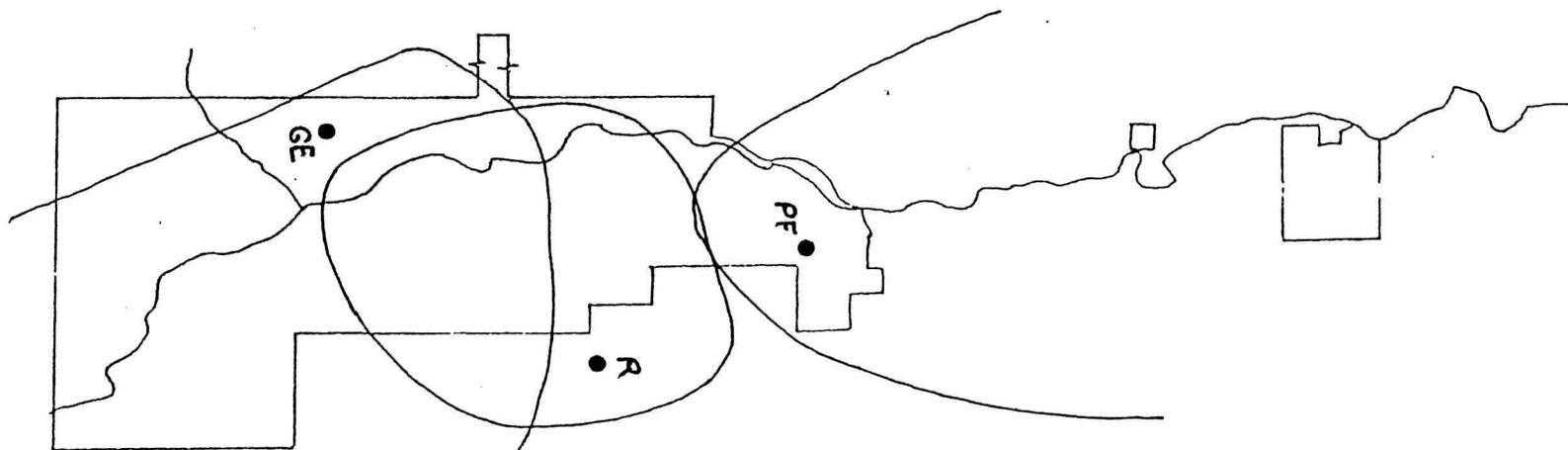
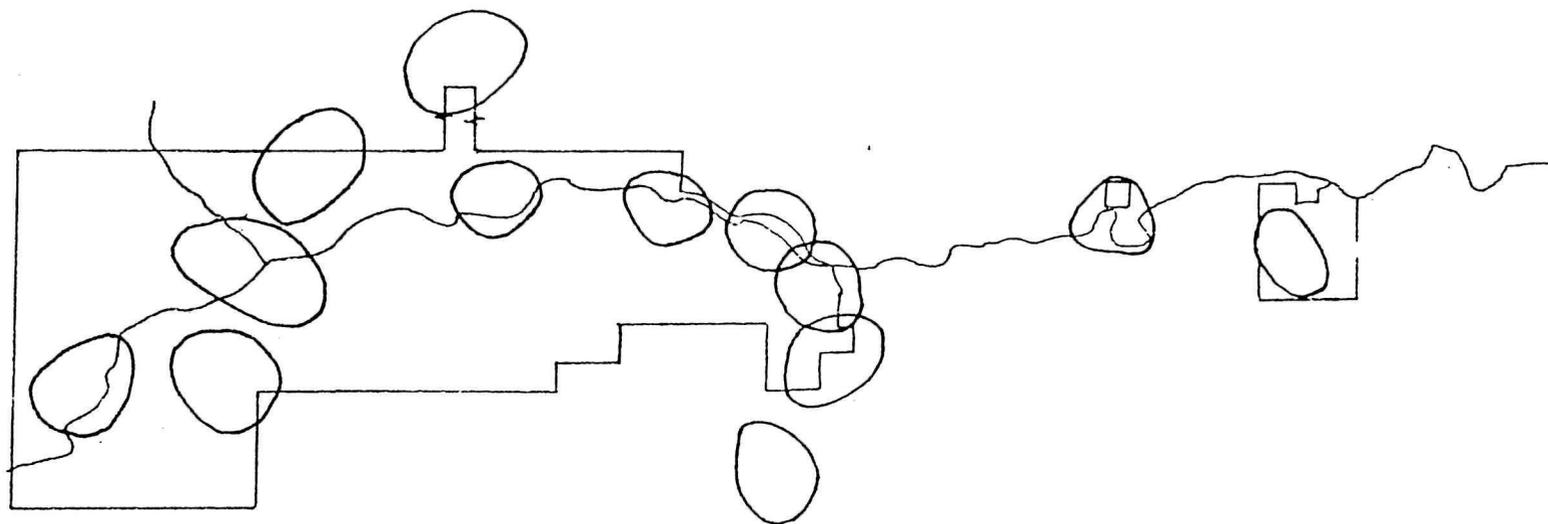


Figure 3. Kestrel territories on the Sheep Rock Unit 1977.



2. ->

Figure 4. Great Horned Owl (●) and Barn Owl (○) territories and nest sites on the Sheep Rock Unit 1977. Possible Screech Owl sites are marked (+).

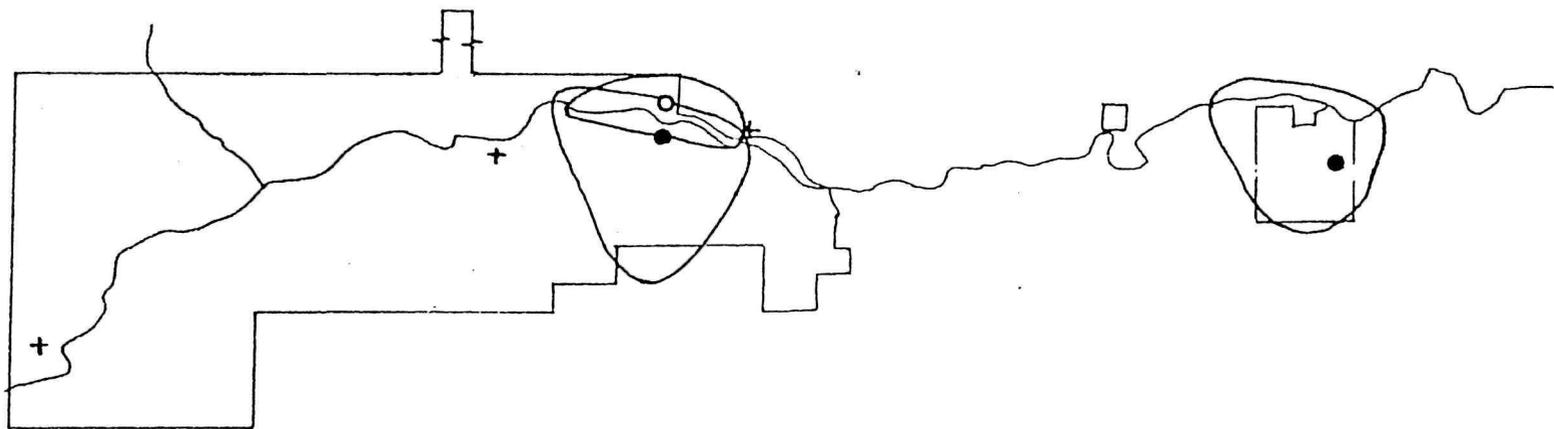


Figure 5. Red-tailed Hawk, Golden Eagle, and Great Horned Owl territories and nest sites on the Painted Hills Unit 1977.

