



EARTHWATCH 2015

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES



MESSAGES FROM EARTHWATCH

DEAR EARTHWATCHER,

Welcome to the *Tracking Fire and Wolves through the Canadian Rockies* expedition! You are going into one of the wildest, most intact places in North America, the Crown of the Continent Ecosystem. It contains all the species present in 1800—including wolves, grizzly bears, wolverines, cougars, and lynx. Consequently, your time on this project will be an adventure filled with compelling data, remarkable wildlife observations, and keen insights about the powerful relationships that shape food webs.

Our long-term research looks at two essential forces of nature: fire and wolves. These ecological forces were present in ecosystems throughout much of North America until humans decided it was easier to live without them. Although it took nearly a century, we eventually realized that it was an enormous mistake to remove two of the most important factors that keep ecosystems healthy. Conservation biologists refer to removal of fire and wolves as the “dewilding,” and to their return as the “rewilding.”

On this expedition, you’ll help document the effects of fire and wolves in a landscape in which wolves have been allowed to return to a healthy population size and fire has been reintroduced via prescribed burning. But as Darwin astutely pointed out in the mid-1850s, nature is a tangled bank. Untangling the effects of these keystone forces of nature is anything but simple, leads to unexpected “aha” moments afield, and to the realization that everything is connected, sometimes in surprising ways. Our research has global relevance, because we’re finding that ecosystems that contain top predators and fire are more resilient to climate change.

I look forward to having you join us afield. Together we’ll collect data to improve our understanding as a society of the critical role fire and wolves play. Data you collect will help enable better coexistence with both.

So let the wild rumpus begin! Be prepared to work hard and have many astonishing experiences as we delve into nature’s tangled bank and help rewild the Earth.

Sincerely,

Dr. Cristina Eisenberg
Lead Earthwatch Scientist

DEAR EARTHWATCHER,

Thank you for joining this expedition! We greatly appreciate your decision to contribute to hands-on environmental science and conservation.

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 over 40 years. You’re in good hands.

We hope this expedition will inspire you to get more involved in conservation and sustainable development priorities—not just out in the field, but also when you return home. We encourage you to share your experiences with others, and to transfer your skills and enthusiasm to environmental conservation efforts in your workplace, community, and home.

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

Sincerely,

Larry Mason
President and CEO, Earthwatch

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GENERAL INFORMATION

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES



EARTHWATCH SCIENTISTS

Dr. Cristina Eisenberg Lead Scientist,
Earthwatch Institute

Dr. David Hibbs Professor Emeritus,
College of Forestry, Oregon State University

RESEARCH SITE

Waterton Lakes National Park in Alberta, Canada

Please refrain from booking flights until
you receive your complete rendezvous
information, which will be sent to you
upon request

EXPEDITION DATES

Team 1: Jul. 13-Jul. 25, 2015

Team 1a: Jul. 13-Jul. 19, 2015

Team 1b: Jul. 19-Jul. 25, 2015

Team 2: Jul. 27-Aug. 8, 2015

Team 2a: Jul. 27-Aug. 2, 2015

Team 2b (Aspen): Aug. 2-Aug. 8, 2015

Team 3: Aug. 10-Aug. 22, 2015

Team 3a: Aug. 10-Aug. 16, 2015

Team 3b: Aug. 16-Aug. 22, 2015

TRIP PLANNER

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES

TRIP PLANNER

IMMEDIATELY

- Make sure you understand and agree to Earthwatch's Terms and Conditions.
- If you plan to purchase additional travel insurance, note that some policies require purchase when your expedition is booked.

90 DAYS PRIOR TO EXPEDITION

- Log in at earthwatch.org to complete your volunteer forms.
- Pay any outstanding balance for your expedition.
- Book travel arrangements (see the Travel Planning section for details).
- If traveling internationally, make sure your passport is current and, if necessary, obtain a visa for your destination country.

60 DAYS PRIOR TO EXPEDITION

- Make sure you have all the necessary vaccinations for your project site.
- Review the Packing Checklist 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 relative or friend.
- Leave copies of your passport, visa, and airline tickets with a 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.

