



EARTHWATCH 2019—ARIZONA

FOLLOWING FOREST OWLS IN THE WESTERN U.S.



PLANNING CHECKLIST

PLANNING CHECKLIST

IMMEDIATELY

- Make sure you understand and agree to Earthwatch's **Terms and Conditions** and the **Participant Code of Conduct**.
- If you plan to purchase additional travel insurance, note that some policies require purchase at the time your expedition is booked.

6 MONTHS PRIOR TO EXPEDITION

- Log in at **earthwatch.org** to complete your participant forms.
- If traveling internationally, make sure your passport is current and, if necessary, obtain a visa for your destination country.
- Bring your level of fitness up to the standards required (see the Project Conditions section).

90 DAYS PRIOR TO EXPEDITION

- Pay any outstanding balance for your expedition.
- Book travel arrangements (see the Travel Planning section for details).
- Make sure you have all the necessary vaccinations for your project site.

60 DAYS PRIOR TO EXPEDITION

- Review the packing list to make sure you have all the clothing, personal supplies, and equipment needed.

30 DAYS PRIOR TO EXPEDITION

- Leave the Earthwatch 24-hour helpline number with a parent, relative, or friend.
- Leave copies of your photo ID and flight reservation number with a parent, relative, or friend.

READ THIS EXPEDITION BRIEFING THOROUGHLY. It provides the most accurate information available at the time of your Earthwatch scientist's project planning, and will likely answer any questions you have about the project. However, please also keep in mind that research requires improvisation, and you may need to be flexible. Research plans evolve in response to new findings, as well as to unpredictable factors such as weather, equipment failure, and travel challenges. To enjoy your expedition to the fullest, remember to expect the unexpected, be tolerant of repetitive tasks, and try to find humor in difficult situations. If there are any major changes in the research plan or field logistics, Earthwatch will make every effort to keep you well informed before you go into the field.

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NOTE FROM THE PI

DEAR EARTHWATCHER

Welcome to the *Following Forest Owls in Western US* expedition, Arizona Edition!

Cavity nesting species, including small owls, play important roles in many ecosystems. Many rely upon other animals (woodpeckers) or processes (rot and decay) to create the cavities that they shelter and breed in. The Flammulated Owl is a little-studied cavity nesting species, and aside from a long-running studies in coniferous forests in Colorado and our own work in Aspen Forest in Utah, we know very little about this tiny owl and the habitats it occurs in. In addition to being cavity nesters, Flammulated Owls are migratory and primarily insectivorous—a unique suite of characteristics in a small forest owl and one that could render this species particularly sensitive to forest management and climate change impacts. Whiskered Screech-Owls are at the northern extent of their range in southeast Arizona. We don't know how this little-studied owl species will respond to changing climate either—will its range expand northward or contract? Will the ranges of other owls, such as the Elf Owl, Western Screech-Owl, Northern Pygmy-Owl, or Northern Saw-whet owl, do the same or shrink? Will the timing or outcome of their nesting efforts change? On this expedition you will help further understanding of how climate change and forest type impact owls and their habitat. You will help track changes in both the timing and outcome of owl nesting efforts in a variety of habitats.

We also have very little understanding about cavities themselves; for example, how do formation rates and/or cavity 'lifespan' vary in different forest types or in the light of a changing climate? You will help us search for, measure, and document where natural cavities occur while also monitoring the status of owl nests found along the way. You will also help measure important habitat characteristics around cavities. You may also help collect nocturnal insects to help monitor potential food availability and relate this to owl use and reproductive outcome in different areas.

While your time contributing to the team will be spent in one location—the Chiricahua Mountains in beautiful southeast Arizona; we are conducting similar research to the north in the aspen forests of Utah. This gives us a broader picture of owl ecology across a variety of landscapes and latitudes and will ultimately yield a better understanding of climate change impacts.

