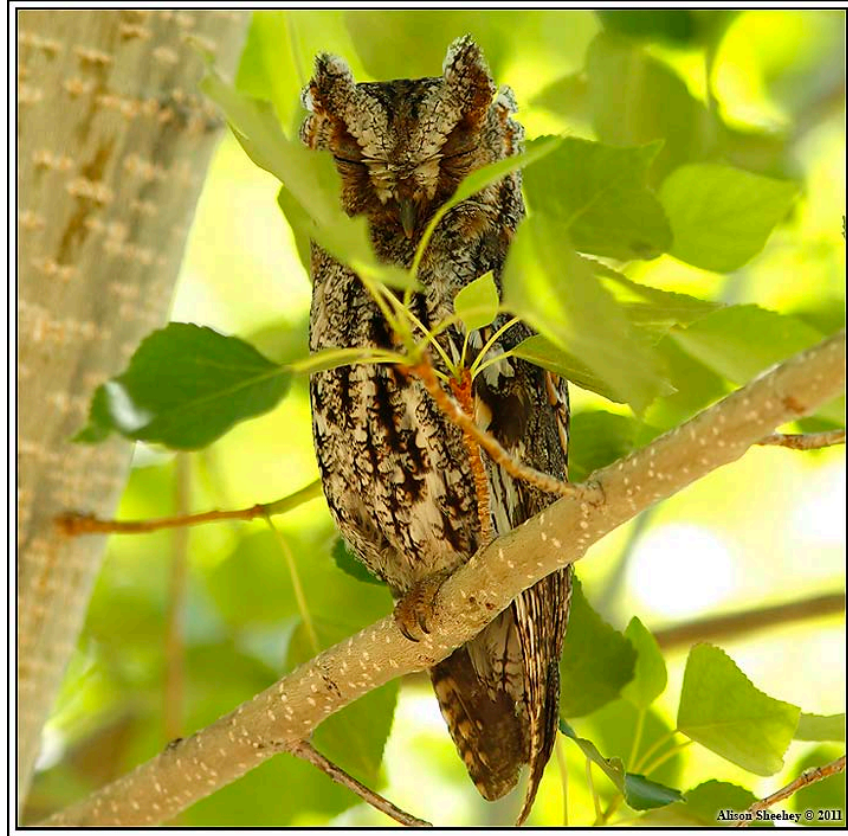


Flammulated Owl Surveys in Sequoia National Forest 2011

Final Report



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Prepared by:

Jenna E. Stanek, John R. Stanek, and Mary J. Whitfield
Southern Sierra Research Station
P.O. Box 1316
Weldon, CA 93283

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Introduction

Flammulated Owls (*Otus flammeolus*) are found across western North America during the breeding season. They primarily inhabit mid-elevation montane forests, in particular ponderosa pine (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) habitats. These diminutive owls are listed as a sensitive species throughout their U.S. range and as a species of special concern in Canada. They are also listed by the U.S. Fish and Wildlife Service as a Bird of Conservation Concern.

Flammulated Owls are small, nocturnal, neotropical migrants that vocalize quietly and are rarely seen. Historically, they have been missed in most nocturnal owl surveys because they do not arrive on their breeding grounds until late April to mid-May. Thus, relatively little is known about their distribution and abundance. To obtain more information about their distribution and abundance, we conducted road-based and off-road Flammulated Owl surveys in Sequoia National Forest, California in 2011. These surveys were part of a coordinated effort by the Partners in Flight Western Working Group (PIFWWG) to conduct Flammulated Owl surveys throughout their western range in order to use the information to develop a long-term monitoring strategy and to contribute to more detailed studies of Flammulated Owl demography.

Methods

We conducted Flammulated Owl surveys, following the PIFWWG Flammulated Owl survey protocols (Fylling et al. 2010), within potentially suitable habitat in the southern section of the Sierra Nevada, California. The few studies on Flammulated Owls in California estimate that these owls arrive on their breeding grounds sometime in mid-April (Winter 1974). Information collected by local birders and the Forest Service indicate that the Flammulated Owls typically arrive in the southern section of the Sierra Nevada between late April and early May. Therefore, we ran preliminary surveys starting in late April at historically known Flammulated Owl locations and did not start official surveys until after our first detection to ensure the owls had arrived; our official surveys ran from May 23 – July 6.

