Partners in Flight – Western Working Group

Flammulated Owl Survey Protocol

Photo by Dick Cannings

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INTRODUCTION

FLAMMULATED OWL BACKGROUND & OBJECTIVES

The Flammulated Owl, *Otus flammeolus*, is listed as a sensitive species throughout the western U.S, and a species of special concern in Canada. Flammulated Owls are small, nocturnal, neo-tropical migrants that vocalize quietly and are rarely seen. Because Flammulated Owls do not arrive on their breeding grounds until late April to mid-May, they have historically been missed in most nocturnal owl surveys.

Our objectives are to:

- Document Flammulated Owl distribution throughout its breeding range in the United States
- Estimate Flammulated Owl detection probability and site occupancy rates by forest habitat type

Ideally, once these goals have been met, we will use this information to develop a long-term monitoring strategy and to inform more detailed studies of Flammulated Owl demography.

GENERAL PROTOCOL

The probability of detecting a male Flammulated Owl varies considerably depending on the nesting phase: from 100% detection probability during pair bonding and incubation, to 80 – 35% detection probability during brooding, to less than 15% detection probability during the post-fledgling period (Barnes and Belthoff 2008). In Idaho, the initiation of brooding for most pairs was between July 1 and July 6; by July 13th only 50% of radio-tagged owls responded to broadcast calls (Barnes and Belthoff 2008). In addition, results from a large regional survey (n = 109 survey routes) in western Montana and northern Idaho also showed that Flammulated Owls were less vocal by mid-July (Smucker et. al. 2008).

Both our understanding of how owl detectability decreases during the brooding stage and our concern that weather may influence the timing of the breeding season factor into our recommendations for when to initiate and conclude surveys for Flammulated Owls. Portions of this protocol were adapted from surveys conducted in western Montana since the mid 1980's (Holt and Hillis 1987). General guidelines for the optimal survey dates are presented below (see Table 1).

- Optimal* survey dates (to coincide with courtship and incubation phases; see Table 1 from Barnes 2007 below):
  - May 15 – June 30 for the northwestern US and central Rockies
  - May 10 – June 20 for southern Rockies
  - May 1 – June 15 for borderland mountain ranges

** could possibly be extended for 10+ days because of use of playback equipment*

- Repeat each survey one to three times according to design protocol.
- Work in pairs whenever safety is a concern (within range of Grizzly Bear, steep/rocky terrain, etc.).
    - When working in pairs (together at each survey point), utilize a double-observer approach in which each observers records data on a separate survey sheet and acts independently (do not share information about whether and where birds are detected).
- Begin no earlier than 30 minutes after sunset.
- Use broadcast equipment and 10 minute survey periods.
- Record the compass bearing to singing owls.

SURVEY AREAS AND SURVEY POINTS

Develop a tentative schedule such that surveys are spread out geographically and no areas are surveyed for the first time too late in the season (when detection rates diminish). However, in early summer there is often a lot of snow on the ground, and you will need to consider elevation and plan to survey the lowest elevation routes first if snow depth or accessibility factors are constraining. In general, begin surveys at lower elevation sites.

Each survey area should have a site number and name. Write these on all survey forms, maps, the Site Location Form (Appendix II) and data forms (Appendix III). For each survey area, you will need to review maps (and potentially get advice) on the best approach and road conditions. Plan to explore and assess the survey area and walk in to the start point during daylight hours.

We will not permanently mark sites or points but can leave flagging up between visits within a season if you feel it is necessary. Remove flagging after the last visit.

CONDUCTING SURVEYS

Season: Flammulated owl surveys should be conducted from ~ May 1 – June 30 depending on the region surveys are taking place (Table 1).

Table 1 (modified from Barnes 2007). Estimated optimal survey dates in different parts of the range of Flammulated Owls. Start dates assume same duration of pairing time as in Idaho, and end dates correspond to mean hatching dates.

Location	Approximate laying dates	Approximate optimal survey season
Idaho	10 June ± 11 days†	15 May to 30 June
Idaho	4 June*	
Colorado	29 May ± 6 days**	15 May to 30 June
New Mexico	28 May ± 6 days***	10 May to 20 June

† Barnes (2007)
* Powers et al. (1996)
** Linkhart (unpubl. data)
*** McCallum (1994)

Start and Finish: Broadcasting for Flammulated Owls can begin no earlier than 30 min after sunset. Thus, counts begin just after dark and continue until you have completed the requisite stops for that night (the numbers of stops may vary from site to site).

Calling at Stations: For the broadcast equipment, we will use a pre-recorded, standardized call and a Foxpro or similar caller. We recommend that all broadcast vocalizations be standardized at 105 dB: this can be measured using a sound level meter from the caller at shoulder height to a distance of 1 meter. See more information about callers and sound level meters in Appendix I.