I've known Flammulated and other owls for 20 years now and am incredibly excited to share a glimpse into their lives with you while collecting valuable data. Your contributions will help us better conserve owls and other cavity nesting wildlife. I hope that your experiences on this trip will change the way you think about wild spaces at night. We look forward to having you on our research team.

Sincerely,

Dr. Dave Oleyar, Lead Earthwatch Scientist





THE RESEARCH

FOLLOWING FOREST OWLS IN THE WESTERN U.S.



THE STORY

In the western U.S., climate change and land use practices are altering the habitat of the many wildlife species, including many small owl species like the Flammulated Owl (*Psiloscoops flammeolus*), the Northern Saw-whet Owl (*Aegolius acadicus*), the Elf Owl (*Micrathene whitneyi*), the Whiskered Screech-Owl (*Megascops trichopsis*), and the Northern Pygmy-Owl (*Glaucidium gnoma*).

Migratory birds, including some of the owls species we study, are particularly vulnerable to the effects of a changing climate, as they have synced their migrations to coincide with events within multiple ecosystems that are often great distances apart. When just one aspect of either ecosystem changes, it can throw off this timing and affect the conservation status of the entire species.

Independent of climate change impacts, we also still know very little about some of these small owls species given their mostly nocturnal and secretive natures. Are some species more abundant, or do they do better in certain forest types than others? How do they interact with other owls? When do they breed, how many eggs do they lay, how many young do they typically raise?



Most owls seek out tree cavities, hollow openings such as those carved by woodpeckers, to nest in. But climate change may also threaten their habitat. Scientists predict that within this century, aspen and other types of forest may all but disappear in many areas. Natural tree cavities will likely disappear along with them, affecting not only owls, but also other species that rely on these cavities for shelter or breeding. We are taking two approaches to address this issue: 1) we will inventory and study the dynamics of cavities in different forest-types, and 2) we will investigate the efficacy of introducing nest boxes as a tool that could replace/augment natural cavities and help to keep some owl populations afloat. While this strategy has been effective in Utah, where Flammulated and Saw-whet Owls regularly use nest boxes, in other regions, nest boxes are not used by Flammulated Owls or our other study species.

It is currently unknown why this strategy might work in one location but not in others for certain species. One explanation might be that lack of cavities leads to higher rates of nest box use and that is what we see in Utah. To shed some light on the question, we plan to document natural cavity and owl densities in Arizona for several years and then add nest boxes to the mix later. Understanding which strategies are effective and why will enable managers to protect the habitat owls across their ranges.

RESEARCH AIMS

Despite being culturally very popular, very little information exists on the breeding ecology and habitat relationships of many small owl species.

You will help the research team to achieve the following objectives:

- 1) Document habitat-specific productivity of owls in both Utah and Arizona. Specifically, teams will help to answer the following questions:
 - a. Has productivity of Flammulated Owls at Utah sites changed over time?
 - b. Do Utah and Arizona sites differ from each other or from other published studies of the species we encounter and monitor?
 - c. Do rates of nest box use differ between species and sites?

- 2) Identify potential impacts of climate change on breeding phenology within and between sites. Specifically:
 - a. Has the timing of the first egg hatching or the fledging date changed over time at either study site?
- 3) Document the availability of natural tree cavities and how it relates owl community dynamics and to the use of nest boxes at each site.

HOW YOU WILL HELP

You will assist with all components of the study including: nighttime surveys for occupied territories, natural cavity surveys, nest box checks and searches (where applicable), and habitat measurements.

Teams that visit at different times of the season will experience different stages of the breeding season. Some will be there for territory establishment and egg laying, others for incubation and early brooding, and others for late brooding and fledging. During each of these times, volunteers may also get to experience banding of adults and young, either in the nest or during nighttime trapping using mist nets.