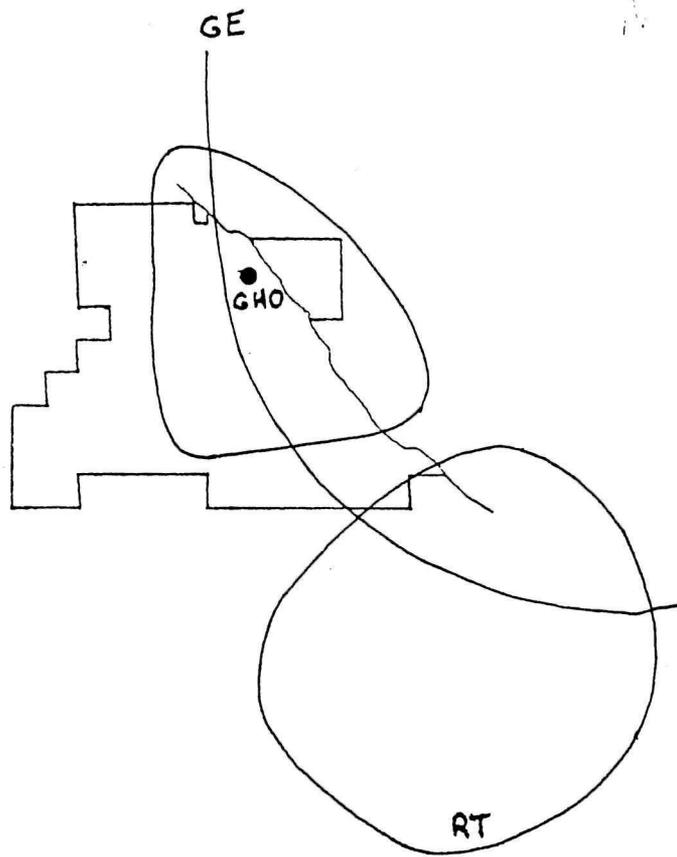


Figure 6. Long-eared Owl and Raven territories and nest sites on the Painted Hills Unit 1977.

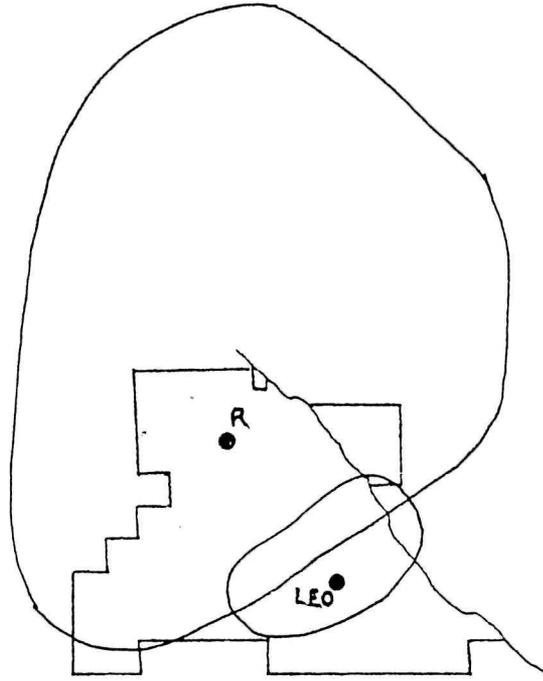


Figure 7. Kestrel territories and nest sites on the Painted Hills Unit 1977.

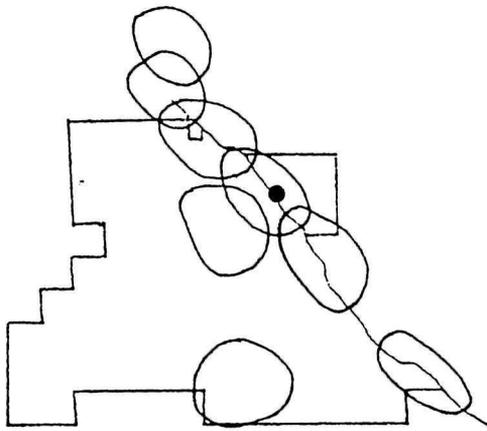


Figure 8. Red-tailed Hawk and Prairie Falcon territories and nest sites on the Clarno Unit 1977.

○ old nests

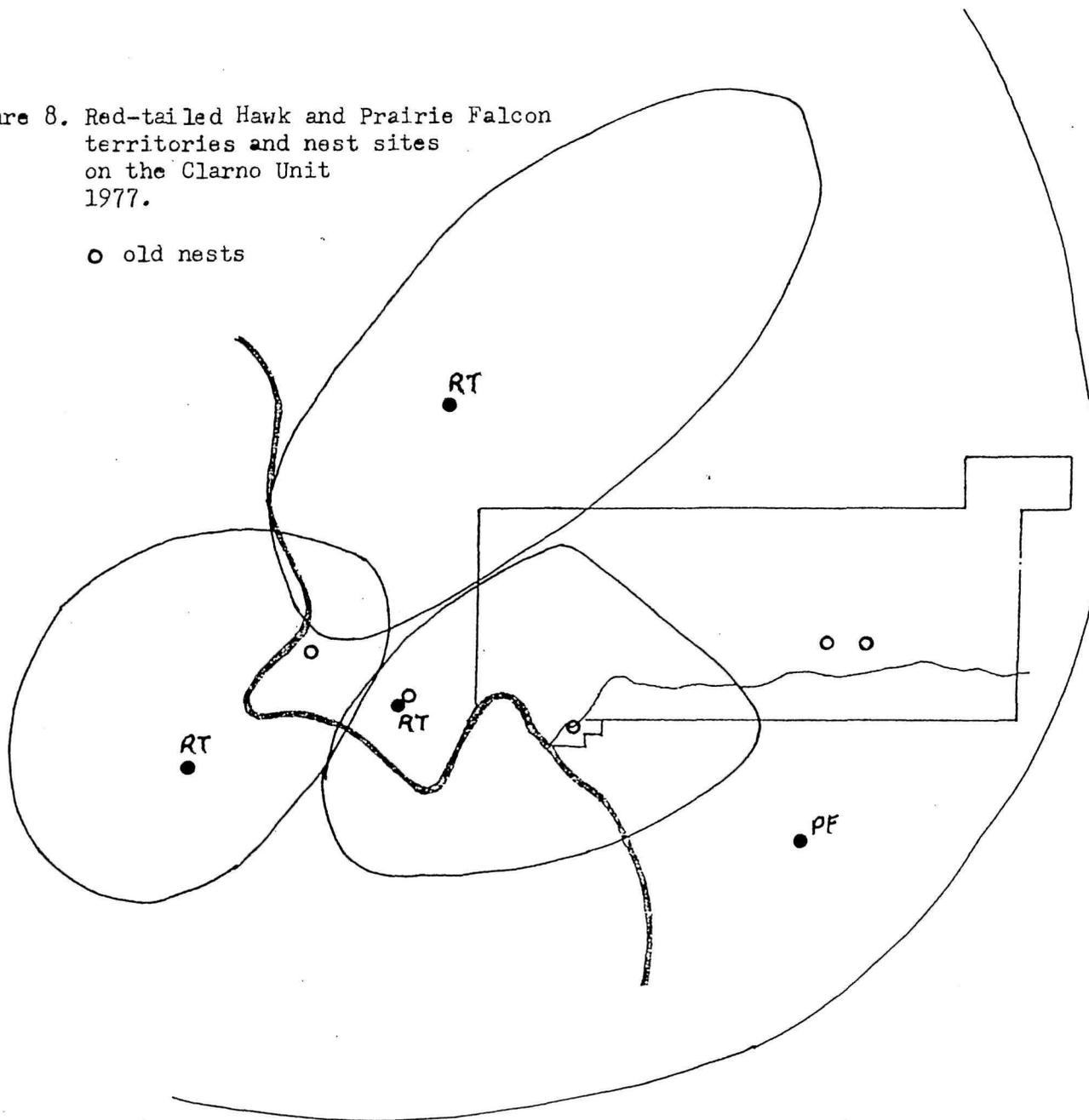




Figure 10. Great Horned Owl, Barn Owl, and Screech Owl territories and nest sites on the Clarno Unit 1977.

