

# FLAMMULATED OWL

## *Otus flammeolus*

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### Species Information

#### Taxonomy

The Flammulated Owl is the only New World *Otus* species that is part of the Old World subgenus *Scops* and is not closely related to other North American *Otus* species. One to six subspecies are recognized (Hekstra 1982; del Hoyo et al. 1999). Populations at the northern range, including those in British Columbia, are generally separated as *O. flammeolus idahoensis* (e.g., Cannings 1998), although the species is sometimes treated as monotypic (e.g., del Hoyo et al. 1999). Geographical differences include the amount of reddish pigment in the plumage (increasing southward with increasing pine dominated habitats; conversely, increasing grey with increasing Douglas-fir heading north) and wing length (increasing northward with increasing migration distances), although the differences may be clinal and not useful for subspecific taxonomy (del Hoyo et al. 1999).

#### Description

Small owl (16–19 cm in length) with variegated red and grey plumage. Small indistinct ear tufts. Brown eyes.

#### Distribution

##### Global

The Flammulated Owl breeds in the western mountains of North America from British Columbia south to Mexico and northern Central America. In winter, populations in Canada and the United States migrate to the southern portions of the breeding range (McCallum 1994a).

#### British Columbia

In the breeding season (May–September), the Flammulated Owl occurs from the Okanagan and Similkameen valleys north through the Nicola and Thompson valleys and the drier parts of the Fraser-Chilcotin valleys to Alexis Creek in the west and McLeese Lake in the north (Roberts and Roberts 1995; Waterhouse 1996, 1997; K. Wright, pers. comm.). It is also found in the Rocky Mountain Trench north at least to Radium Hot Springs.

The species occurs in the elevational band characterized by dry Douglas-fir (*Pseudotsuga menziesii*) forests along the upland slopes of the major drainages of the southern region of the province. Confirmed records are from the Fraser River between Williams Lake (M. Waterhouse, pers. comm.) and Lytton (Texas Creek) (van Woudenberg 1998); North Thompson Valley (Christie 1996; Christie and Low 1996); Merritt, Princeton, and Nicola valleys (van Woudenberg and Christie 2000); South Thompson and Okanagan valleys (Cannings and Booth 1997); and the southern Rocky Mountain Trench to Radium Hot Springs (CDC 1998; van Woudenberg et al., in prep.).