You will spend a total of 10 minutes listening and calling for owls at each survey point. The 10-minute protocol will be split into five 2-minute intervals: two minutes of silent listening, and for each of the remaining 2-minute intervals, you will spend the first 30 seconds broadcasting, followed by 90 seconds listening. For the 30 seconds of broadcasting, play approximately 7.5 seconds with the caller pointed in each of 4 cardinal directions. Hold the broadcast caller approximately at shoulder height or above your head. Continue with the broadcast protocol, even if owls are heard in the first 2 minutes (to identify other Flams in the vicinity and to keep the protocol consistent). One row in the data form is used for each individual bird detected. Although we are not targeting other species with the playback, you will also record all detections of other owl and nightjar species.

Safety: Your personal safety comes first. Typically, we will access sites in pairs and divide the effort appropriately, where each technician is responsible for their portion of the grid. To ensure safety, technicians should carry radios or cell phones so they are in communication with each other at all times. To minimize obvious danger, work in pairs; be aware of the potential for bears, mountain lions, and steep, rocky terrain. Bring a good headlamp/flashlight, a backup light, and extra batteries; bring proper clothing and other safety equipment (see Appendix I). Likely the biggest concern is the drive back home or to camp after surveying. Because you will undoubtedly be tired, please drive carefully and, if possible, only a short distance! Ideally you will have already found and set up a nearby camp prior to starting your survey.

Unacceptable field conditions: Do not conduct surveys when the weather is inclement enough to modify owl behavior or influence your ability to hear singing owls – that includes continuous rain (anything more than a light drizzle) and wind that is constant and of enough strength to put small branches in motion (4 or 5 on the Beaufort scale).

The weather can be so variable that we recommend you travel to the site start area before assessing weather conditions. Often times, winds will let up in the early evening just as night settles in. Under all circumstances safety comes first. If weather (e.g., lightening, cold, rain, snow) or road conditions are placing you at risk, please find safety.

If conditions are questionable, go ahead and survey but make a note detailing the weather conditions. Flams have been known NOT to respond to callers the night after a storm (presumably they are more interested in finding food than defending territories). If you have flexibility with time, try to schedule the survey with the best possible conditions with regard to the night before and the day and night of surveying.

DATA COLLECTION

Details for how and what data to collect are explained here. Recommended site location forms and survey data forms are also included (Appendix II and III).

Top section: The top section of the data form is where technicians will record transect, date, moon phase and observer information.

In the scientific literature, moon phase is known to affect activity levels of some nocturnal species including owls and nightjars (Ganey 1990, Hardy and Morrison 2000). Record the moon phase by counting the number of days that have passed since the most recent new moon. The day of the new moon should be recorded as "0".

When surveying points together, use a double-observer approach (see above for more information) and indicate this on the survey form.

Point section: In the second section of the data form, you will record the point information. For *each* point number, you will record UTM's, visit #, weather info, noise levels (stream, wind, or other noise), moon visibility (Y or N), and survey times. Always fill in every variable on the field forms. Blanks are interpreted as missing data, NOT as zeros. Likewise, a zero is NOT to be used to represent missing data. Forms with missing information compromise the reliability of your data. To avoid mistakes, it is absolutely essential to double-check your entries on data forms and maps on the same day that each site is visited.

If you fail to finish a point (some form of disturbance or weather forces you to quit), make it clear that the count was not completed, and draw a line through the line on the data sheet. Whenever a point does not receive a complete survey, record the reason using the codes at the bottom of the form.

If you cannot obtain GPS locations, i.e. insufficient satellites or dead batteries (you should always carry plenty of extras), please try to describe the point locations (using obvious point markers: bridge, road or trail intersection, some distinct geographic feature) and place them on a topographic map and aerial photos. This will aid in relocating points in future visits and years if necessary.

CODES

WIND CODES (Beaufort Wind Scale):
0 -- < 1 mph; smoke rises vertically
1 -- 1-3 mph; wind direction shown by smoke drift
2 -- 4-7 mph; wind felt on face; leaves rustle at times
3 -- 8-12 mph; leaves and small twigs in constant motion; light flag extended
4 -- 13-17 mph; raises dust and loose paper; small branches in motion (DON'T SURVEY)
5 -- 18-24 mph; small trees sway; crested wavelets on inland waters (DON'T SURVEY)

SKY CODES (Sky Condition): you shouldn't be surveying with a 5 or 6!
0 – clear or a few clouds (<30% cloud cover)
1 – partly cloudy (30-70% cloud cover)
2 – cloudy (>70% cloud cover)
3 – fog or smoke (visibility impaired beyond 30 m.)
4 – light drizzle
5 – constant snow (DON'T SURVEY)
6 – constant rain (DON'T SURVEY)