We used Landfire vegetation data layers in ArcGIS 9.3 to randomly select survey stations within potentially suitable habitat. Potentially suitable habitat was determined based on previous studies (Winter 1974, Marcot and Hill 1980, Bloom 1983, Linkhart et al. 1998) and expert opinions gathered from members of PIFWWG. Following modified PIFWWG protocols, the majority of our

surveys were conducted at road-based stations. Approximately 10% of our surveys were at off-road stations located at least 1 km from a road. Most of our stations were surveyed once; while a randomly selected subset (~25%) were surveyed up to 3 times during the survey period.

Survey stations were located using Garmin GPS units and survey information was recorded using standardized PIFWWG forms. Upon arriving to a survey station, surveyors listened and watched for Flammulated Owls for two minutes. Surveyors then broadcast a thirty-second Flammulated Owl call once every two minutes for the remaining ten minutes of the survey. Thirty seconds of calling was followed by 90 seconds of active observation and listening. During the survey a sound level meter was used to ensure consistency in the loudness of the broadcast call. Even if a Flammulated Owl was detected, the call-playbacks continued for the duration of the survey. For each detection, the surveyor recorded the true bearing and estimated distance from the surveyor to the Flammulated Owl, time of detection, how detected, and the minute-interval at which the owl was detected. Each individual owl visually observed or heard during a survey was recorded as a survey detection. We also collected vegetation data at all surveyed stations using standardized forms and protocols from Rocky Mountain Bird Observatory (RMBO). We entered all data into the RMBO online database. Only survey data and associated GIS Landfire vegetation data are presented in this summary report.

Locations of all survey stations were incorporated into ArcGIS 9.3 using DNRGarmin v5.03 (Minnesota Department of Natural Resources 2001) software. Estimated distances and true bearings were used to create a survey detection map of the locations of Flammulated Owl detections. These estimates were also used to determine the Landfire vegetation characteristics at the estimated FLOW location in order to compare this to the Landfire vegetation at calling stations. We projected all geospatial data to the North American Datum of 1983 (NAD83), Universal Transverse Mercator (UTM) Zone 11 projection.

Results

Between May 23 and July 6, we conducted 299 surveys at 207 different stations within six different mountain regions resulting in 39 Flammulated Owl detections (Figure 1, Figure 2, and Table 1). Of the 207 stations, 189 were road based and 18 were off-road stations (8.7%). We sampled 45 stations three times (21.7%). Detections occurred between 1604 meters and 2487 meters.

