

ATTACHMENT SS2

REGION 2 SENSITIVE SPECIES EVALUATION FORM

Species: Boreal Owl ( <i>Aegolius funereus</i> )			
Criteria	Rank	Rationale	Literature Citations
1 Distribution within R2	B	<p>Boreal owls occur from the northern to southern extent of Region 2 in subalpine forest habitats. Therefore the species has a broad geographic distribution. Throughout this range the species occurs in a patchy network of habitats (habitat associations are pretty well known). For this species, subpopulations likely occur at the spatial extent of areas the size of the Grand Mesa or the Snowy Mountains. Gaps in forest habitat of 1 km likely represent divisions between subpopulations but this is a hypothesis. The degree of dispersal among patches is unknown but currently being investigated. Dispersal among patches is hypothesized to be uncommon but not rare and facilitated by the nomadic nature of the species.</p> <p>Confidence in Rank <del>High or Medium or Low</del></p>	<ul style="list-style-type: none"> <li>• Ryder et. al. 1987 (owls symposium)</li> <li>• Hayward et. al 1987</li> <li>• Hayward et al. 1993.</li> <li>• Koopman et al. 2000</li> <li>• Wyndd Database 2001</li> <li>• Hayward and Verner 1994.</li> </ul>
2 Distribution outside R2	B	<p>Boreal owls have a broad distribution outside Region 2 that extends northward through the Rocky Mountains and throughout the boreal forests of North America. The southern most forests in Region 2, however, occur near the southern extent of boreal owl range in North America. Furthermore, boreal owls do not occur east of the subalpine forests of the Rockies in Region 2 nor are there extensive populations known immediately west of the Region 2 populations. Therefore, despite the extensive distribution in Region 2 and the extensive distribution in North America, movement of boreal owls into habitats in the Region is limited by the geographic arrangement of habitats.</p> <p>Confidence in Rank <del>High or Medium or Low</del></p>	<ul style="list-style-type: none"> <li>• Hayward and Hayward 1993</li> <li>• Hayward and Verner 1994</li> </ul>
3 Dispersal Capability	C	<p>Based on their ability to move long distances during nomadic movement events in Europe and suggestion of similar movements in North America, we assume that boreal owls can disperse readily across non-forested habitat. In the Rockies, radio marked owls have been observed moving long distances including movements across inhospitable habitat. Questions arise regarding how readily the owls will move and then settle in new habitat. In most years, boreal owls are highly sedentary, remaining in the same home range throughout the year, for several years.</p> <p>Confidence in Rank <del>High or Medium or Low</del></p>	<ul style="list-style-type: none"> <li>• Hayward et al. 1993</li> <li>• Korpimaki et al. 1987a</li> <li>• Lofgren et al. 1986</li> <li>• Evans and Rosenfeld 1977.</li> <li>• Hayward and Hayward 1993</li> </ul>

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<p><b>4</b> Abundance in R2</p>	<b>B</b>	<p>I am unaware of density estimates for boreal owl anywhere in North America. Indications of RELATIVE abundance of boreal owls comparing sites in Region 2 with sites elsewhere in North America can be made from relative nest-box occupancy rates – however, these comparisons are tenuous because they rest on numerous assumptions. Based on nest box occupancy, however, it appears that boreal owls seldom occur at densities in Region 2 that are high compared to densities in Montana and Idaho. Furthermore, because the principle cavity excavating species (Piliated woodpecker) in the Northern Rockies does not occur in most of Region 2, and large cavities are not abundant in this portion of the Rocky Mountains, breeding densities are expected to be lower.</p> <p>Confidence in Rank <del>High</del> or <del>Medium</del> or <del>Low</del></p>	<ul style="list-style-type: none"> <li>• Koopman et al. 2000</li> <li>• Palmer 1986</li> <li>• Hayward et al. 1992</li> <li>• Hayward et al. 1993</li> <li>• Hayward and Hayward 1993</li> <li>• Hayward 1997</li> </ul>
<p><b>5</b> Population Trend in R2</p>	<b>B-A</b>	<p>Based on the limited inferential evidence available, the suspected population trend for boreal owl could not be characterized as STABLE, however, it could also not be characterized as a SIGNIFICANT downward trend. Two primary factors lead me to believe that boreal owl populations are likely declining over the long-term, but at a slow rate. First, climate change appears to be leading toward warmer summer temperatures. The elevation distribution of boreal owls is likely determined, in part, by summer temperatures. Boreal owls are easily heat stressed. Therefore, warm temperatures would force boreal owls to higher elevations. Because subalpine forest is limited in its distribution by the alpine zone, such movement would reduce habitat availability. Second, during the past 200 years, mature and older spruce-fir forest has declined in the Rockies due to mining, timber harvest, and human-caused fire. This trend has declined in recent years, and the relationship between the current extent of these forests and patterns in the past is unknown. However, it is certain that the extent of these forests have varied substantially over time.</p> <p>Confidence in Rank <del>High</del> or <del>Medium</del> or <del>Low</del></p>	<ul style="list-style-type: none"> <li>• Hayward et al. 1993</li> <li>• Hayward and Verner 1994</li> <li>• Knight 1994</li> </ul>