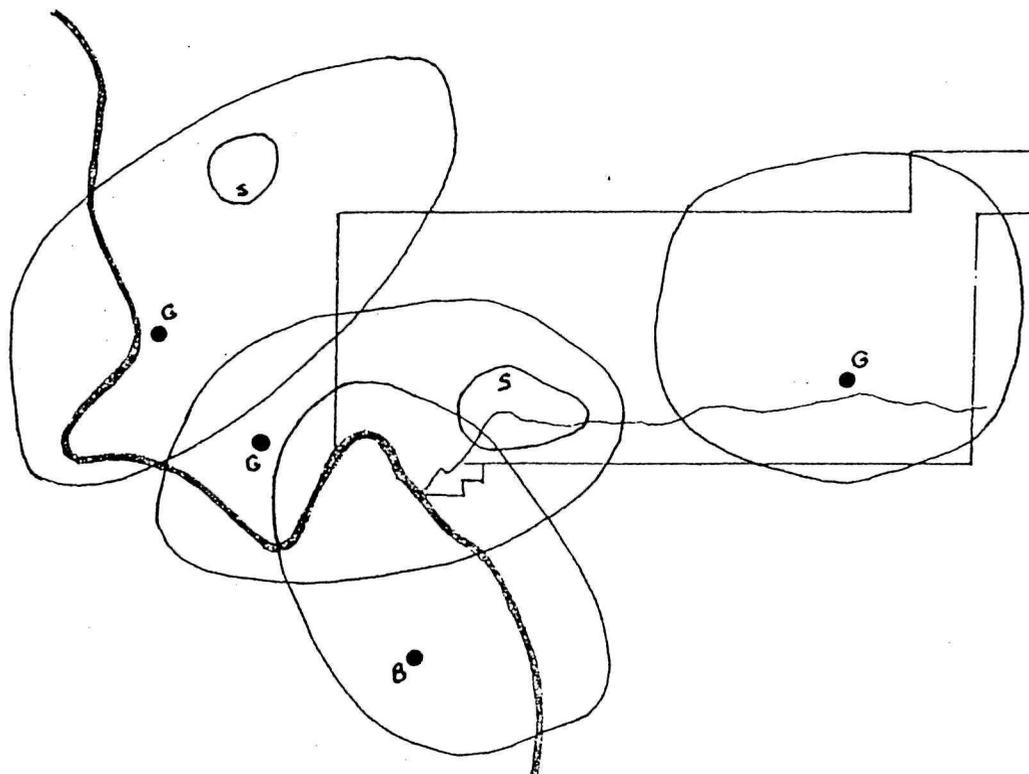


Figure 11. Raven territories and nest sites  
on the Clarno Unit 1977.

○ old nests.

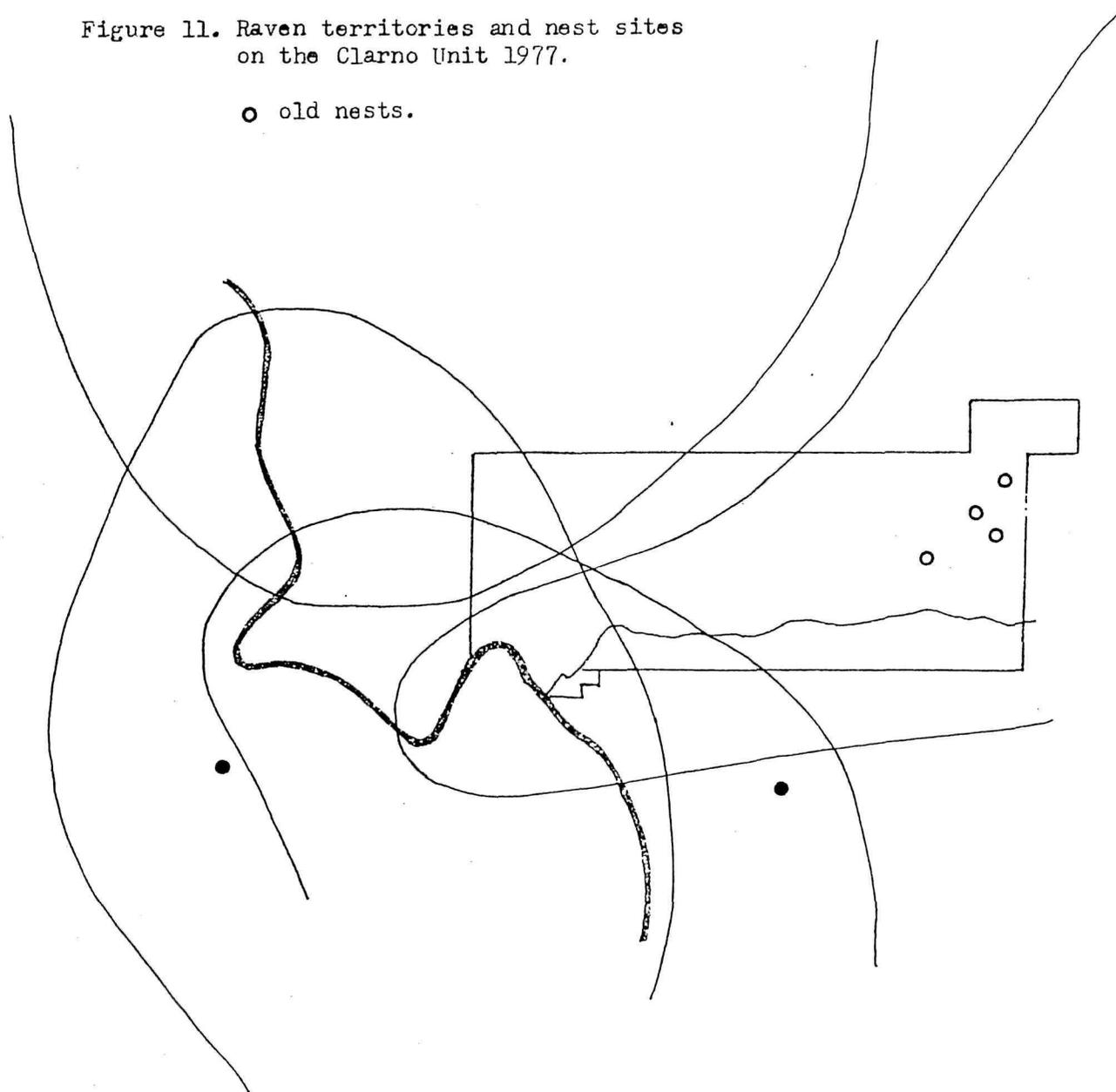


Table 3. Food habits of long-eared owls on the Painted Hills Unit, 1977.  
57 pellets.

	Individuals	Percent
Northern Pocket Gopher	3	3
Ord's Kangaroo Rat	16	16
Great Basin Pocket Mouse	16	16
Deer Mouse	48	47
Western Harvest Mouse	7	7
Meadow Mouse	11	11
Western Meadowlark	1	1
Unidentified Small Bird	1	1
	<hr/> 103	<hr/> 102%

Table 4. Food habits of great horned owls on the Painted Hills Unit, 1977.  
8 pellets.

	Individuals	Percent
Mountain Cottontail	1	6
Northern Pocket Gopher	1	6
Ord's Kangaroo Rat	3	18
Bushy-tailed Wood Rat	1	6
Deer Mouse	5	29
Scorpion	4	24
Cricket	2	12
	<hr/> 17	<hr/> 101%

Table 5. Food habits of great horned owls on the Sheep Rock Unit, 1977.  
3 pellets, 20 pellet fragments.

