

# Flammulated Owl

## *Psiloscopus flammeolus*

### **REGULATORY STATUS**

USFWS: Migratory Bird  
USFS R2: Sensitive  
USFS R4: Sensitive  
Wyoming BLM: No special status  
State of Wyoming: Protected Bird

### **CONSERVATION RANKS**

USFWS: Bird of Conservation Concern  
WGFD: NSSU (U), Tier III  
WYNDD: G4, S1  
Wyoming Contribution: MEDIUM  
IUCN: Least Concern  
PIF Continental Concern Score: 15

### **STATUS AND RANK COMMENTS**

Flammulated Owl (*Psiloscopus flammeolus*) does not have any additional regulatory status or conservation rank considerations in the United States beyond those listed above. Canada has designated the small population that occurs in British Columbia as a Species of Special Concern <sup>1</sup>.

### **NATURAL HISTORY**

#### **Taxonomy:**

This insectivorous owl, formerly in the genus *Otus*, was recently assigned to *Psiloscopus* based on genetic work that indicates it is not closely related to other species of *Otus*, but is instead a sister to species of *Megascops* <sup>2</sup>. Up to six subspecies of Flammulated Owl have been described, but recent genetic analysis of 14 localities throughout its distribution showed high levels of genetic diversity and gene flow among all populations except one in northeastern Mexico <sup>3-5</sup>. Most authors now treat the species as monotypic.

#### **Description:**

Identification of Flammulated Owl is possible in the field. Flammulated Owl can be identified from other sympatric owl species by its tiny size; dark eyes in all age classes; densely feathered tarsi; and small, delicate feet <sup>4-6</sup>. The sexes are similar in appearance, but males average slightly smaller than females <sup>4</sup>. The wings are long and pointed, and the tail is short. Its ear tufts are short and usually flattened, forming corners on the rectangular-shaped head. The grayish-white facial disk is speckled with black and rimmed with dark brown, with rufous around the eyes, ears and throat. Upperparts and crown are gray-brown and heavily vermiculated with varying amounts of rufous. There is a partial collar of white spots around the base of the neck. The flight feathers are dark gray-brown with buffy spots on the outer primaries and buffy-gray mottled bars on the inner primaries and secondaries. No distinct color phases or morphs are recognized, but feather

coloration varies geographically<sup>4</sup>. Owls in the Great Basin and Rocky Mountains are the darkest gray, while those to the north, west, and south have redder feather fringes and finer markings. These variations in plumage color and pattern may represent local adaptations to match tree bark as a form of crypsis.

**Distribution & Range:**

Flammulated Owl is considered a rare summer resident in Wyoming with only one documented breeding population in the Sierra Madre Mountains in Carbon County<sup>7-9</sup>. The species has also been documented in Fremont and Teton Counties, and a single detection from the Black Hills of South Dakota suggests that Flammulated Owl may also occur in northeastern Wyoming<sup>5</sup>. The continental breeding distribution is comprised of disjunct pockets of habitat varying in size in higher elevation western mountains from southern British Columbia into Mexico, including Washington, Oregon, California, Nevada, Idaho, Montana, and Wyoming<sup>5</sup>. It is more widespread in the mountains of Colorado, New Mexico, and Arizona, and is also thought to occur in western Texas and in a number of mountains ranges in Mexico south to Oaxaca<sup>10</sup>. In Idaho, Flammulated Owl has been recorded in the southern part of the state, including the Owyhee Mountains, Sawtooth National Forest, and the Caribou-Targhee National Forest close to the Wyoming border<sup>11</sup>. Flammulated Owl is thought to make long-distance migrations to Mexico, Guatemala, and El Salvador but its winter range is poorly documented and complicated by a mixture of migrants and year-round residents in southern locations<sup>4</sup>.