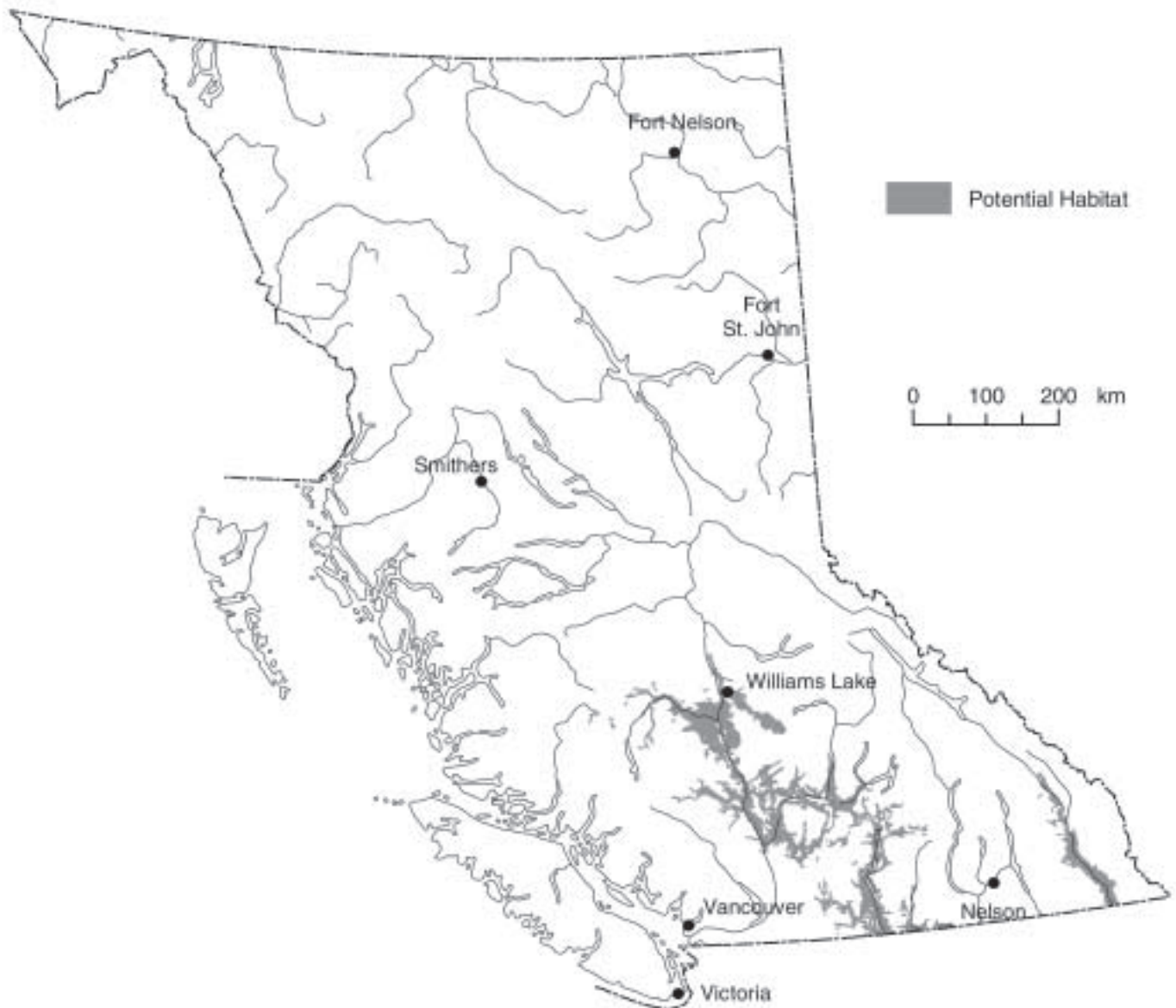
#### Forest region and districts

Southern Interior: 100 Mile House, Cascades, Central Cariboo, Chilcotin, Kamloops, Okanagan Shuswap, Rocky Mountain

#### Ecoprovinces and ecosections

CEI: CAB, CCR, CHP, FRB, QUL  
SOI: GUU, NIB, NOB, NOH, NTU, OKR, PAR, SCR, SHB, SOB, SOH, STU, THB, TRU  
SIM: EKT, EPM, MCR, UCV

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Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion, Biogeoclimatic and Broad Ecosystem Inventory) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated. More detailed maps are available for this species from the Ministry of Sustainable Resource Management.

### **Biogeoclimatic units**

BG: xh1, xh2, xw, xw1, xw2  
PP: dh1, dh2, xh1, xh2  
IDF: dk1, dk2, dk3, dk4, dm, dm1, dm2, mw1, mw2, un, xh1, xh1a, xh1b, xh2, xh2a, xh2b, xm, xw, xw2

### **Broad ecosystem units**

DE, DP, PP

### **Elevation**

North America: 375 (Campbell et al. 1990)–2700 m (Winter 1974)

British Columbia: Kamloops and Merritt 400–1375 m (van Woudenberg et al. 1995)

## **Life History**

### **Diet and foraging behaviour**

Insectivorous. Prey consists of larger insects, including moths, katydids, crickets, and beetles, often taken on the wing from high grass or shrubs in forest openings, or gleaned from forest canopies.

### **Reproduction**

Breeds in British Columbia between May and August. Generally, one clutch is laid per year. Clutch size is typically two to four eggs; young may fledge from mid-July through mid-August; fledglings depend on parents for 4–5 weeks.

The Flammulated Owl is a secondary cavity nester, nesting in natural cavities or those excavated by Pileated Woodpeckers (*Dryocopus pileatus*) or Northern Flickers (*Colaptes auratus*) (van Woudenberg 1999). Alternative cavities have been used for nesting in the same tree in successive years and alternative trees have been used within the same foraging areas. The Barred Owl (*Strix varia*) is a significant predator in some localities, and may be a particular risk to Flammulated Owl fledglings.

### **Site fidelity**

This species shows strong fidelity to breeding areas (Reynolds and Linkhart 1992). Males typically return to territories.