	Individuals	Percent
Black-tailed Jackrabbit	2	2
Mountain Cottontail	31	24
Northern Pocket Gopher	1	1
Bushy-tailed Wood Rat	11	8
Deer Mouse	4	3
Western Harvest Mouse	1	1
Muskrat	1	1
Meadow Mouse	5	4
Spotted Skunk	1	1
Pallid Bat	1	1
Mallard	1	1
Chukar	5	4
California Quail	2	2
Rock Dove	1	1
Common Flicker	3	2
Western Meadowlark	1	1
Blackbird (species unknown)	1	1
Unidentified medium bird	3	2
Unidentified small bird	2	2
Snake (species unknown)	2	2
Fish (species unknown)	5	4
Crayfish	2	2
Scorpion	17	13
Cricket	26	20
	131	105%

Table 6. Food habit summary of red-tailed hawks on the Clarno Unit, 1973-1974.

	<u>Individuals</u>		<u>Biomass</u>	
	Number	Percent	Wt. (grams)	Percent
Black-tailed Jackrabbit <u>Lepus californicus</u>	6	8.6	15,550	47.5
Mountain Cottontail <u>Sylvilagus nuttallii</u>	15	21.4	5,095	15.5
Golden-mantled Ground Squirrel <u>Spermophilus lateralis</u>	7	10.0	1,246	3.8
Deer Mouse <u>Peromyscus maniculatus</u>	4	5.7	88	0.3
Great Basin Pocket Mouse <u>Perognathus parvus</u>	3	4.3	52.5	0.2
Porcupine <u>Erethizon dorsatum</u>	1	1.4	4,000	12.2
<u>Total Mammal</u>	39	55.7	26,121.5	79.4
Chukar	2	2.9	1,136	3.5
Black-billed Magpie	2	2.9	346	1.4
Flicker	1	1.4	100	0.3
Medium Bird	6	8.6	600	1.8
<u>Total Bird</u>	11	15.8	2,182	7.0
Snake	12	17.1	4,464	13.6
Arthropod	8	11.4	4	Tr.
<b>TOTAL</b>	70	100.0	32,771.5	100.2

Table 7. Food habit summary of golden eagles on the Clarno Unit, 1973-1974.

	Individuals		Biomass	
	Number	Percent	Wt. (grams)	Percent
Black-tailed Jackrabbit <u>Lepus californicus</u>	22	40.7	59,400	69.2
Mountain Cottontail <u>Sylvilagus nuttallii</u>	13	24.1	4,940	5.8
Golden-mantled Ground Squirrel <u>Spermophilus lateralis</u>	2	3.7	400	0.5
Northern Pocket Gopher <u>Thomomys talpoides</u>	1	1.9	75	0.1
Bushy-tailed Wood Rat <u>Neotoma cinerea</u>	2	3.7	560	0.7
Yellow-bellied Marmot <u>Marmota flaviventra</u>	4	7.4	9,000	10.5
House Cat <u>Felis catus</u>	1	1.9	4,500	5.2
<u>Total Mammal</u>	45	83.3	78,875	91.9
Pheasant	3	5.6	4,200	4.9
Chukar	2	3.7	1,136	1.3
Black-billed Magpie	1	1.9	175	0.2
Raven	1	1.9	900	1.0
Large Bird	1	1.9	400	0.5
Mourning Dove	1	1.9	130	0.2
<u>Total Bird</u>	9	16.7	6,941	8.1
<b>TOTAL</b>	54	100.2	85,816	100.0

Table 8. Food habit summary of prairie falcons on the Clarno Unit, 1974.

	<u>Individuals</u>		<u>Biomass</u>	
	Number	Percent	Wt. (grams)	Percent
Ground Squirrel				
<u>Spermophilus townsendii</u>				
<u>Spermophilus lateralis</u>	3	12.0	570	28.5
Northern Pocket Gopher				
<u>Thomomys talpoides</u>	1	4.0	65	3.3
Deer Mouse				
<u>Peromyscus maniculatus</u>	2	8.0	44	2.2
Bushy-tailed Wood Rat				
<u>Neotoma cinerea</u>	1	4.0	280	14.0
<u>Total Mammal</u>	7	28.0	959	48.0
Red-wing blackbird	1	4.0	67	3.4
Starling	1	4.0	80	4.0
Meadowlark	2	8.0	240	12.0
Medium Bird	6	24.0	600	30.0
Small Bird	2	8.0	50	2.5
<u>Total Bird</u>	12	48.0	1,037	51.9
Insect	6	24.0	3	0.1
<b>TOTAL</b>	<b>25</b>	<b>100.0</b>	<b>1,999</b>	<b>100.0</b>

Table 9. Food habit summary of kestrels on the Claro Unit, 1973.  
124 pellets.

	Frequency of Occurrence in Pellet	% F.O.P.	% Volume
Insect	124	100.0	83.1
Mammal	30	24.2	12.1
Reptile	16	12.9	4.8
TOTAL	170	137.1	100.0

Identified remains: Montane Vole Microtus montanus  
 Western Fence Swift Sceloporus occidentalis  
 Western Skink Eumeces skiltonianus  
 Northern Alligator Lizard Gerrhonotus coeruleus  
 Hymenoptera  
 Chrysomelidae  
 Cerambycidae  
 Carabidae  
 Cicindelidae  
 Tenebrionidae  
 Gryllidae  
 Locustidae

Table 10. Food habits of kestrels on the Clarno Unit, 1974.  
39 pellets.

	Frequency of Occurrence in Pellet	% F.O.P.	% Volume
Insect	31	79.5	79.5
Mammal	3	7.7	7.7
Reptile	3	7.7	7.7
Bird	2	5.1	5.1
TOTAL	39	100.0	100.0

Identified remains: Great Basin Pocket Mouse Perognathus parvus  
 Western Harvest Mouse Reithrodontomys megalotis  
 Racer Coluber constrictor  
 Hymenoptera  
 Tenebrionidae  
 Gryllidae  
 Locustidae

Table 11. Selected food habit summary of great horned owls on the Clarno Unit, 1975 (tentative results). Only those pairs whose diets best determined included. 7 pairs.

	Individuals		Biomass	
	$\bar{X}$ %	Range %	$\bar{X}$ %	Range %
Black-tailed Jackrabbit <u>Lepus californicus</u>	.5	(0.0-2.4)	5.9	(0.0-27.5)
Mountain Cottontail <u>Sylvilagus nuttallii</u>	15.2	(7.1-22.0)	33.9	(19.9-47.2)
Northern Pocket Gopher <u>Thomomys talpoides</u>	16.3	(0.9-64.4)	9.5	(0.4-42.8)
Deer Mouse <u>Peromyscus maniculatus</u>	10.5	(0.0-22.0)	1.4	(0.0-2.4)
Great Basin Pocket Mouse <u>Perognathus parvus</u>	12.6	(0.0-21.3)	1.4	(0.0-2.3)
Montane Vole <u>Microtus montanus</u>	5.8	(1.9-12.2)	1.2	(0.4-2.1)
Bushy-tailed Wood Rat <u>Neotoma cinerea</u>	7.0	(0.9-12.2)	12.5	(1.8-22.5)
Sage Vole <u>Lagurus curtatus</u>	0.3	(0.0-0.9)	.6	(0.0-3.6)
Mammal	72.1	(50.5-92.7)	71.3	(50.0-87.4)
Bird	7.3	(0.0-10.3)	18.2	(0.0-38.4)
Reptile	1.9	(0.0-3.6)	5.4	(0.0-13.2)
Fish	2.9	(0.0-8.5)	5.0	(0.0-14.8)
Arthropod	14.8	(0.0-37.4)	.1	(0.0-0.3)
n	755		112,798.5g	

Table 12.. Selected food habit summary of long-eared owls on the Clarno Unit, 1975 (tentative results). Only those pairs whose diets best determined included. 6 pairs.