**Habitat:**

Flammulated Owl has specialized habitat requirements. The species breeds in open, dry, mature and old-growth conifer forest often found on south or east facing slopes, with an oak (*Quercus* spp.) or aspen (*Populus* spp.) component, herbaceous or grass understory, and pockets of dense brushy understory<sup>3, 5</sup>. In the Sierra Madre Mountains of south central Wyoming, and in eastern Idaho, breeding pairs occupied mature stands of mixed-conifers and Quaking Aspen (*P. tremuloides*) from 2,134 to 2,743 m in elevation<sup>7, 11</sup>. In Colorado, a long term study found that Flammulated Owl productivity and occupancy were positively correlated with mature, open stands of Ponderosa Pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) habitat, and negatively correlated with young, dense stands of Douglas-fir<sup>12</sup>. Most nests are found in Ponderosa Pine and Douglas-fir habitats, and to a lesser extent Jeffrey (*Pinus jeffreyi*), Washoe (*P. washoensis*), and Limber Pine (*P. flexilis*), and White (*Abies concolor*) and Subalpine Fir (*A. lasiocarpa*). In Idaho, vocalizing owls were also detected in some juniper-sagebrush (*Juniperus* spp.-*Artemisia* spp.) habitat<sup>11</sup>. As a secondary cavity nester, Flammulated Owl relies on cavities made by Northern Flicker (*Colaptes auratus*) or sapsuckers (*Sphyrapicus* spp.) for nesting.

**Phenology:**

Flammulated Owl returns to nesting areas in North America from southern wintering grounds between late April and mid-May, with males arriving 1–2 weeks earlier than females<sup>13</sup>. Males call during the courtship period from May to mid-June from high perches in the nest area with low, deep, resonant hoots. Mean date for clutch completion in Colorado ranged from May 29–June 7<sup>13</sup>. In Oregon, incubated eggs were found from June 8 to July 3<sup>14</sup>. Females lay up to 4 eggs, with clutches of 2–3 most common. Incubation lasts 21–24 days. Young owls fledge 22–25 days after hatching, and broods divide up to follow either the male or female adult. Young began to disperse in late August. Fall migration flights begin in mid-August in Idaho and Nevada, peak in mid-September, and are over by the end of October<sup>5</sup>.

**Diet:**

The main foods of Flammulated Owl include nocturnal arthropods, especially owlet and geometrid moths (Noctuidae and Geometridae), crickets and grasshoppers (Orthoptera), and beetles (Coleoptera)<sup>4</sup>. In Colorado, noctuid and geometrid moths appear to be the only flying prey available to Flammulated Owl during the cold spring nights<sup>13</sup>.

**CONSERVATION CONCERNS**

**Abundance:**

**Continental:** WIDESPREAD BUT PATCHY

**Wyoming:** VERY RARE

Using North American Breeding Bird Survey data, the Partners in Flight (PIF) Science Committee estimated the global population of Flammulated Owl to be 20,000 birds<sup>15</sup>. Currently, no population estimates exist for Wyoming<sup>16</sup>. The statewide rank of VERY RARE is based on the rather small area of the state known to be occupied in any given season, and the small coverage of suitable habitat within that area. Even within suitable habitat in the occupied area, Flammulated Owl appears to be rare, as it occupies only a small percentage of preferred habitat within its range and may not be readily detected during surveys expected to indicate its presence<sup>8</sup>. However, there have been few surveys for this species in Wyoming. Survey results from Teton County, Wyoming in 2016 suggest that Flammulated Owl may be more common, at least in some years and areas, than previously thought<sup>8, 17</sup>.

**Population Trends:**

**Historic:** UNKNOWN

**Recent:** UNKNOWN

Population trends for Flammulated Owl in Wyoming are unknown. The species is assumed to have suffered population declines in the late 19<sup>th</sup> and the 20<sup>th</sup> centuries due to large-scale logging and suppression of natural fire regimes in old-growth Ponderosa Pine forests. However, the extent of this population decline and suspected subsequent recovery is unknown. Flammulated Owl appears to be more widespread and abundant than once believed, but population growth rates are not known<sup>5</sup>.