### **Home range**

Home range size and dispersal behaviour of Flammulated Owls are not well understood in British Columbia, although foraging distances have been as far as 586 m from nest sites. Home range areas have been recorded as large as 15.9 ha on average (McCallum 1994b); however, 2.2–3.7 ha were roughly estimated for two nest sites in British Columbia (van Woudenberg 1992).

### **Dispersal and movements**

Often forages within 300 m of nest site during breeding season.

Neotropical migrant. Winters in Mexico and northern Central America (McCallum 1994a).

## **Habitat**

### **Structural stage**

6: mature forest  
7: old forest

### **Important habitats and habitat features**

#### **Nesting**

Important nesting habitat includes multi-age class stands with multiple canopy layers, including a veteran tree component for nesting and roosting. Wildlife trees with large live branches (class 1) provide considerable security cover for roosting, calling, and snags with cavities (wildlife tree classes 3–6) provide nesting habitat. Occasionally, nests can be found in class 7 wildlife trees, particularly if the tree species is ponderosa pine (*Pinus ponderosa*); however, successful recruitment of young is unknown. Regenerating thickets of Douglas-fir provide security cover if they are adjacent to grassy or shrub-dominated openings that provide foraging habitat. Flammulated Owls do not occupy pre-commercially thinned stands or areas where silvicultural treatments leave evenly spaced, open stands, probably because even-aged, single canopy layer stand structure does not provide the density required for security cover (van Woudenberg 1999).

Recruitment of large diameter ponderosa pine for nest trees may be critical for sustainability of local

populations. Large diameter pine tend to be more stable as snags than smaller trees and other species, and may enhance productivity if predation of nests is reduced by high cavities in smooth, hard snags with no bark. Flammulated Owls selected large diameter ponderosa pine disproportionately to Douglas-fir for nesting (van Woudenberg 1992; Christie and Low 1996).

In Oregon, Pileated Woodpecker cavities were preferred by Flammulated Owls in comparison with Northern Flicker cavities (Bull et al. 1990). In British Columbia, 67% of the Flammulated Owl nest trees were in ponderosa pine and 28% were in Douglas-fir (van Woudenberg 1999). Of the nest trees studied in Oregon, 91% were dead and in British Columbia, 75% were dead (Bull et al. 1990; van Woudenberg 1999).

Because Flammulated Owls nest in Pileated Woodpecker and Northern Flicker cavities, it is useful to consider the nesting requirements of these two species in forests where Flammulated Owls occur (see Appendix 12).

Pileated Woodpeckers in northwestern Montana selected mainly western larch (*Larix occidentalis*) and rarely Douglas-fir for nest trees (McClelland and McClelland 1999). They used ponderosa pine where groves were almost entirely composed of ponderosa pine and Douglas-fir. In riparian forests, nest trees were in large black cottonwood (*Populus balsamifera*) and all aspen (*Populus tremuloides*) nest trees were in monospecific groves of aspen (McClelland and McClelland 1999). In the Okanogan National Forest, Northern Flickers selected ponderosa pine and western larch in greater proportion than Douglas-fir or other species (Madsen 1985). In south-central British Columbia, Pileated Woodpeckers nested exclusively in trembling aspen (Harestad and Keisker 1989). Northern Flickers preferred trembling aspen to conifers near Riske Creek (Wiebe 2001).

In British Columbia, the diameter at breast height (dbh) of Flammulated Owl nest trees ( $n = 11$ ) was  $63.8 \text{ cm} \pm 13.5$  (after van Woudenberg 1992). The mean dbh varied slightly between tree species, although the range was not dissimilar (Table 1).

**Table 1.** Dbh (mean  $\pm$  SD) (cm) of Flammulated Owl nest trees (after van Woudenberg 1992)

Tree species	<i>n</i>	dbh	Range
Ponderosa pine	7	$65.7 \pm 12.8^*$	46.2–81.2
Douglas-fir	4	$60.6 \pm 14.6$	49–82

\* Weighted mean and pooled standard deviation

Nests are often located within and/or near foraging habitat, characterized by small forest openings (<1 ha) adjacent to Douglas-fir thickets and/or large veteran Douglas-firs or ponderosa pines with heavy branching for security.