Specifically, you will help to:

- **SURVEY FOR AND CAPTURE OWLS AT NIGHT.** Listen for the low-pitched 'boop' of the Flammulated Owl, the telegraph-like call of the Whiskered Screech-Owl, or the high-pitched 'laugh' of the Elf Owl as you use recordings of their calls to attract them. You'll help to set up and take down lightweight mist nets with pockets that catch and hold the owls. When you catch one of these little birds, you'll help the researchers take its measurements, photograph it, and attach a band before releasing it back into the wild.
- **MEASURE THE HABITAT.** Search for natural tree cavities and record their GPS locations. Search cavities for evidence of owl usage using mirror poles or specialized video cameras. Measure tree height and vegetation in surrounding habitat.
- **SEARCH DURING THE DAY AND NIGHT FOR OWL NESTS** by zeroing in on calls of adults and young.
- **SURVEY INSECT PREY** potentially available to owls using specialized traps.

DAILY LIFE IN THE FIELD

PLANS FOR YOUR TEAM

Upon arrival in Tucson, we'll travel by van to the Southwestern Research Station (SWRS) near Portal, Arizona (~3 hrs). After getting settled and eating we'll talk about safety, project goals and how they relate to global conservation issues. When we begin our fieldwork, project staff will introduce and demonstrate each new task. We'll work with you until you're comfortable with any new activities. We will also supervise to ensure data quality. You will spend days and some nights in the riparian and coniferous forests of southeastern Arizona. During free time you will have the opportunity to bird and explore the spectacular setting around SWRS.



ITINERARY

Weather and research needs can lead to changes in the daily schedule. We appreciate your cooperation and understanding.

DAILY ACTIVITIES

DAY 1	Arrive at Rendezvous Site, Travel to Accommodations, Project Intro
DAY 2	Travel to study sites, study overview, training on habitat measures, nest cavity survey techniques, and data logging. Nighttime trip to sites for survey training, possible owl trapping using mist nets.
DAY 3	Continued training on habitat measures and cavity surveys/searches.
DAY 4	Nest cavity checks / Habitat measures / Nighttime Surveys or Trapping
DAY 5	Nest cavity checks / Habitat measures / Nighttime Surveys or Trapping
DAY 6	Nest cavity checks / Nighttime Surveys or Trapping/Last night with the Owls/ Farewell Dinner
DAY 7	Travel to Airport / Head home with new skills, ecological knowledge, and satisfaction with your contribution to conservation.

DAILY SCHEDULE (may vary slightly)

7:30 a.m.	Breakfast
8:00 a.m.	Rest/free time
10:00 a.m.	AM Briefing/ Data entry / Gear check / Occasional fieldwork
12:00 p.m.	Lunch
1:00 p.m.	Depart for field (some days will depart for field @10:00 a.m. and take sack lunch)
1:30 p.m.	Fieldwork
5:00 p.m.	Leave field for Dinner
6:00 p.m.	Dinner
8:00 p.m.	Depart for field (night work)
8:30 p.m.	Fieldwork (surveys/trapping)
11:30 p.m.	Depart for lodging



ACCOMMODATIONS AND FOOD

ABOUT YOUR HOME IN THE FIELD



You'll stay at the Southwest Research Station (SWRS; www.research.amnh.org/swrs/), which houses scientists from all over the country studying the ecology, behavior, and evolution of many different organisms in the area.

SLEEPING

You'll sleep in dormitories and share single-sex rooms with two to four twin beds in each. There are no private rooms for singles. It may be possible to accommodate couples if arranged in advance; please inquire with Earthwatch. All bedding and towels will be supplied.

BATHROOMS

The dormitories have shared bathrooms with showers separated by gender. Hot water is available at all times.

ELECTRICITY

Rooms do not have televisions or telephones, but there are electrical outlets for any personal devices such as digital cameras or laptop computers. You are welcome to bring your own electronic equipment (cell phones, digital cameras, laptops, etc.), but you will be required to limit your use of cell phones or laptops to recreational time only.

PERSONAL COMMUNICATIONS

The station is equipped with Internet capability, though the signal can sometimes be weak and unreliable. The study areas and SWRS do not have reliable cell phone service. There is cell service in Portal, AZ, which is five miles away. The SWRS does have phone line for which members can buy a calling card. In extreme emergencies the station number +1-520-558-2396 can be used. The station does have free wired and wireless Internet and encourages visitors to communicate via Skype. Note that occasional service outages can occur but are uncommon.