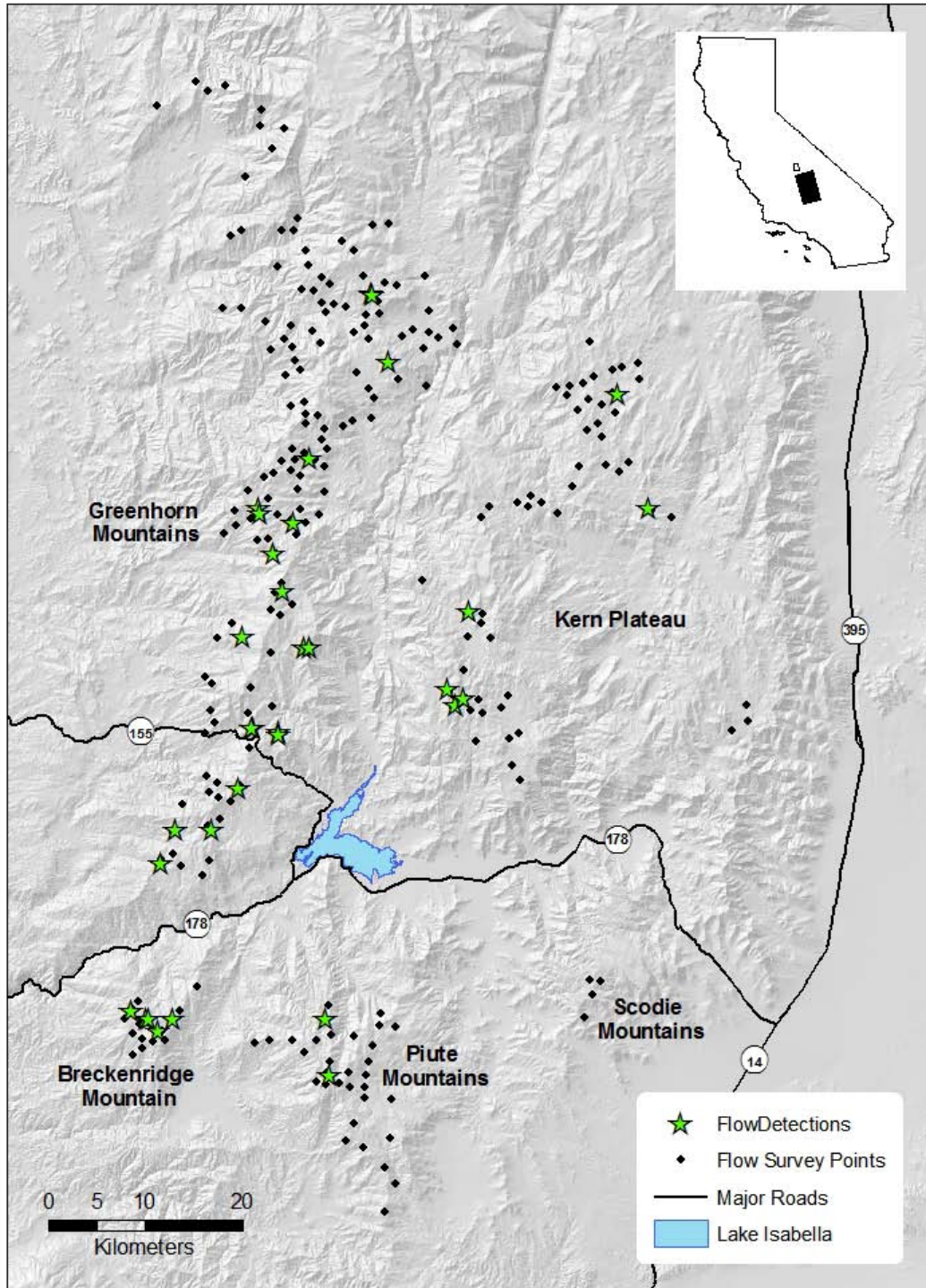


Figure 1. Flammulated Owl survey detections for five mountain regions in the Lake Isabella area, 2011. Area shown is depicted as black rectangle on inset map.