**Intrinsic Vulnerability:**

HIGH VULNERABILITY

Flammulated Owl is a habitat specialist with a low annual rate of reproduction (considered a “K-selected” species with high longevity and low reproductive output), making it vulnerable to extrinsic factors that might cause decreases in longevity or fecundity<sup>5</sup>.

**Extrinsic Stressors:**

MODERATELY STRESSED

Stressors to Flammulated Owl include outright habitat destruction; removal of large snags; decreases in arthropod populations as a result of pesticides, pollution or climate change; intense, large-scale wildfires; and deforestation in both winter and summer ranges. Fuel reduction and aspen restoration projects that remove large snags and live mature/old-growth aspen and conifer trees over extensive areas could cause local extirpations of Flammulated Owl. Firewood cutting can eliminate large snags needed for cavity nesting. Use of carbonyl-based insecticides kills moths that may be critical prey for Flammulated Owl, especially during the early breeding season, as many moths are cold-tolerant. Effects of climate change could result in a disparity

between breeding phenology and peak prey abundance on breeding grounds for this long-distance migrant<sup>4</sup>.

### **KEY ACTIVITIES IN WYOMING**

Flammulated Owl is classified as a Species of Greatest Conservation Need (SGCN) by the Wyoming Game and Fish Department (WGFD). This species is unlikely to be detected by statewide avian monitoring programs, or by surveys for other species of forest owls which are completed in March-April prior to the arrival of Flammulated Owl to its breeding sites. On July 9, 2005, a survey effort by Rocky Mountain Bird Observatory (now Bird Conservancy of the Rockies) and Audubon Wyoming (now Audubon Rockies) documented 10 singing males and found one occupied cavity nest in the Sierra Madre Range in Carbon County. One week later, a fledgling was photographed in that same area, thus confirming Wyoming's first breeding record for the species<sup>7-9</sup>. The Western Working Group of PIF designed Flammulated Owl a priority species and developed an action plan calling for a west-wide inventory and a regional monitoring plan<sup>18</sup>. Idaho, California, Colorado, and Utah participated in surveys and Bird Conservancy of the Rockies is to complete global analyses of these data<sup>19</sup>. Surveys were also completed in Montana in 2005 and 2008<sup>20</sup>. In 2012, the Wyoming Natural Diversity Database (WYNDD) conducted call-back surveys across the Medicine Bow National Forest and detected Flammulated Owl at two sites on the western side of the Sierra Madre Range (I. Abernethy, pers. comm.). Most recently, in 2016 the Teton Raptor Center conducted Flammulated Owl call-back surveys at a total of 160 sites in the Bridger-Teton National Forest, the National Elk Refuge, and on private lands in Teton County<sup>17</sup>. Flammulated Owl was detected at 10% of the sites surveyed, for a total of 18 individual detections.

### **ECOLOGICAL INFORMATION NEEDS**

Knowledge of Flammulated Owl breeding distribution in Wyoming is lacking. There are no data on preferred prey populations, amount of suitable nesting habitat, trends in nesting habitat quality, or migration routes and wintering areas for birds that nest in the state. Information is needed on what forest types and age classes are used for nesting and how demographic performance varies across the species' range. Studies are also needed on how management activities (e.g., timber thinning and harvesting, prescribed fire) affect nesting populations of Flammulated Owl. The effectiveness of nest boxes as a management tool for this species also needs investigation.

### **MANAGEMENT IN WYOMING**

*This section authored solely by WGFD; Susan M. Patla.* Flammulated Owl was designated a SGCN (status unknown) in Wyoming in 2016<sup>8</sup>. Although Flammulated Owl is designated a Sensitive Species in Regions 2 and 4 of the United States Forest Service (USFS), statewide, systematic surveys of potential Flammulated Owl habitat on Forest Service lands have not been conducted. Future surveys for Flammulated Owl in Wyoming should be based on protocols similar to those developed by the PIF Western Working Group, and used in adjacent states, to collect baseline data and also to contribute towards a regional population assessment<sup>19</sup>. Flammulated Owl can nest in disjunct patches of old-growth, so mapping potential nesting habitat accurately may be difficult given current GIS coverages. The highest likelihood for finding breeding pairs appears to be in aspen/conifer forest habitats in the southern parts of the Bridger-Teton National Forest, including the Jackson area, which are close to known nesting