FACILITIES AND AMENITIES

SWRS is quite remote. SWRS has a couple of washers and dryers for guests that are available at a small cost (\$1.50 per load at time of publication). There are some hiking trails that people can enjoy in groups or pairs.

FOOD AND WATER

The Southwest Research Station offers a full service cafeteria. Teams will eat with other station members during set meal times (7:30 a.m., 12:00 p.m., 6:00 p.m.). The station offers guests that will be in the field during the day the opportunity to prepare their own sack lunches or dinners. Water is potable at the station.

The following are examples of foods you may find in the field. Variety depends on availability. We appreciate your flexibility.

TYPICAL MEALS

BREAKFAST	Cereal, oatmeal, bagels, eggs, toast, fruit, yogurt, coffee/tea, juice
LUNCH	Sandwiches, chips, fruit
DINNER	Pasta and other grain dishes, grilled/roasted meats, salads, vegetables, pizza

SPECIAL DIETARY REQUIREMENTS

Please alert Earthwatch to any special dietary requirements (e.g., diabetes, lactose intolerance, nut or other food allergies, vegetarian or vegan diets) as soon as possible, and note them in the space provided on your volunteer forms.

Vegetarian fare is available if requested.

PROJECT CONDITIONS

THE FIELD ENVIRONMENT



The Chiricahua Mountains, and southeast Arizona in general, is a world-renowned birding hot spot. A blend of riparian canyons and coniferous forest dominate the study areas, which range in elevation from 5400 ft. to 7000 ft. Days are hot and nights are cool. Fantastic scenery and a diverse blend of north and central American plant and animal species occur in the area. Portal, Arizona is the nearest town to the research station.

GENERAL CONDITIONS

The following are averages. Please check weather resources for your team dates for more accurate weather predictions. Projects have experienced unseasonable weather at all times of year.

HUMIDITY: 0%–20%

TEMPERATURE RANGE: 45–100° F (7–38° C)

ALTITUDE: SWRS is situated at about 5,400 feet (1,646 m)

RAINFALL: 21 inches per year

ESSENTIAL ELIGIBILITY REQUIREMENTS:

All participants must be able to:

- Follow verbal and/or visual instructions independently or with the assistance of a companion.
- Enjoy being outdoors most of the day in variable weather, in the potential presence of wild animals and insects.
- Be comfortable walking on and off trail at night, using headlamps, but occasionally turning off lights and standing still in the dark while conducting broadcast surveys.
- Tolerate hot temperatures and a dry, arid environment.
- Traverse uneven, rocky terrain sometimes at an incline for 3–9 (4.8–14.4 km) miles per day, with an average of 4–5 miles (6.4–8 km). The hiking distance to arrive at a site is generally less than 4 miles at one time, but once at the site, you must stay on your feet traversing the area for hours at a time, which will equal a greater total distance covered.
- Move with good balance through low, thick vegetation over variable terrain
- Carry personal daily supplies such as lunch, water (2 liters), and some field equipment (10–20 lbs./4.5–9k)



POTENTIAL HAZARDS

FOLLOWING FOREST OWLS IN THE WESTERN U.S.