NOISE CODES (for constant noise, not intermittent; can include stream, wind or other noise):
0 – no noise
1 – some noise, but can hear very well
2 – moderate noise; can still hear within 200 meters, but distant birds are tough to hear
3 – loud noise; noise affecting ability to detect most birds
4 – very loud stream or other noise; difficult to hear anything at all (DON'T SURVEY)

Detection information: Each line will represent a single bird you have detected from a particular compass bearing at a specific point. If more than one individual is detected from a point, record each individual on a separate line. For individual birds detected from more than one point (either by the same observer or by observers at separate points), assign a unique bird ID to that individual, using capital letters. For example, if you detect what you know to be the same owl from your first and second survey points, enter "A" in the Unique Bird ID field for both detections, and fill out all fields for both detections. If you detect an owl from your fourth survey point and your fellow technician records the same owl from his/her 3rd survey point, you will both enter "B" in the Unique Bird ID field on each of your survey forms.

For each bird, record the point, species, sex if known, method of detection (see codes on data sheet), compass bearing (corrected for declination), detection time (military time), number of minutes from start of survey that you first detected the owl, and the time period in which the owl was detected (1-5). IF you can pinpoint the location of the owl, record the location (in UTMs), and distance from the survey point. Do not leave blanks! See Appendix III to view the data sheet and a complete list of codes.

VOCALIZATIONS: The single-note territorial hoot is the most commonly detected vocalization given by Flammulated Owls. This hoot is typically given by a male until another male (usually one in an adjacent territory) starts calling in response. At this time, it is possible that technicians will hear a 3-note call, which is most frequently heard by two or more males responding along common territory boundaries.

The owl species that sounds most like a Flammulated Owl is the Long-eared Owl. Listen to the difference in their calls by clicking on the links below. Their habitats have potential to overlap. Long-eared Owls inhabit open, sparsely forested habitats (Bull 1987), which may occur throughout Flammulated Owl habitat, although their primary breeding seasons differ slightly. If you click on the links below, they will take you to the Cornell website where you can hear the calls of both Long-eared Owls and Flammulated Owls. The Flammulated Owl call is a bit higher in pitch and the hoot is slightly shorter in length.

Long-eared Owl call: http://bna.birds.cornell.edu/bna/species/133/galleries/audio

Flammulated Owl call: http://bna.birds.cornell.edu/bna/species/093/galleries/audio

DATA ENTRY: Ideally data would be transposed from field forms to the computer soon after the survey and by the person who collected the data. However, depending on computer access, this may not be done until the end of the season. Thus, it is essential that data forms are complete and legible! Ideally, an online data entry system will be in place before technicians begin their surveys. Contact your supervisor for specific information on how to enter your data.

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APPENDIX I. Field Equipment and Mapping Materials

FIELD EQUIPMENT:

Headlamp and extra flashlight
GPS unit and extra batteries
Compass (corrected for declination)
Digital watch with timer
Broadcast calling unit with extra batteries
Binoculars
Methods protocol
Data forms
Clipboard and plastic page cover
Pencils with erasers or pens
Daypack or cruiser vest
Radio or cell phone
Food and water
Raingear, extra layers

MATERIALS FOR MAPPING POINT AND SITE LOCATIONS:

Forest travel map
Ortho-photo maps with selected habitat, roads, and stops (GPS location)
USGS 7.5-minute topographic quads (optional)
Site Location Forms (see Appendix III)
Pencil
Highlighter
Fine-line permanent black ink pen

BROADCAST CALLERS:

A Foxpro (http://www.gofoxpro.com/) or similar caller should be used to broadcast standardized vocalizations. These devices are very reliable, lightweight in the field, and the volume can be carefully adjusted (ideally the call can be heard by us for ~200m under calm conditions). If you'd like to use a FoxPro we recommend the NX3 ($199.95), but be aware that model numbers change frequently. If you use an older model of a Foxpro caller (e.g. 48B) it is essential to use a secondary low frequency speaker.

SOUND LEVEL METER:

An example of an adequate device for standardizing the dB level on the broadcast levels can be found here: http://www.radioshack.com/product/index.jsp?productId=2103667. This meter can be purchased for around $50.00.

APPENDIX II. Site Location Form.

FLAMMULATED OWL - SITE LOCATION FORM

*Forest or General Area:*_____

*SITE NUMBER:*_____ *SITE NAME:*_____

*GPS info for access point: Point:*_____

Lat/Longs or UTMs:_____

DATUM: _____

DIRECTIONS TO START POINT (from nearest main road) and ACCESS INFORMATION:

ACCESS CONSIDERATIONS (circle those that apply):

4WD ONLY
2WD OKAY
HIGH CLEARANCE ONLY
OFF TRAIL
HIKE TO START
OPEN ROAD
CLOSED ROAD (key needed)

APPENDIX III. Data sheet for PIF-WWG Flammulated Owl surveys.