pairs in Idaho<sup>7, 17</sup>. Potential habitat in the Sierra Madre, Medicine Bow, and Laramie Mountains are also areas with high potential for finding owls. A high priority management goal for Flammulated Owl in Wyoming should be to develop a statewide monitoring strategy which would include mapping potential habitat and planning systematic surveys from May to early July statewide<sup>19, 21</sup>. WGFD and WYNDD have begun to develop a State Wildlife Grant proposal to initiate coordinated surveys in 2018 using broadcast call-back surveys and automated recording devices in areas of the state with suitable habitat. Additional management recommendations include: 1) conduct surveys for Flammulated Owl during the breeding season in proposed project areas on USFS and state lands that contain suitable habitat for this species throughout the state; 2) identify and conserve existing pockets of old growth Douglas-fir/mixed conifers/aspen on public and private lands in the mountain ranges of Wyoming; 3) carefully evaluate proposed treatments for insect control on forested lands of Wyoming for possible effects on breeding Flammulated Owls; 4) develop a research project to collect needed information on nesting ecology, habitat selection and prey use once an adequate sample of nest sites has been documented; and 5) test the effectiveness of using nest boxes in sites where tree cavities for nesting are limited.

### **CONTRIBUTORS**

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Figure 1: Adult Flammulated Owl in Garfield County, Colorado. (Photo courtesy of Bill Schmoker)

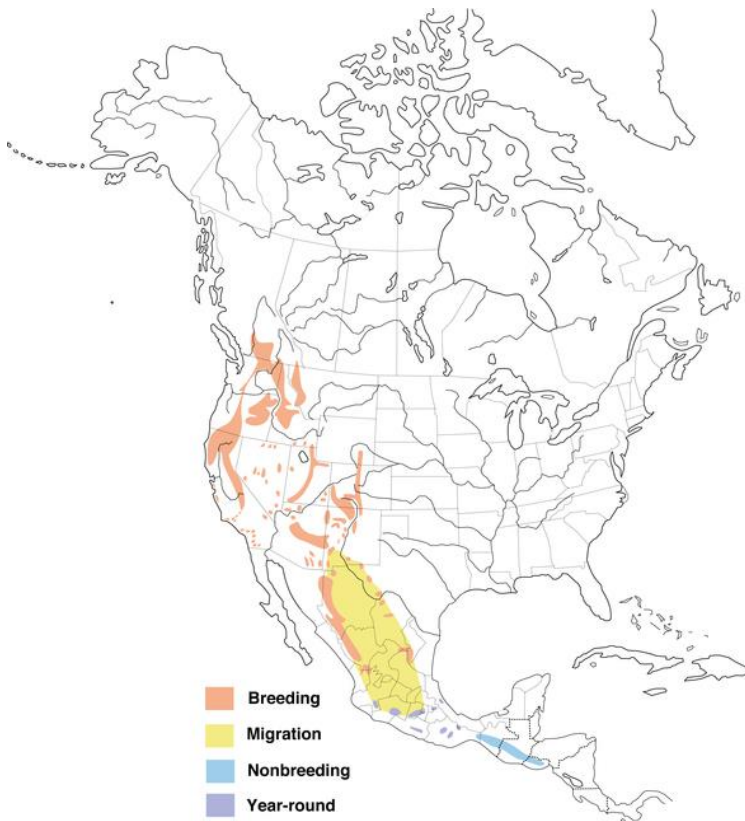


Figure 2: North American range of *Psilosops flammeolus*. (Map courtesy of Birds of North America, <http://bna.birds.cornell.edu/bna>, maintained by the Cornell Lab of Ornithology)