	Individuals		Biomass	
	$\bar{X}$ %	Range %	$\bar{X}$ %	Range %
Mountain Cottontail <u>Sylvilagus nuttallii</u>	2.1	(0.0-4.2)	17.1	(0.0-37.6)
Northern Pocket Gopher <u>Thomomys talpoides</u>	1.6	(0.0-4.0)	3.1	(0.0-6.6)
Deer Mouse-Pinyon Mouse <u>Peromyscus maniculatus</u> <u>Peromyscus truei</u>	47.5	(33.1-66.7)	37.2	(24.7-62.6)
Great Basin Pocket Mouse <u>Perognathus parvus</u>	26.6	(12.8-41.9)	15.9	(7.7-27.4)
Montane Vole <u>Microtus montanus</u>	10.0	(5.6-14.0)	10.7	(6.3-18.5)
Sage Vole <u>Lagurus curtatus</u>	0.2	(0.0-0.5)	0.2	(0.0-0.6)
Mammal	94.8	(84.5-100.0)	92.8	(69.7-100.00)
Bird.	2.3	(0.0-8.0)	6.5	(0.0-26.0)
Reptile	0.1	(0.0-0.4)	0.7	(0.0-4.1)
Arthropod	2.9	(0.0-7.1)	0.1	(0.0-0.2)
n	1090		34,898.5g	

Table 13. Food habit summary of ravens on the Clarno Unit, 1974. 1 pair.

	<u>Individuals</u>		<u>Biomass</u>	
	Number	Percent	Wt. (grams)	Percent
Mountain Cottontail <u>Sylvilagus nuttallii</u>	9	13.2	2,925	54.3
Golden-mantled Ground Squirrel <u>Spermophilus lateralis</u>	1	1.5	178	3.3
Northern Pocket Gopher <u>Thomomys talpoides</u>	1	1.5	65	1.2
Deer Mouse <u>Peromyscus maniculatus</u>	8	11.8	176	3.3
Great Basin Pocket Mouse <u>Perognathus parvus</u>	1	1.5	17.5	0.3
Montane Vole <u>Microtus montanus</u>	1	1.5	30	0.6
<u>Total Mammal</u>	21	31.0	3,391.5	63.0
Small Bird	6	8.8	150	2.8
Egg	13	19.1	130	2.4
Snake	3	4.4	1,116	20.7
Fish	2	2.9	500	9.3
Arthropod	14	20.6	7	0.1
Plant	9	13.2	90	1.7
<b>TOTAL</b>	<b>68</b>	<b>100.0</b>	<b>5,384.5</b>	<b>100.0</b>

## GENERAL DISCUSSION

The raptor communities present on each of the three units of the Monument, though they display variation, represent the same community type. If larger areas including each of the units were studied, communities would more closely resemble each other in the species present and in the numbers found. This community is typical of the John Day River Valley. The raptor communities of the John Day River Valley, in my estimation, rank second or third in abundance for eastern Oregon behind (1) the remnants of the paleuse prairie in north central Oregon and perhaps (2) the lake areas of southeastern Oregon.

### Geology/Raptor Relationships

Geology has a profound effect upon all wildlife and raptors are no exception. The following is a discussion of each major geologic unit and its implications with respect to raptors.

Picture Gorge Basalt. The basalt comprising this formation provides excellent nest sites for raptors though its great height above the floodplain eliminates many raptors from utilizing them. It is restricted to those such as the golden eagle, prairie falcon, and raven that have relatively large territories, or kestrels that are not dependent upon the floodplain. The main prey species inhabiting the plant communities on this formation are rabbits, jackrabbits, and deer mice.

John Day Formation. Typically, the John Day Formation and associated soils support sparse vegetation. This in combination with the clay soils provides poor habitat for most prey species with the possible exception of pocket mice and kangaroo rats. In addition, the John Day Formation provides few potential nest sites. Exceptions include the rare basalt flows found within this formation.

Clarno Formation and Goose Rock. The rock of these formations provides excellent nest sites, and these sites are available to most raptors except those that prefer more remote areas. Prey as in the Picture Gorge Basalt consists principally of rabbits, jackrabbits, and deer mice.

Floodplain. Floodplains for the most part owing to the high water table and associated surface water are valuable to raptors because of the abundance and diversity of prey such as ground squirrels, pocket gophers, meadow mice, rabbits, and birds. They are also valuable because of nest sites provided by the cottonwoods and willows associated with water.

#### Raptor Population Stability

Long Term Stability. The density and species composition of raptor communities present on each of the three units appears to be relatively stable. The major changes from the original condition have already occurred on the Monument. This situation is not true for other parts of eastern Oregon.

Short Term Stability. From one year to the next, the same community composition will exist with minor variation. High prey years may bring in an extra pair of red-tailed hawks in a marginal area or a pair of Cooper's hawks in a remote juniper grove, but the same basic pattern will remain.

A high degree of stability will also be reflected in the re-use of nest sites and especially territories. There will be minor shifting of nest sites within an established territory in all species and of territories themselves (more prevalent in the smaller species). However, the same pattern will be recognizable from year to year.

Raptor communities and their use of an area changes little from one year to the next regardless of prey or the weather. Stress brought on by low prey numbers or harsh weather tends to be reflected in the number of young raised

rather than density of nesting adults in the area. The opposite is also true. More young are raised in good years rather than a noticeable influx of new pairs.

### Food

The principal prey around which the larger raptors are dependent upon on each of the three units appears to be rabbits and jackrabbits. These are normal prey but unpredictable in terms of abundance. However, the diversity in the diets in addition to these lagomorphs infers that the principal prey species are not abundant.

The presence of harvest mice and other species more easily recognized as being water oriented shows that the riparian areas are hunted regularly if not actually providing the majority of their food. Further, the scarcity or lack of such prey species as ground squirrels, pocket gophers, and meadow mice suggest that the floodplains are not providing the potential food source that they might. Typically, in most studies these three kinds of prey (species vary with location) comprise by far the majority of the diets of nearly all the raptors in an area.

### Species of Concern

Prairie Falcons. The only species of concern either on the Oregon or National list nesting on the Monument is the prairie falcon. It is classified as rare on both lists. There is one nest located on the Sheep Rock Unit and one just south of the Clarno Unit. These nests tend to be used again and again and are easier to protect than other species that switch nest sites more frequently. Though prairie falcons are very sensitive to human disturbance, the remoteness and inaccessibility of these two nests and its far ranging hunting habits would seem to assure their continued presence.

Ospreys. Ospreys, though not observed this year on the Monument, do migrate through the area and do nest sparingly along the John Day River. One has nested regularly 5 miles up river from the Clarno Unit. It is conceivable that ospreys may some day nest on the Sheep Rock Unit, and management for that possibility is discussed later.

Northern Bald Eagle. The northern bald eagle is classified as endangered on the state level. It winters in small numbers along the John Day River in the vicinity of the Clarno Unit and is also expected in the Sheep Rock Unit. It does not breed on the Monument.

#### Wintering Raptors

The winter raptor populations are distinct from the breeding populations. Many of the breeding raptors migrate and are replaced by fewer numbers of other raptors from higher elevations and farther north. Great horned owls and golden eagles tend to be the most likely to remain on their breeding territories. Wintering raptors in the Clarno and Antelope areas have included the goshawk, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, rough-legged hawk, golden eagle, bald eagle, marsh hawk, prairie falcon, merlin, kestrel, screech owl, great horned owl, pygmy owl, long-eared owl, short-eared owl, saw-whet owl, and raven.

## POTENTIAL IMPACTS ON RAPTOR POPULATIONS

### Visitor Impacts

All raptors are sensitive to human disturbance to some degree and will desert nests at any stage and even desert the area entirely. Some, like the kestrel and screech owl, can do very well around normal human activity, while others as the prairie falcon and golden eagle are particularly sensitive. Fortunately, for the most part, raptors and visitors have nonconflicting interests in the Monument.