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<p><b>6</b> Habitat Trend in R2</p>	<b>B-A</b>	<p>Inferences regarding population trend for boreal owl made in #5 come largely from knowledge of boreal owl habitat associations and assumptions regarding changes in habitat extent. Therefore, inferences regarding trend in habitat echo those stated in #5. It might be added that currently, spruce bark beetle, combined with blowdown, is reducing the extent of large spruce in the region.</p> <p>Confidence in Rank <del>High or Medium or Low</del></p>	<ul style="list-style-type: none"> <li>• Hayward et al. 1993</li> <li>• Hayward and Verner 1994</li> <li>• Knight 1994</li> </ul>
<p><b>7</b> Habitat Vulnerability or Modification</p>	<b>B</b>	<p>As mentioned earlier, subalpine forests are vulnerable to climate change. The distribution of these forests, their structure, and composition are all strongly influenced by climate. Fire frequency and intensity is also climatically driven in these forests and an increase in fire frequency or intensity would decrease the extent of habitat for this owl. These forests also represent valuable fiber resources and are vulnerable through timber harvest. This threat is mediated by the extent of high elevation forests that are found in wilderness areas or other lands not considered a portion of the timber base. However, in some geographic regions the most productive subalpine forests are part of the timber base.</p> <p>Confidence in Rank <del>High or Medium or Low</del></p>	<ul style="list-style-type: none"> <li>• Knight 1994</li> <li>• Hayward et al. 1993</li> <li>• Hayward 1997</li> </ul>

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<p><b>8</b> Life History and Demographics</p>	<p><b>B</b></p>	<p>In the most general sense, boreal owls would be considered a species whose life history protects it from 'extinction'. These owls are relatively long-lived, have a flexible reproductive biology, employ nomadic movements to respond to environmental change, and have a broad diet. However, several factors suggest that boreal owls in the mountains at the southern extent of their range may be more vulnerable. Boreal owls in the Rockies appear to have relatively low reproduction and potentially higher mortality than northern counterparts. The owls are secondary cavity nesters in a region with few cavities large enough for the birds – the abundance of these cavities changes over long time periods because of dynamics of the forest. In the Rockies, the owls occupy winter home ranges (coincident with summer ranges) that receive extremely deep snows. This reduces the range of prey available and makes the owl vulnerable to the interaction between snow conditions and prey characteristics. Small mammal populations in these mountains are never as abundant as during prey highs in the boreal forests, therefore, extremely high reproduction never occurs.</p> <p>Confidence in Rank <del>High</del> <del>Medium</del> <del>Low</del></p>	<ul style="list-style-type: none"> <li>• Sonerud 1986</li> <li>• Korpimaki 1992</li> <li>• Korpimaki 1989</li> <li>• Hayward 1997</li> <li>• Hayward and McDonald 1997</li> </ul>
<p>Evaluator(s): Gregory D. Hayward</p>			<p>Date: 13 July 2001</p>

**National Forests in the Rocky Mountain Region where species is KNOWN (K) or LIKELY (L)<sup>1</sup> to occur:**

<sup>1</sup> Likely is defined as more likely to occur than not occur on the National Forest or Grassland. This generally can be thought of as having a 50% chance or greater of appearing on NFS lands.