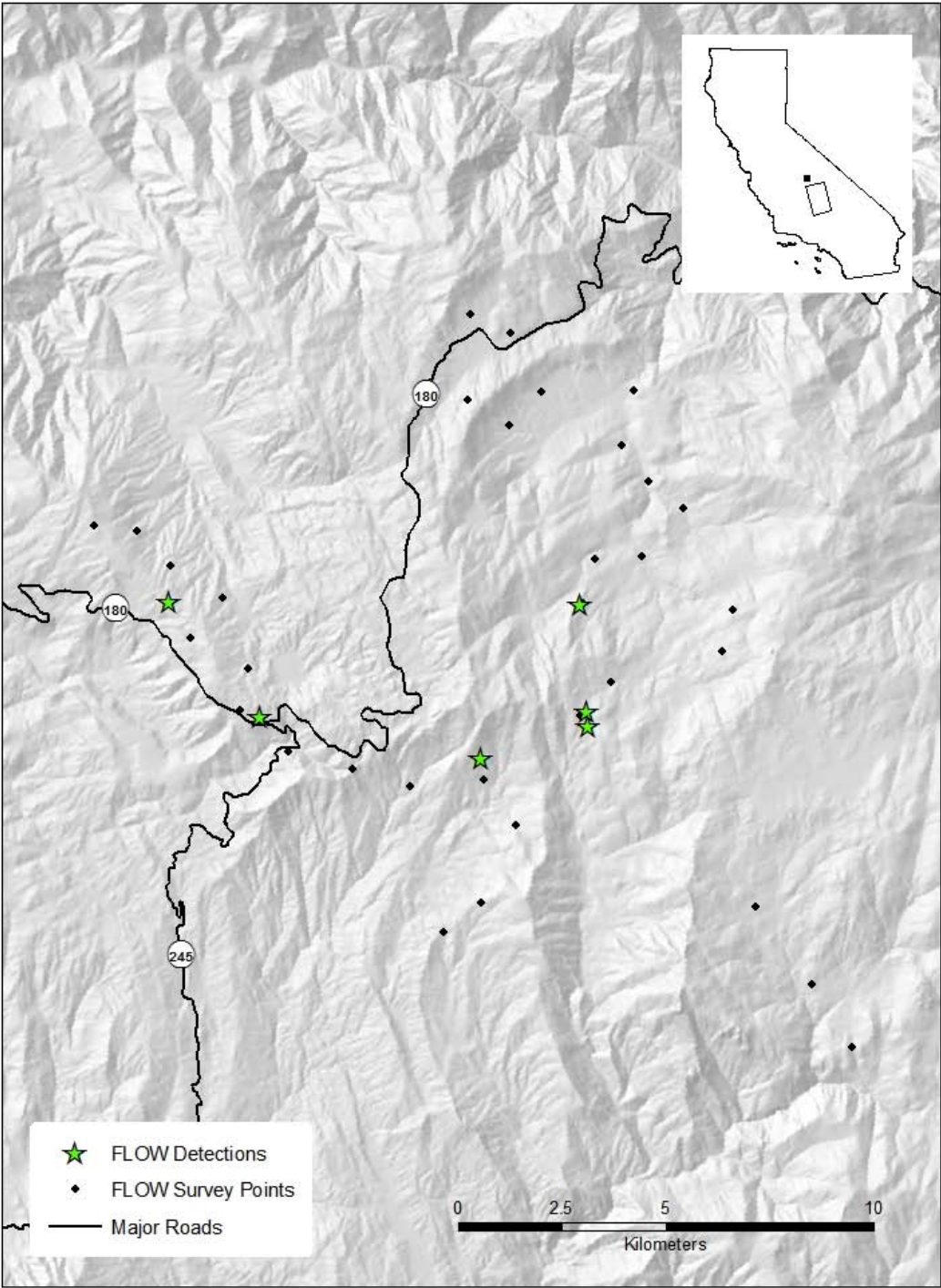


Figure 2. Flammulated Owl survey detections for the Hume Lake Ranger District, 2011. Area shown is depicted as black rectangle on inset map.

Table 1. 2011 Flammulated Owl survey detection results for a southern section of the Sierra Nevada in California.