### Foraging

Understorey structure may be important in forest openings for foraging habitat. Flammulated Owls were not observed nesting in areas they had previously occupied after grazing had reduced grasses <10 cm (van Woudenberg 1999).

## Conservation and Management

### Status

The Flammulated Owl is on the provincial *Blue List* in British Columbia. It is designated as a species of *Special Concern* in Canada (COSEWIC 2002).

Summary of ABI status in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	ID	MT	OR	WA	Canada	Global
S3S4B, SZN	S3B, SZN	S3B, SZN	S4B	S3B, SZN	N3B	G4

### Trends

#### Population trends

Current population levels and distribution are poorly known, and since historical populations are completely unknown, trends are difficult to establish. The species is more widespread than previously reported, because of increased search

effort in the past decade rather than any real population increase.

The total Flammulated Owl population in British Columbia, including breeders and non-breeders, may be somewhat greater than 3000 birds (van Woudenberg 1999). While minimum population estimates have been refined tremendously over the past 20 years, absolute densities cannot be measured using census results alone, because these only provide minimum numbers of calling birds. Only a nesting pair is clearly indicative of breeding activity and breeding habitat suitability, and relatively few nests have been found. There is thus little information regarding population sizes and no information regarding population trends for the province.

### **Habitat**

Likely declining due to harvesting of old-growth forest and firewood cutting.

### **Threats**

#### **Population threats**

The low fecundity of the Flammulated Owl (clutch sizes of two to four) (McCallum 1994b) and its dependence on old-growth features of dry montane forests compound an inherent vulnerability regarding long-term population sustainability.

#### **Habitat threats**

The greatest immediate risk to the Flammulated Owl is loss of critical nesting, security, and foraging habitat features from forest management (i.e., harvesting, spacing, thinning, road construction, pest management). A secondary threat is loss of grass and shrub components of foraging habitat by livestock grazing during key breeding periods. In addition, snag removal for safety reasons or for firewood is also a threat. Long-term major threats are recruitment and maintenance of old-growth habitat features, particularly large diameter ponderosa pine snags with cavities. Fire suppression is also a concern as it may reduce foraging habitat over the long term.

Suitable silvicultural treatments and grazing regimes can maintain and encourage regeneration of habitat features.

### **Legal Protection and Habitat Conservation**

The Flammulated Owl, its nests, and its eggs are protected from direct persecution by the provincial *Wildlife Act*.

There are several parks within the range of this species that may contain suitable habitat.

Wheeler Mountain has the highest nesting density of Flammulated Owls documented in British Columbia and is within the Lac du Bois Protected Resource Management Zone (Kamloops LRMP Team 1995). Timber harvesting is not permitted within the protected area but grazing is allowed. There remains the concern that stand structure in the protected area will change without proper management, to the detriment of Flammulated Owl habitat quality. Season-long grazing during the breeding period may reduce current available shrub and grass structure.

The general legal provisions of the results based code, such as wildlife tree retention areas and old growth management areas (OGMAs) provide non-specific protection for forest birds and nesting habitat, including the Flammulated Owl (P. Holman, pers. comm.). Old growth management area considerations for this species could consist of awareness of the preference for ponderosa pine, prescribed treatments may be needed to maintain appropriate stand structure, and grazing should be moderated to maintain grasses >10 cm height on average.

Ungulate winter range provisions likely provide some habitat. Flammulated Owl records in the Cariboo-Chilcotin were completely within ungulate winter ranges (M. Waterhouse, pers. comm., cited by Van Woudenberg 1999).

### **Identified Wildlife Provisions**

#### **Sustainable resource management and planning recommendations**

Because this species is largely dependent on woodpecker cavities (Northern Flickers and Pileated Woodpeckers) for nest sites, management practices that benefit woodpeckers will also enhance habitat for the Flammulated Owl.



The objective for this species is to maintain wildlife trees and green recruitment trees for nesting across the breeding range and over time. Consider WTR area and OGMA objectives for this species in the following forest districts: Kamloops, Okanagan Shuswap, Cascades, Central Cariboo, 100 Mile House, Chilcotin, and Rocky Mountain. Blocks should be assessed to identify potentially suitable WTR areas. Table 2 provides information that should be considered when establishing WTR areas for this species.