HAZARD TYPE	ASSOCIATED RISKS AND PRECAUTIONS
Hiking	Teams will be walking up to nine miles per day (14.4km), possibly in rocky, uphill, rough terrain, or high altitude. Equipment up to 10–20 lbs. will be carried during the day; this could include eight feet extension ladders, measuring tapes, insect traps, and mist nets and poles. Staff and volunteers will share the responsibility of carrying equipment. Participants must wear hiking boots with ankle support and long pants. Individuals unable to walk on and off trail in the forest to measure habitat characteristics and access cavities and nest boxes will have difficulty with this expedition.
Climbing	Individuals with fear of heights and that are unable to climb a 16 ft. ladder to access nests, can still enjoy this expedition but will miss out on this activity.
Night work	Individuals that have extreme fear of being out in the forest in the dark will have difficulty with some key aspects of this expedition.
Elevation/Extreme temperatures and dehydration	It will be very hot and dry, so heat exhaustion, dehydration, and sunburn are serious hazards. Working at high altitude puts team members at risk for altitude sickness and at greater risk of sunburn and dehydration. SWRS is at an elevation of 5400 ft. and the research sites can be as high as 8500 ft. Be prepared to drink plenty of water, wear protective clothing (such as long sleeves and a wide-brimmed hat), and use lots of sunscreen. Volunteers will be reminded to drink sufficient water in and out of the field. Night temperatures can drop—bring warm clothes and bring layers—it will be warm when moving but cold (even in southern Arizona) when we are stationary during surveys/trapping.
Animals/Plants	<p>Though unlikely, you may see rattlesnakes in the desert habitats. Other hazards include cacti with sharp spines, scorpions, stinging wasps, and ants. Some plants and arthropods in the area are dangerous. Avoid grabbing cacti or arthropods. Wear appropriate footwear, e.g., hiking boots, and watch your step as you hike in these areas. Deer, bear, mountain lions, jaguar and cougars are also present in the area, though rarely encountered. Do not approach wild animals and follow field staff instructions.</p> <p>You may also pass areas where dead tree branches fall regularly and could potentially injure or kill a person walking underneath. Participants are encouraged not to walk through these areas. Do not walk under dead branches.</p>
Insects	Biting and stinging insects and ticks are present. Inspect for tick bites daily. If you are allergic to any insect bites or stings, please bring medication with you into the field (at least two Epi-Pens, antihistamines, etc.) as appropriate and alert expedition leaders about your condition.
Transportation	We will travel on public roads with few traffic issues, but risks inherent in road travel still apply. All volunteers will have a seat belt and must wear it whenever the vehicle is in motion.
Personal Security	SWRS is a generally safe region for travelers; however, do not leave valuables unattended in public areas. We are working close to the US/Mexico border and therefore will encounter border patrol agents in the field and run the risk of encounters with individuals in the field that are migrating through the wild and do not wish to be encountered. We will discuss this possibility during safety briefings.
Swimming	There is a pool open to guests at SWRS. There is no lifeguard on duty. Adults may swim in pairs at their own risk.

HEALTH & SAFETY

FOLLOWING FOREST OWLS IN THE WESTERN U.S.



EMERGENCIES IN THE FIELD

Project staff members are not medical professionals.

The project will have cell phones and two-way radios for communication among the team while conducting field work.

SWRS and field vehicles all have first aid kits. In the event of a medical emergency, the Earthwatch scientists will administer first aid, and depending on the seriousness of the injury or condition, either take the volunteer to the hospital using one of the project vehicles (always available) or call emergency services by landline, cell phone (if possible) or radio. If a volunteer has to leave the expedition early for emergency reasons, the Earthwatch scientists will determine the most appropriate form of transport to the airport (either one of the project vehicles or ambulance).

STAFF CERTIFIED IN SAFETY TRAINING:

Dave Oleyar (Wilderness First Aid/CPR)

For emergency assistance in the field, please contact Earthwatch's 24-hour emergency hotline number on the last page of this briefing. Earthwatch is available to assist you 24 hours a day, 7 days a week; someone is always on call to respond to messages that come into our live answering service.

IMMUNIZATIONS & TRAVEL VACCINATIONS

Please be sure your routine immunizations are up-to-date (for example: diphtheria, pertussis, tetanus, polio, measles, mumps, rubella and varicella) and you have the appropriate vaccinations for your travel destination. Medical decisions are the responsibility of each volunteer and his or her doctor, and the following are recommendations only. Visit [cdc.gov](https://www.cdc.gov) or [who.int](https://www.who.int) for guidance on immunizations.