Station Location ¹	Habitat Type at Call Station ²	Habitat Type at estimated FLOW location ³	Flammulated Owls Detected Per Visit and Date			Total Survey Detections
			1	2	3	
Breckenridge Mtns.	White Fir	Jeffrey Pine	1 (5/24)	-	-	1
Breckenridge Mtns.	Jeffrey Pine	Black Oak	0 (5/23)	1 (6/1)	1 (6/6)	2
Breckenridge Mtns.	Aspen	Aspen	0 (5/24)	0 (6/1)	1 (6/6)	1
Breckenridge Mtns.	White Fir	Montane Shrubland	0 (5/23)	0 (6/1)	1 (6/6)	1
Greenhorn Mtns.	Mixed Conifer	Mixed Conifer	1 (6/2)	-	-	1
Greenhorn Mtns.	Jeffrey Pine	Jeffrey Pine	1 (6/2)	-	-	1
Greenhorn Mtns.	Jeffrey Pine	Jeffrey Pine	1 (6/2)	-	-	1
Greenhorn Mtns.	Jeffrey Pine	Jeffrey Pine	0 (5/25)	1 (6/2)	0 (6/22)	1
Greenhorn Mtns.	White Fir	White Fir	1 (6/13)	0 (6/18)	1 (7/4)	1
Greenhorn Mtns.	Riparian	White Fir	1 (6/13)	-	-	1
	Woodland					
Greenhorn Mtns.	White Fir	White Fir	1 (6/15)	-	-	1
Greenhorn Mtns.	White Fir	White Fir	1 (6/15)	-	-	1
Greenhorn Mtns.	Red Fir	Red Fir	1 (6/16)	-	-	1
Greenhorn Mtns.	White Fir	White Fir	0 (6/21)	1 (6/24)	0 (7/4)	1
Greenhorn Mtns.	Mixed Conifer	White Fir	0 (6/22)	1 (6/26)	1 (7/5)	2
Greenhorn Mtns.	Red Fir	Red Fir/Red Fir	2 (7/4)	-	-	2
Greenhorn Mtns.	Red Fir	Red Fir	1 (7/5)	-	-	1
Greenhorn Mtns.	Mixed Oak	White Fir/Black Oak	2 (7/5)	-	-	2
Greenhorn Mtns.	Mixed Conifer	Mixed Conifer/White Fir	0 (6/22)	0 (6/25)	2 (7/5)	2
Hume Lake	White Fir	Mixed Conifer	1 (6/2)	-	-	1
Hume Lake	White Fir	White Fir/White Fir	2 (6/23)	-	-	2
Hume Lake	Mixed Conifer	Mixed Conifer	1 (6/2)	-	-	1
Hume Lake	White Fir	White Fir	1 (6/23)	-	-	1
Hume Lake	White Fir	White Fir	1 (6/3)	-	-	1
Piute Mtns.	Red Fir	Red Fir	0 (6/8)	1 (6/14)	0 (6/22)	1
Piute Mtns.	White Fir	White Fir	0 (6/8)	1 (6/14)	0 (6/22)	1
Kern Plateau	Jeffrey Pine	Riparian Woodland	0 (6/19)	0 (6/27)	1 (7/3)	1
Kern Plateau	White Fir	Riparian Woodland	0 (6/19)	0 (6/27)	1 (7/3)	1
Kern Plateau	Aspen	Montane Shrubland	1 (6/20)	-	-	1
Kern Plateau	Jeffrey Pine	White Fir	1 (6/19)	-	-	1
Kern Plateau	Jeffrey Pine	Jeffrey Pine	1 (6/27)	-	-	1
Kern Plateau	Jeffrey Pine	Mountain Sagebrush	1 (6/26)	-	-	1
Totals			24	6	9	39

¹All detections were located at road based stations.

²Based on Land Fire Habitat at station locations.

³Based on Land Fire Habitat at estimated FLOW locations using true bearings and estimated distances from calling stations. For multiple FLOW detections at one station, multiple habitat types are given.

The majority of Flammulated Owl detections were in White Fir, Jeffrey Pine, mixed conifer, and Red Fir habitat (Table 2). Owls were also detected in Aspen, mixed Oak woodland, riparian woodland, Black Oak, montane shrubland, and montane sagebrush habitat. Our estimated Flammulated Owl locations are based on approximate distances that may be inaccurate enough to put the location in a different Landfire vegetation category than where the Flammulated Owl was actually located. For example, we suspect that the detections estimated to be in montane shrubland and montane sagebrush habitats were inaccurate.

Table 2. Percentage of LandFire vegetation types for all FLOW detections. Percent of vegetation shown at call station locations and estimated FLOW locations (based on estimated distances and true bearings from call stations).

Vegetation Variable	Station Location	FLOW Location
White Fir	35.9 %	38.5 %
Jeffrey Pine	23.1 %	12.8 %
Mixed Conifer	15.4 %	12.8%
Red Fir	12.8 %	12.8 %
Aspen	5.1 %	2.6 %
Mixed Oak Woodland	5.1 %	0 %
Riparian Woodland	2.6 %	5.1 %
Black Oak	0 %	7.7 %
Montane Shrubland	0 %	5.1 %
Montane Sagebrush	0 %	2.6 %

Discussion

We detected Flammulated Owls throughout the survey area in the southern Sierra Nevada during the 2011 breeding season (Figure 1 and Figure 2). Peak detections occurred in mid to late June. However, we suspect that the peak time of detections may not be representative of a typical year and that the Flammulated Owls arrived late to their breeding grounds this survey season. In Utah and Colorado, nesting phenology was estimated to be behind by ~10-14 days this year (pers. comm., M. Mikka, June 21, 2011, pers. comm., B.D. Linkhart, June 22, 2011). Locally the snow pack was 165% of average and the snow melt was late (California Department of Water Resources 2011). Also, in comparison to information given by local birders and the forest service, Flammulated Owls, and a variety of other neotropical migrants, arrived on their breeding grounds approximately two weeks later than normal.