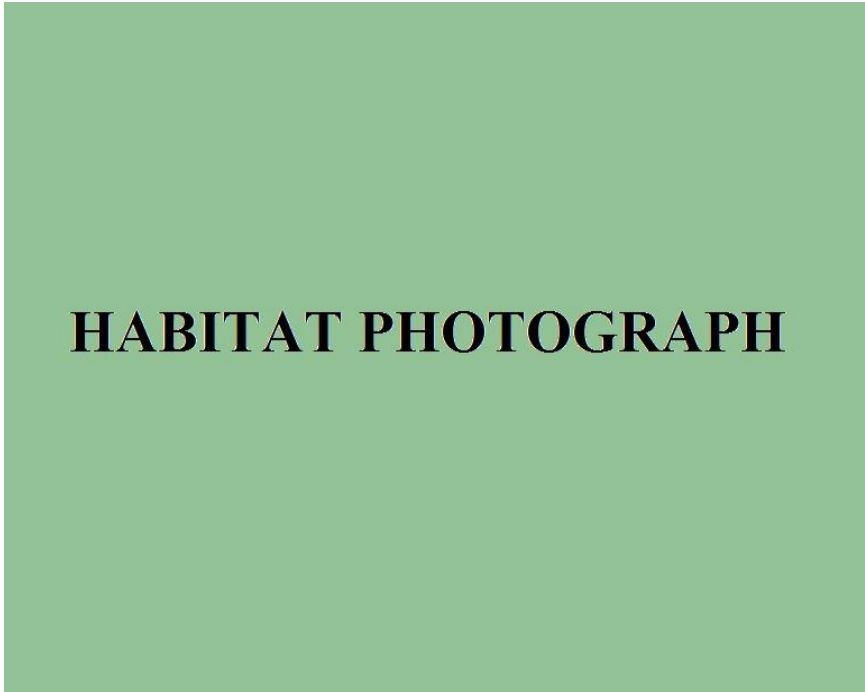


Figure 3: Photo not available.

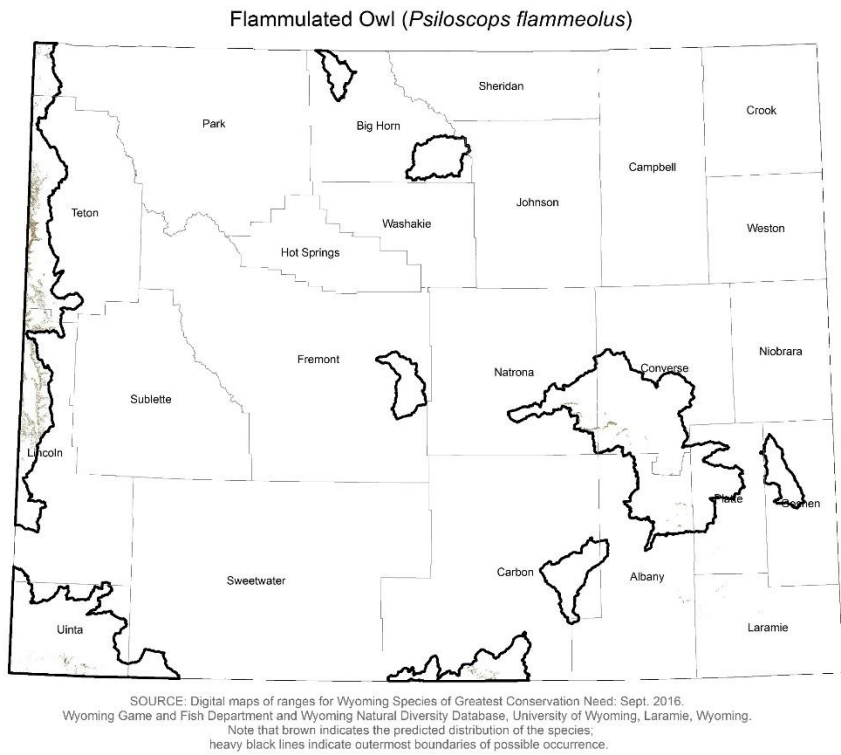


Figure 4: Range and predicted distribution of *Psiloscops flammeolus* in Wyoming.