Visitors in John Day Exposures. Most visitors are interested in the John Day Formation, and I assume, most development such as interpretive trails, and parking areas, as is presently the case, will be centered on the John Day Formation. These are the areas least used by raptors, and visitor use here, unless it increases dramatically, should have little impact on the present raptor populations even with the most sensitive prairie falcons and golden eagles.

Visitors in Riparian Habitats. Another area in which I perceive interest by visitors and a consequent potential for development is in riparian habitat for picnic areas and other uses. These areas are used by present raptor populations as a principal source of food. In addition, raptor use of the riparian habitats could increase under management plans discussed later, further intensifying potential raptor/visitor conflicts. To minimize the potential conflict, visitor use of the floodplain and other riparian sites should be restricted especially from April through June when raptor dependency is greatest. Where visitor use is allowed it should be localized to specific, well-defined areas leaving the majority of the habitat undisturbed.

Visitors Around Cliffs. A third area that invariably attracts visitors is cliff-top. This brings visitors into direct conflict with raptors at the

most sensitive place, the nest. Increased use of the Palisades in the Clarno Unit may explain in part the decline in use by raptors for nesting over the past 7 years. This activity should be discouraged particularly in the area of known nests both past and present. Old nests as a rule are used again as nest sites in subsequent years.

Shooting and Removal of Raptors. The shooting of raptors has thankfully become an uncommon event in this area. Local landowners most often are happy to have these birds on their land and protect them. Only ravens and occasionally golden eagles are ever spoken of negatively. Most of the shooting of raptors that I have encountered has been done by nonlocals and has occurred along roads or where people have camped. The only ways I see to reduce this event is through education and the restriction of camping in this area.

The removal of young from nests also needs to be contended with though it is rare. Again, for people that see them as pets, knowledge of the laws and the unsuitability of these birds as pets is the best solution. Falconers or other people that see themselves as falconers can also present problems with the taking of nestlings. To best minimize this, it is best not to publicize the locations of nests. In the case of prairie falcons, the information pertaining to nest locations in this paper should not become public knowledge.

Seasonal Considerations. Beyond the general sensitivity of raptors to people during the breeding season, there are particularly sensitive times within this period. The breeding season for raptors lasts from February through July. It begins with golden eagle and great horned owl courtship and nest site selection and ends with the fledging of young in kestrels. Within this period of time, the period of nest site selection and egg laying is

critical in terms of sensitivity. Considering the raptors now present, this period extends from February through April. This situation is fortunate as I suspect the majority of visitor use falls between Memorial Day and Labor Day.

A final word of caution lest I paint an overly optimistic picture. I keep recalling reports from friends and landowners of deserted and destroyed nests caused by rafters which descend upon the John Day River on Memorial Day weekend each year. It only takes one improper visit to a nest to cause its desertion and a failure of that pair to raise any young that year. It does not take much more disturbance to make an area unacceptable to a pair for any kind of existence.

Raptors are intelligent and in many cases can coexist with man. Most raptors come to learn the individual ranchers and farmers that work the land on their territory and disregard them. However, let a stranger near their nest (a role which I have been cast in), and they will immediately defend it. I have also, where my presence has been continuous and benign, come to be accepted and subsequently ignored. The point is that raptors can live around normal human activity where the same people are involved and the kinds of activities remain pretty much the same. However, the kinds of disturbance that are to be found on the Monument are quite different, and I would expect raptors to be much more sensitive to it.

It is not beyond reason to believe that the Monument could lose many of the raptors presently living and breeding in the area. At what point territory desertion would occur I cannot say. This depends as much on the individual raptor as it does on the kind of disturbance. Any loss of raptors through excessive disturbance would begin with the larger species, those that many people find more desirable.

### Grazing

Grazing is not necessarily incompatible with raptors. If properly administered no harmful effects should be noted. In fact, there is some evidence that, to a degree, grazing actually benefits the principal prey species including rabbits and ground squirrels (Hamerstrom 1974). However, overgrazing causes serious damage to the land and ultimately to the raptors. Considering the grazing history of the Monument, the best option would be to discontinue grazing.

### Alfalfa and Other Crops

Alfalfa and other irrigated crops that do not require disturbance of the soil every year tend to benefit raptors greatly. Alfalfa normally supports high numbers of prey species including ground squirrels, pocket gophers, and meadow mice, as well as rabbits on the periphery. However, crops that require cultivation each year are "deserts" in that they are devoid of prey species. Land that has been over-grazed severely will support more raptors than high disturbance crops.

### Miscellaneous Management Practices

Most other management activities such as juniper removal (minor detriment to the raptor community), range seeding (minor benefit), fire (mixed), and pest control (detriment) should have relatively minor impact on the raptor communities present on the Monument as long as conducted outside the breeding season (February through July).

One final note, cattle watering troughs can be raptor (and other bird and mammal) death traps. Once they enter the trough to bathe or drink they may not be able to get back out and drown. A floating cover or ramp as described in Giles (1971) can prevent this situation.

### Peripheral Areas

It must be added here that land use on the lands surrounding the Monument is as important as land use on the Monument itself to the raptors. Almost none of the raptors exist exclusively on the Monument, and most could not exist at all if the peripheral lands were not available to them.

### POTENTIAL RAPTOR MANAGEMENT

Before entering a discussion on raptor management, there are some limitations that should be kept in mind. The first problem and by far the largest is that of the size of the Monument itself. Golden eagles and prairie falcons in this area have territories roughly the size of the Sheep Rock Unit, usually somewhere in the range of 10 to 40 square miles. Potential management for these species is reduced to dealing with a single pair. For the other species, potential is greater because, excepting the raven, the rest have territories less than two square miles. Therefore, unless the size of the Monument is increased or a cooperative situation with the surrounding landowners is reached, meaningful raptor management is limited to the Sheep Rock Unit and to a lesser extent the Painted Hills Unit. Another problem, though minor, is that raptors don't always use the same nest from year to year making it more difficult to protect active nests.

There are several potential options for a raptor management plan. All are related to a greater or lesser degree and differ mainly in emphasis. The possible goals listed below are discussed.

1. Population restoration to pre-settler times.
2. Maintenance of present raptor populations.
3. Promotion of maximum breeding raptor density.
4. Promotion of maximum breeding raptor diversity.
5. Promotion of maximum density and diversity of wintering raptors.

### Population Restoration

The problem here is determining what was the original condition. From what I have been able to learn, it will be mostly speculation. I would guess that perennial grasses were more dominant at least on soils derived from rock other than John Day Formation. Also I would expect that the floodplain was bordered by a gallery forest of cottonwood and/or willow with a fair amount of undergrowth. The lower portion of the White River in Tygh Valley is the best existing example I can think of. Springs probably ran more water and possessed an associated riparian habitat of better quality than now found.

If these guesses are anywhere close, it still is not certain what it means in terms of the raptor community. I would doubt that the large raptor populations were much different than found today in the species present though density was probably greater. The presence of ospreys may have been the exception. The topography just isn't suited to the prairie birds such as ferruginous or Swainson's hawks that were once much more abundant over other parts of eastern Oregon. I know too little of peregrine falcons to say whether they might have been present, but I doubt there ever were high enough bird populations to support them. Most changes I suspect would have been in the medium and small raptors. Marsh hawks, Cooper's hawks, screech owls, and long-eared owls were probably present and/or more abundant. The possibility also exists for burrowing and short-eared owls. The number of raptors spending the winter on the area, I suspect, would have been much greater. Still, it is not known for certain what did exist, and the best approach would be to restore the plant communities and wait to see what raptors come.