We noticed that the habitat preferences for the majority of detections at station locations and estimated Flammulated Owl locations were within habitat predicted from other California studies (Winter 1974, Marcot and Hill 1980, Bloom 1983). These areas included White Fir, Jeffrey Pine, Red Fir, and mixed conifer. Jeffrey Pine was thought to be a habitat that would be highly selected for, but our results show that White Fir may be as important if not more important. Another habitat type of interest is Black Oak. Marcot and Hill (1980) noted that Flammulated Owls utilized California Black Oak habitat as often as yellow pine habitat. They speculated that Flammulated Owls may use the many natural cavities commonly found in Black Oak for nesting sites (Marcot and Hill 1980). Black Oak was not used in our study design of suitable habitat designations for station locations, but it could potentially be an important habitat to Flammulated Owls. However, with such a small sample size (39 detections) it is hard to draw robust conclusions about habitat preferences.

Conclusions and Recommendations

The southern Sierra Nevada appears to be an important area for breeding Flammulated Owls. Because local populations can fluctuate drastically from one year to the next, continued surveys are vital to understanding the Flammulated Owl demography. Future surveys in this region should continue to use road based surveys that include a subsample of repeated visits (~25%). These road based survey stations should use data from Landfire vegetation data layers in ArcGIS 9.3 to randomly select survey stations within potentially suitable habitat. Based on our results this year, previous studies, and expert opinions gathered from members of PIFWWG, potentially suitable habitat would include the following: White Fir, Jeffrey Pine, mixed conifer, Red Fir, Aspen, mixed Oak woodland, riparian woodland, Aspen, and Black Oak.

Although few studies have assessed the distribution of Flammulated Owls in California, they are thought to be most common in the Sierra Nevada district (Winter 1974) which includes where our study took place. Still, relatively little is known about the current distribution and abundance of Flammulated Owls in California. Long-term monitoring programs focus on the status and trends of species distribution, and can effectively document a species' annual state and changes in their condition through time (LaRoe et. al. 1995). The analysis of multi-year datasets can reveal emergent trends in a number of population parameters, including fluctuations and response to environmental changes. We aim to continue long-term monitoring of Flammulated

Owls in Sequoia National Forest, California using PIFWWG protocols. The collaborative effort with the PIFWWG and other organizations to conduct Flammulated Owl surveys throughout their western range will enable us to obtain information to develop a long-term monitoring strategy and to contribute to more detailed studies of Flammulated Owl demography.

Literature Cited

- Bloom, P.H. 1983. Notes on the distribution and biology of the Flammulated Owl in California. *Western Birds* 14:49-52.
- California Department of Water Resources. 2011. <http://cdec.water.ca.gov/snow/current/snow/>>
- Fyelling, M.A., J.D. Carlisle, A.B. Cilimburg, J.A. Blakesley, B.D. Linkhart, and D.W. Holt. 2010. Partners in Flight - Western Working Group Flammulated Owl Survey Protocols. <<http://sites.google.com/site/pifwesternworkinggroup/projects/flammulated-owl-monitoring>>
- LaRoe, E. T., G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac. 1995. Our living resources: a report to the nation on the distribution, abundance, and health of US plants, animals, and ecosystems. U.S. Department Interior, National Biological Service, Washington, D.C.
- Linkhart, B.D., R.T. Reynolds, and R.A. Ryder. 1998. Home range and habitat preferences of breeding Flammulated Owls in Colorado. *The Wilson Bulletin* 110:342-351.
- Marcot, B.G. and R. Hill. 1980. Flammulated Owls in Northwestern California. *Western Birds* 11:141-149.
- Minnesota Department of Natural Resources. 2001. DNRGarmin GPS Application, version 5.1.2600. <<http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>>
- Winter, J. 1974. The distribution of the Flammulated Owl in California. *Western Birds* 5:25-44.

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