As OGMA are generally larger than WTR areas and are meant to have or obtain old growth features, they may be better suited to the habitat needs of this species.

It is recommended that salvage not occur in WTR areas and OGMA established to provide habitat for this species. In addition, these areas should be designed to include as many suitable wildlife trees as possible that should be maintained/recruited over the long term (>80 years).

### Wildlife habitat area

#### Goal

Because there are relatively few known nest areas for this species, these sites should be established as WHAs. Suitable habitat should be managed through old forest retention and wildlife tree retention objectives.

#### Feature

Establish WHAs at known nest sites, occupied breeding territories indicated by detection during

the breeding season, or areas with high densities of breeding pairs.

#### Size

Typically between 10 and 30 ha. Size should be based on estimated home range size using habitat suitability information. High densities may occur within high suitability habitat. Where this occurs, use habitat suitability and home range estimates to determine WHA size.

#### Design

Design the WHA to minimize disturbance and maintain suitable foraging habitat. The WHA should include a 7–12 ha core area that includes key foraging and security habitats and a ~100 m radius management zone surrounding the core area. The core area should be centred on the nest site when known. The management zone provides adult and fledgling foraging and security habitat. In high density areas, the WHAs may be larger with multiple core areas.

### General wildlife measures

#### Goals

1. Minimize disturbance during the breeding season (1 June to 31 August).
2. Maintain adequate foraging habitat for productivity.
3. Ensure security cover from predators for both foraging adults and fledglings.
4. Ensure WHA is windfirm.

**Table 2.** Preferred WTP characteristics for the Flammulated Owl

Attribute	Characteristics
Size (ha)	≥4 ha; larger is preferred
Location	PPdh, PPxh, IDFxh, IDFxw, IDFxM, IDFdM, IDFdK, IDFMw
Tree features	visible woodpecker or natural cavities; understorey brush or thickets
Tree species	ponderosa pine; Douglas-fir, possibly trembling aspen or western larch
Tree size (dbh)	64–77 cm; in the absence of trees with the preferred dbh, trees ≥35 cm or largest available should be retained for recruitment
Wildlife tree class	3–7

5. Maintain suitable nesting habitat and surrounding suitable foraging and security habitat (e.g., dry Douglas-fir dominated forests characterized by a mixed-age class, multi-layered canopy, old-growth features, and thickets adjacent to small openings).

## Measures

### Access

- Do not construct roads. Deactivate or control road access on existing roads.

### Harvesting and silviculture

- Do not harvest or salvage within core area except for partial harvesting systems designed to maintain suitable habitat features (i.e., recruitment nest trees; brushy understorey) that will achieve the objective of the general wildlife measures. Treatments should not occur during the breeding season (1 June to 31 August).
- Do not harvest in xeric sites. In the management zone, in mesic or subhygric/hygric sites, use selective harvest methods that retain  $\geq 50\%$  of the dominant or codominant trees of which some should include healthy crowns. Openings should be  $\leq 0.6$  ha.
- Retain all ponderosa pine and aspen wildlife trees and all wildlife trees  $\geq 35$  cm dbh, using no work zones if necessary.
- Plan for recruitment of ponderosa pine, aspen, and other species into  $> 35$  cm dbh class.
- Maintain thickets and veteran trees adjacent to openings.

### Pesticides

- Do not use pesticides.

### Range

- Manage livestock grazing to retain shrub and grass structure ( $\geq 10$  cm).

### Recreation

- Do not develop trails, roads, or recreation sites within core area.
- Do not cut any wildlife, mature, or veteran trees.

## Additional Management Considerations

Post wildlife tree signs to prevent firewood cutting.

Avoid isolating quality habitat patches; maintain some mature, veteran, or thicket component as security linkage. Avoid isolating habitat patches by thinning intervening stands (van Woudenberg 1992).

Within xeric or mesic sites where thickets are continuous, particularly on south, east, or west aspect slopes  $\geq 20\%$ , harvest to create openings  $\leq 2$  ha.

Encourage ponderosa pine regeneration and understorey shrub development.

## Information Needs

1. Post-fledgling habitat needs.
2. Further inventories.

## Cross References

White-headed Woodpecker

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