### Maintenance of Present Raptor Populations

This option is basically a freeze on conditions as they are. Only negative trends still in motion need to be dealt with. At the same time

degradation of conditions necessary to raptors through new Monument related activities must be prevented. As for trends still in motion, only erosion and consequent further damage to the plant communities needs to be contended with. For a discussion of possible Monument activities having a negative influence on present raptor populations, refer to the previous section, Potential Impacts on Raptor Populations. By preventing further damage to the present plant communities and successfully handling potential visitor problems, the present raptor communities should remain pretty much as they are.

#### Promoting Maximum Breeding Raptor Density

There are two overriding considerations for all raptors in eastern Oregon. One is food and the other is nest sites. When raptors of any species are apparently lacking in an area, one of the two above factors is almost invariably in short supply.

Food. The best prey situation for raptors is an abundant and diverse one. Most prey species, especially rabbits, are periodically very abundant and very rare. A raptor depending on one or two such species will be susceptible to periods of hardship. If there is a greater diversity of prey to choose from, the likelihood that all prey populations will be low at the same time is slim. A prey base that is more stable provides not only for higher raptor productivity but also a denser raptor population. The best approach is to develop habitat that emphasizes diversity.

Riparian habitats are noted for their diversity and should be encouraged in all forms: pond, riverside and floodplain, slough, streamside and spring.

Ponds and sloughs like the one found to the south of the road immediately east of Picture Gorge and the beaver pond on Pine Creek on the Clarno Unit are productive, and the creation of more would benefit more raptors. A couple of

large trees in association with such ponds as hunting perches increase their value as hunting areas. The elimination of the large trees around the beaver pond on the Clarno Unit when they improved the road was the largest factor responsible for the loss of a pair of great horned owls in that area. The pond is not less productive, it just became unhuntable for the owls because they had no place to perch.

Since the amount of floodplain available on the Sheep Rock Unit is sizable, it could be best developed by breaking it up into cottonwood, willow, scrub, and alfalfa patches creating a mosaic. These four should constitute a balanced mixture (see diagram) coupled with pond development.

In reference to the diagram, the intention with cottonwoods is to create woodlots not just a row of trees bordering the river. Where rows do appear on the diagram, these strips should be at least two or three trees deep with respect to the river. It is also recommended that the relatively large woodlots be spaced approximately one mile apart as this is the normal spacing of red-tailed hawks and great horned owls along the John Day River in the Clarno Unit.

It should also be noted that none of the ponds represented are bordered directly by alfalfa which would bring more disturbance to these areas. Ponds are bordered by willow, cottonwood, and scrub in varying amounts. Cottonwood and willow woodlots in each case are found in close proximity to each pond if not actually bordering them. In either event at least one large tree is present on the pond edge to serve as a hunting perch. Also it is important that each pond not be entirely encircled by willows or other trees. At least one third of the shoreline should be bordered by low vegetation.

The scrub areas represented on the diagram are simply floodplain areas left to follow their own course. An example of such a situation can be found

about 2 miles up river from the Clarno Unit and across the river. In selecting these areas, the lowest in elevation with respect to the river should be selected because of the more favorable soil moisture situation.

Alfalfa is an essential part of this plan as it provides excellent prey habitat (see page 34 Alfalfa and Other Crops, and following in reference to Belding's ground squirrels). This is mentioned here as it is my understanding that at a future date agriculture on the Monument is planned to be phased out.

A final comment, junipers can be found scattered along the upper edges of the alfalfa and scrub areas and serve as hunting perches.

This approach is not suitable in this form for the Painted Hills Unit, but the same ideas apply and a simpler version could be adapted from this outline.

In association with riparian habitat, Belding's ground squirrels could be encouraged if present and introduced if not present. Belding's ground squirrels are a favored raptor food and along with associated pocket gophers and meadow mice provide the most abundant and reliable prey base for raptors in this area.

I encountered none on my survey of the Painted Hills and Sheep Rock Units. However, a colony exists 2 miles north of Clarno along the west side of the river.

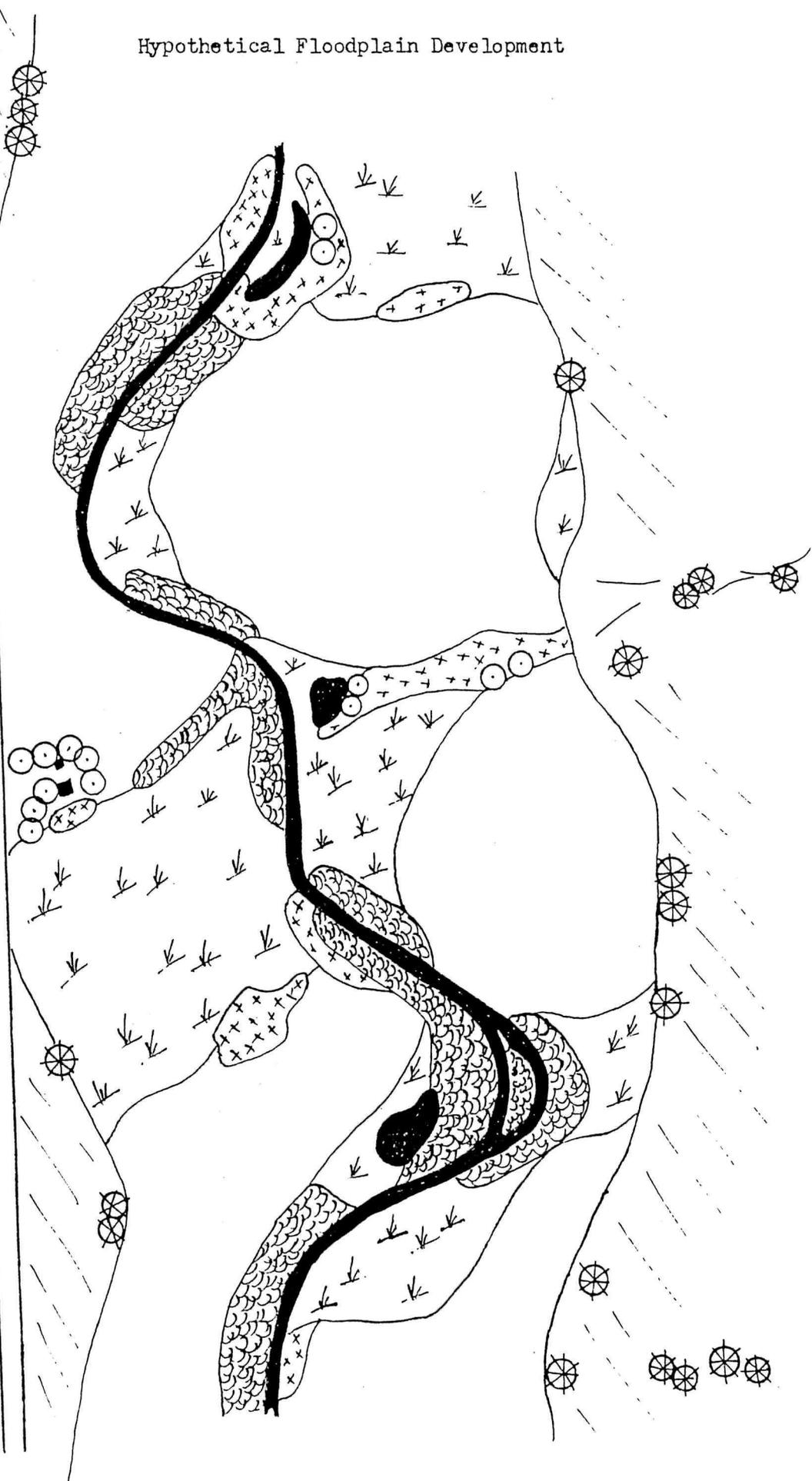
Belding's ground squirrels were most likely present on at least the Sheep Rock and Clarno Units at one time. Besides their present location with respect to the Clarno Unit, Bailey (1936) collected specimens at 2 locations just upriver from the present Sheep Rock Unit (1 about Dayville) and at 2 locations just downriver (1 about Kimberly).