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<u>Colorado NF/NG</u>	Known	Likely	<u>Kansas NF/NG</u>	Known	Likely	<u>Nebraska NF/NG</u>	Known	Likely	<u>South Dakota NF/NG</u>	Known	Likely	<u>Wyoming NF/NG</u>	Known	Likely
Arapaho-Roosevelt NF	K		Cimmaron NG			Samuel R. McKelvie NF			Black Hills NF			Shoshone NF	K	
White River NF	K					Halsey NF			Buffalo Gap NG			Bighorn NF	K	
Routt NF	K					Nebraska NF			Ft. Pierre NG			Black Hills NF		
Grand Mesa, Uncompahgre, Gunnison NF	K					Ogalala NG						Medicine Bow NF	K	
San Juan NF	K											Thunder Basin NG		
Rio Grande NF	K													
Pike-San Isabel NF	K													
Comanche NG														

Known occurrences are from Forest Service surveys. Likely occurrence is based on authors knowledge of distribution and likely habitat

Some forests with 'Known' occurrence may not have breeding populations.

Literature Cited

Evans, D. L., and R. N. Rosenfield. 1977. Fall migration of Boreal Owls. *Loon* 49:165-167

Hayward, G. D. 1997. Forest management and conservation of boreal owls in North America. *J. Raptor Research* 31:114-124.

Hayward, G. D., and P. H. Hayward. 1993. Boreal Owl. In A. Poole, P. Stettenheim, and F. Gill, editors. *Birds of North America*. Philadelphia: Academy of Natural Sciences, Washington, D, USA

Hayward, G. D. and J. Verner. 1994. Flammulated, boreal, and great gray owls in the United States: A technical conservation assessment. USDA Forest Service, GTR RM-253.

Hayward, G. D., P. H. Hayward, and E. O. Garton. 1993. Ecology of Boreal Owls in the northern Rocky Mountains, USA. *Wildlife Monographs* 124:1-59

Hayward, G. D., P. H. Hayward, E. O. Garton, and R. Escano. 1987. Revised breeding distribution of the Boreal Owl in the northern Rocky Mountains. *Condor* 89:431-432

Hayward, G. D., R. K. Steinhorst, and P. H. Hayward. 1992. Monitoring Boreal Owl populations with nest boxes: sample size and cost. *Journal of Wildlife Management* 56:776-784

Hayward, G. D., and D. B. McDonald. 1997. Matrix population models as a tool in development of habitat models. Pages 205-212. In: J. R. Duncan, D. H. Johnson, and T. H. Nicholls. Eds. *Biology and Conservation of owls of the Northern Hemisphere*. USDA Forest Service, GTR NC-190.

Knight, D. H. 1994. Dynamics of subalpine forests. Pages 128-138. In: G. D. Hayward and J. Verner eds. *Flammulated, boreal, and great gray owls in the United States: A technical conservation assessment*. USDA Forest Service, GTR RM-253.

Koopman, M., D. B. McDonald, and G. D. Hayward. 2000. Boreal owl population trend, habitat use, and dispersal: Combined Progress report. Unpublished report to USDA Forest Service, Rocky Mountain Station, Missoula, MT.

Korpimaki, E. 1989. Breeding performance of Tengmalm's Owl *Aegolius funereus*: effects of supplementary feeding in a peak vole year. *Ibis* 131:51-56

Korpimaki, E., M. Lagerstrom, and P. Saurola. 1987a. Field evidence for nomadism in Tengmalm's Owl *Aegolius funereus*. *Ornis Scandinavica* 18:1-4.

Korpimaki, E. 1992. Fluctuating food abundance determines the lifetime reproductive success of male Tengmalm's Owls. *Journal of Animal Ecology* 61:103-111

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- Lofgren, O., B. Hornfeldt, and G. Carlsson. 1986. Site tenacity and nomadism in Tengmalm's Owl (*Aegolius funereus*) in relation to cyclic food production. *Oecologia* 69:321-326.
- Palmer, D. A. 1986. Habitat selection, movements and activity of Boreal and Saw-whet Owls. Thesis. Colorado State University, Fort Collins, Colorado, USA
- Ryder, R. A., D. A. Palmer, and J. J. Rawinski. 1987. Distribution and status of the boreal owl in Colorado. Pages 169-174. in R. W. Nero, C. R. Knapton, and R. H. Hamre, editors. *Biology and conservation of northern forest owls*. Symposium proceedings, Winnipeg, Manitoba, February 1986
- Sonerud, G. A. 1986. Effect of snow cover on seasonal changes in diet, habitat, and regional distribution of raptors that prey on small mammals in boreal zones of Fennoscandia. *Holarctic Ecology* 9:33-47
- WYNDD Database. 2001. Unpublished distribution information on *Aegolius funereus* in Wyoming from the Biological and Conservation Data System of the Wyoming Natural Diversity Database, University of Wyoming. Laramie, WY.