If traveling from countries or region where yellow fever is endemic, you must have a certificate of vaccination.



TRAVEL TIPS

SUGGESTIONS FOR THE ROAD

YOUR DESTINATION

LANGUAGE: English

TIME ZONE: Mountain Standard Time, which equals GMT-7 hours. Arizona does not adhere to daylight savings time and therefore is an hour behind nearby New Mexico during our expeditions despite both being in MST—this will occasionally throw cell-phone clocks off as we pass through New Mexico en route to SWRS.

CULTURAL CONSIDERATIONS: Casual, modest dress is acceptable nearly everywhere. Tipping restaurant wait staff, taxi drivers, airport curbside baggage handlers, and hotel bellhops is customary.

ELECTRICITY: The U.S. standard voltage used for small appliances, hair dryers, electronic equipment, etc. is 120 volts, 60Hz, supplied through type A or B sockets

LOCAL CURRENCY: U.S. dollar

PERSONAL FUNDS: We recommend you bring some spending money (\$100–200 is sufficient) for snacks, extra beverages (e.g., soda) and souvenirs.



COUNTRY AND PROJECT ENTRY REQUIREMENTS

Entry visa requirements differ by country of origin, layover, and destination, and do change unexpectedly. For this reason, please confirm your visa requirements at the time of booking and, again, 90 days prior to travel. Please apply early for your visa (we recommend starting 6 months prior to the start of your expedition). Refunds will not be made for volunteers cancelling due to not obtaining their visa in time to meet the team at the rendezvous. You can find up to date visa requirements via the following site::

www.travisa.com

If a visa is required, participants should apply for a TOURIST visa. Please note that obtaining a visa can take weeks or even months. We strongly recommend using a visa agency, which can both expedite and simplify the process.

Generally, passports must be valid for at least six months from the date of entry and a return ticket is required.

CONTACT INFORMATION

You may be required to list the following contact information on your visa application and immigration form, or if your luggage does not make it to baggage claim at your destination:

Dr. Dave Oleyar

C/O Southwestern Research Station
2003 W Cave Creek Rd
San Simon, AZ 85632





EXPEDITION PACKING LIST

WHAT TO BRING

EXPEDITION PACKING CHECKLIST

GENERAL

- This expedition briefing
- Your travel plans, rendezvous details, and Earthwatch's emergency contact information
- Photocopies of your passport, flight itinerary, and credit cards in case the originals are lost or stolen; the copies should be packed separately from the original documents
- Passport and/or visa (if necessary)
- Certification of vaccination (if necessary)
- Documentation for travel by minors (if necessary)
- Calling card or mobile phone (**NOTE:** the SWRS does not have good cell phone reception, but does have wireless internet available throughout, although it is stronger some areas than others)
- Credit card that may be used in the event of an emergency (travel delays, etc.)

CLOTHING/FOOTWEAR FOR FIELDWORK

- Warm layers of clothing (e.g., jacket or fleece— it gets cold some evenings, even in AZ)
- Lightweight, quick-drying, long-sleeved shirts
- Lightweight, quick drying long pants
- Rain jacket
- Well worn-in, comfortable hiking boots with grippy soles and adequate full ankle support
- Wide brimmed hat for sun protection
- Warm hat
- Mittens or gloves

CLOTHING/FOOTWEAR FOR LEISURE

- At least one set of clothing to keep clean for end of expedition
- Pair of light shoes or sandals

FIELD SUPPLIES

- Small daypack
- Sunscreen lotion with SPF 30 or higher
- Headlamp with extra batteries and extra bulb (we highly recommend a headlamp for hands-free capability)
- Two one-liter water bottles
- Sunglasses

BEDDING AND BATHING

NOTE: the project will provide linens, pillows, towels, blankets, etc.