Belding's ground squirrels prefer moist, deep-soiled areas which on the Monument means floodplain. Optimum habitat is alfalfa above normal flooding. An added benefit from Belding's ground squirrel is that they provide potential burrowing owl nest sites with their burrows.

### Hypothetical Floodplain Development

#### KEY

-  Cottonwood
-  Willow
-  Scrub
-  Alfalfa
-  Upland
-  Water
-  Junipers
-  Deciduous Trees
-  Dwellings
-  Road



Golden-mantled ground squirrels, which already exist on the three units, are not colonial and do not reach the abundance that the Belding's ground squirrel characteristically achieves. As a result they are not a major prey species.

In combination with riparian habitat development, there should be a similar effort in encouraging perennial grasses in the upland areas increasing prey through a general increase in land productivity.

Nest Sites. Potential nest sites on the Sheep Rock and Clarno Units for the most part are adequate while on the Sheep Rock Unit much could be done to provide more low elevation nest sites. Nest sites on the Painted Hills Unit are scarce. Since cliffs cannot be constructed, additional nest sites can be provided eventually through cottonwood and maybe poplar plantings. Cottonwood and poplars provide not only platforms for the larger raptors but also cavities for the smaller raptors. The area from Goose Rock to Picture Gorge in particular could use such plantings as well as along Bridge Creek in the Painted Hills Unit.

The abundance of kestrels infers that cavities are not in short supply, but suitable nest boxes may be placed in riparian habitat to encourage screech owls, barn owls, and maybe even more kestrels. The possibility also exists for the construction of nesting platforms for the larger raptors (Olendorff and Stoddart 1974).

Since owls and falcons make no nests of their own, they rely on natural sites or the old nests of other species. These support species: red-tailed hawks, ravens, and magpies, should be encouraged or at least not persecuted.

In addition, considerations discussed in the section on Potential Impacts on Raptors should be followed.

The best gains in the direction of promoting maximum raptor density can be made by:

1. The development of the patchwork riparian habitat on the Sheep Rock Unit.
2. The introduction of Beldings's ground squirrels.
3. The planting of cottonwoods and willows and some alfalfa along Bridge Creek.

#### Promoting Maximum Breeding Raptor Diversity

The emphasis here parallels that of the previous section with special attention towards encouraging rare species and bringing in new species. Since typically dominant species like great horned owls and golden eagles do not exist on any part of the Monument in either number or pattern of use in a way to inhibit other species, management for diversity is nonconflicting with management for density. The following discussion will present management suggestions for each species individually.

##### Raptors Present but Rare.

Golden eagle - Little can be done to increase the number of golden eagles due to their large territory size. However, on the Painted Hills Unit an old eagle nest exists in which a rock has fallen making it unusable. The removal of this rock might encourage an eagle to nest here, but the proximity of this nest to the road makes this nest vulnerable to disturbance.

Prairie falcon - The introduction of Belding's ground squirrels would create the greatest chance of increasing the population of prairie falcons. Ravens should not be discouraged because they provide nest sites for prairie falcons. Fences particularly on the floodplain should be minimized as they can prove to be a hazard to hunting falcons.

Long-eared owl - These owls would be best benefitted through spring development away from the river or other places inhabited by great horned owls which occasionally predate upon them. In addition, the removal of the tops of old magpie nest would provide higher quality nest sites for these birds.

Great horned owls - Another pair or two of these owls could probably exist between Goose Rock and Picture Gorge if suitable low elevation nest sites were available.

Screech and barn owls - These birds could be encouraged through both the introduction of nest boxes on or adjacent to the floodplain and the development of the patchwork riparian habitat.

Raptors Not Now Present.

Ferruginous hawk and Swainson's hawk - There is little chance in attracting these birds due to the topography.

Marsh hawk - There is a relatively good chance to attract this bird. The marsh hawk is a largely riparian oriented bird though not exclusively. They are ground nesters and require tall grasses or a similar situation to nest in. This could be provided for in the patchwork riparian habitat which would also provide ideal hunting habitat.

Peregrine falcon - There is only the slightest chance for peregrines to ever occupy the Monument. In the intermountain region of the western United States there are two basic sets of circumstances that can allow the presence of peregrines (to my knowledge) both involving their preferred prey, birds. The first situation is the presence of extensive wetlands like that found in Malheur which support large numbers of birds. The second situation is the presence of large populations of rock doves as in the canyon country of the Idaho portion of the Snake River. Neither situation exists on the Monument.

Cooper's hawk - These birds presently nest not far from the Clarno Unit and are a definite possibility for inhabiting the Monument. This would require spring development in the backcountry to encourage prey (largely birds) and provide nest sites.

Osprey - As mentioned previously these birds do nest along the John Day River. The addition of a healthy gallery forest of cottonwood might attract a pair of these birds by providing a remote, low elevation nest site. The shade provided by the trees might also enhance fish populations.

Burrowing owl - The possibility of attracting these birds is not great but not out of the question. The introduction of Belding's ground squirrels and the presence of badgers would increase this chance through increased nest site potential.

Short-eared owl - Their requirements are similar to those of the marsh hawk described above.

#### Winter Raptor Management

Management for winter raptors hinges on the availability of prey active in the winter. These include rabbits, jackrabbits, deer mice, pocket gophers, meadow mice and birds. The best habitat for the majority of these species is found in the patchwork riparian habitat.

#### RECOMMENDED MANAGEMENT PLAN

Below are those options that if implemented should protect and enhance the present raptor populations without resorting to raptor increase at any cost. Because raptors are the embodiment of freedom, it is possible in my opinion to overmanage raptors to the point they are semi-domesticated. I do not advocate the construction of nest boxes or nest platforms, but I prefer

a habitat approach emphasizing land health. This approach, as I said at the outset, becomes management for all wildlife and not just raptors. In addition, I feel the role of the National Park Service should be more than just to provide recreation. A quality range and wildlife program (including raptors) can provide an example to all of how a well-administered piece of land should appear in this area. This could be an incentive for others to incorporate such practices as they can to their own land.

The presented management suggestions fall in to two categories:

(1) prevention of degradation through increased visitor use and other management activities and (2) habitat modification to enhance attractiveness to raptors. Most are simply outlined here and described in detail elsewhere in this paper. These options are only the major points. Many of the management suggestions made previously are still of value but would not have the impact of those presented here.

Prevention of Impact on Raptors

1. Discourage dispersed visitor use.
2. Restrict human activity around active nests. For example, in red-tailed hawks this would best be an elimination of disturbance within 300 yards of a nest. This applies to low and exposed nests. Nests like the red-tailed hawk nest on the cliff inside the southern entrance to Picture Gorge need not be so protected. For more tolerant birds like the kestrel the distance can be much less.
3. Clearly define and minimize visitor use on the floodplain and other riparian areas.
4. Permit no camping on the Clarno and Sheep Rock Units. Do not encourage greater use of the Painted Hills campground.
5. Carry out management activities that could affect raptors outside the breeding season (February through July).
6. Retain a portion of the alfalfa fields now present on the Monument in accordance with the patchwork riparian habitat described within this paper.

Encouragement of Raptors

1. Encourage more nest sites through cottonwood and willow plantings in the riparian areas of all units. This recommendation is related to the next.
2. Develop the patchwork riparian habitat including ponds as described within this paper on the Sheep Rock Unit and in simplified form on the Painted Hills Unit. This option I feel is the most important of all those presented here. It is an option that may appear at first glance to be gargantuan, but I think not. The only effort would be to draw up a detailed plan, excavate the ponds, and gradually over a period of years plant cottonwood and willow slips.
3. Encourage prey species particularly through the introduction of the Belding's ground squirrel.
4. Restore the perennial grasses where they are not as abundant as they might be, and eliminate or restrict grazing to the point that the native plant communities can recover.

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