PERSONAL SUPPLIES

- Personal toiletries (biodegradable soaps and shampoos are encouraged)
- Antibacterial wipes or lotion (good for cleaning hands while in the field)
- Personal first aid kit (e.g., anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, blister covers, etc.) and medications
- Spending money

OPTIONAL ITEMS

- Binoculars (recommended)
- Flip flops or sandals for the shower
- Extra flashlight or headlamp
- Camera, film or memory card(s), extra camera battery
- Hardware for sharing digital photographs at the end of the expedition
- Dry bag or plastic sealable bags (e.g. Ziploc) to protect equipment like cameras from dust, humidity, and water
- Books, games, art supplies, etc. for free time
- Earplugs for light sleepers

NOTE: Do not bring more luggage than you can carry and handle on your own. If traveling by air and checking your luggage, we advise you to pack an extra set of field clothing and personal essentials in your carry-on bag in case your luggage is lost or delayed.



PROJECT STAFF

YOUR RESOURCES IN THE FIELD

NOTE: The specific staff scheduled to run your team is subject to change.



DR. DAVE OLEYAR, SENIOR SCIENTIST HAWKWATCH INTERNATIONAL, is the lead researcher and coordinator in the investigation of the habitat and nesting behaviors of forest owls in northern Utah and southeastern Arizona. He is looking to increase knowledge of these species and to determine how to best mitigate the effects of climate change and keep populations afloat. He will coordinate all the fieldwork and surveys in Arizona and Utah.



DR. MARKUS MIKA, ASSOCIATE LECTURER UNIV. OF WISCONSIN LACROSSE, is a field team leader for both Arizona (first 2 teams) and Utah (all teams) expedition locations. He has studied Flammulated Owls across their range in western North America.



RECOMMENDED READING

YOUR RESOURCES AT HOME

RESOURCES

ARTICLES/WEBSITES

- State of the Birds Report 2014: <http://www.stateofthebirds.org/>
- 314 Species on the Brink: <http://climate.audubon.org/> (Flammulated Owls not listed here but 26 species of cavity nesters are, including many that create cavities used by forest owls)
- Review of Technical Knowledge on Flammulated Owls http://www.fs.fed.us/rm/pubs_rm/rm_gtr253/rm_gtr253_014_046.pdf
- USA National Phenology Network: <https://www.usanpn.org/>

BOOKS

- Walden Warming (Richard Primack)
- A Sand County Almanac (Aldo Leopold)

FIELD GUIDES

- HawkWatch International: <http://www.hawkwatch.org/learn/factsheets/item/89-flammulated-owl>
- The Sibley Field Guide to Birds of Western North America (David Sibley)

EARTHWATCH SOCIAL MEDIA

- FACEBOOK: [facebook.com/Earthwatch](https://www.facebook.com/Earthwatch)
- TWITTER: twitter.com/earthwatch_org
- INSTAGRAM: [instagram.com/earthwatch](https://www.instagram.com/earthwatch)
- BLOG: <https://blog.earthwatch.org/>
- YOUTUBE: [youtube.com/earthwatchinstitute](https://www.youtube.com/earthwatchinstitute)

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LITERATURE CITED

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EMERGENCY NUMBERS

AROUND-THE-CLOCK SUPPORT



MESSAGE FROM EARTHWATCH

DEAR EARTHWATCHER,

Thank you for joining this expedition! We greatly appreciate your decision to contribute to hands-on environmental science and conservation. It is volunteers like you who fuel our mission and inspire our work.

While at Earthwatch, I've had the opportunity to field on a few expeditions, most recently in Kenya with one of my daughters. Each expedition has touched me deeply, and made me proud to be able to roll up my sleeves alongside my fellow volunteers and contribute to such meaningful work.

As an Earthwatch volunteer, you have the opportunity to create positive change. And while you're out in the field working toward that change, we are committed to caring for your safety. Although risk is an inherent part of the environments in which we work, we've been providing volunteer field experiences with careful risk management and diligent planning for nearly 45 years. You're in good hands.

If you have questions as you prepare for your expedition, we encourage you to contact your Earthwatch office. Thank you for your support, and enjoy your expedition!

Sincerely,



Scott Kania
President and CEO, Earthwatch





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