EXPEDITION PACKING LIST

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES

EXPEDITION PACKING LIST

REQUIRED ITEMS

The scientist recommends checking out Sierra Trading Post (sierratradingpost.com) for good deals on the high quality gear necessary for maximum comfort and safety on this project.

NOTE: all items with asterisk (*) will be carried in each volunteer's pack every day, plus lunch/snacks and some field equipment.

GENERAL

- ☐ This expedition briefing
- ☐ 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)

CLOTHING/FOOTWEAR FO FIELDWORK

- ☐ Gore-Tex rain gear tops and bottoms*
- ☐ Gore-Tex gaiters (Outdoor Research brand is good)*
- ☐ Completely waterproof heavy-duty, all-leather backpacking boots (a couple good brands to consider are Lowa and La Sportiva)
- ☐ Clothing suitable for keeping you comfortable in 20-90° temperatures*
- ☐ Field clothes that will not tear easily during bushwhacking*
- ☐ Wide brimmed hat for sun protection
- ☐ Earthwatch T-shirt

CLOTHING/FOOTWEAR FOR LEISURE

- ☐ At least one set of clothing to keep clean for end of expedition
- ☐ Comfortable shoes to change into after conducting field work

FIELD SUPPLIES

- ☐ 35 liter capacity (minimum) backpack for all-day use in the field that are well-structured and comfortable to wear all day (a couple good brands are Osprey and Gregory)*
- ☐ Hydration system or water bottles sufficient to hold 2 liters of water*
- ☐ Personal first aid kit (e.g., anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, blister covers, etc.) and medications *

- ☐ Binoculars*
- ☐ Sunscreen lotion with SPF 30 or higher*
- ☐ Insect repellent*
- ☐ Sunglasses

BEDDING AND BATHING

- ☐ Sleeping bag
- ☐ Small travel pillow and pillowcase
- ☐ Bath towel(s)

PERSONAL SUPPLIES

- ☐ Personal toiletries (biodegradable soaps and shampoos are encouraged)
- ☐ Antibacterial wipes or lotion (good for cleaning hands while in the field)
- ☐ Spending money

OPTIONAL ITEMS

- ☐ Laptop for personal use
- ☐ Compass with a mirror
- ☐ Pocket knife (remember to pack in your checked luggage!)
- ☐ Field guides to plants and animal tracks
- ☐ 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.

THE RESEARCH

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES



THE STORY

For nearly one hundred years, ecologists have recognized the powerful link between wolves, elk, aspen, grass, and fire. Large carnivores, such as wolves, and disturbances, such as fire, have been identified as forces of nature that increase biodiversity, create more resilient ecosystems, and help energy to cycle more vigorously through communities. These cascading direct and indirect food web interactions affect songbird and invertebrate species diversity.

By the 1920s, as is the case in much of North America, wolves had been killed by humans to the point that they were practically extinct. Without wolves preying on them, elk and deer exploded in number. Burgeoning elk populations ravaged plant communities, including aspen forests (an important elk food). Literally eating themselves out of house and home, elk damaged aspen to the point that few sapling survived to grow into mature trees. At the same time that we wiped out wolves, we eliminated fire.

Beginning in the mid-1970s, with the passage of powerful environmental laws in the US and Canada, we began to conserve wolves and other large carnivores. We also began to realize that fire is as important of an ecological force as wolves. With the return of wolves we are noticing changes in elk behavior and their density. This means that elk may not be eating aspen in places where wolves are present, because it is more difficult to escape a wolf in an aspen thicket than on open terrain. This effect is called “the ecology of fear.” We are also finding that wolves in some places reduce elk numbers to a more sustainable level. With the return of fire we are noticing that aspen are sprouting more vigorously and growing faster. The combination of wolves and fire is leading to aspen rapidly growing above the height that elk can eat them and into the forest canopy.

RESEARCH AIMS

Our overarching goal is to learn more about trophic cascades and how fire and wolves can help us create healthier, more resilient grassland and aspen forest communities.

Our study area, Waterton Lakes National Park (WLNP), is in one of the most intact temperate ecosystems in North America. This ecosystem contains all the large carnivore species present at the time of the Lewis and Clark Expedition and 6 million acres of protected wilderness and reserves. As such, it makes the perfect natural laboratory to investigate the complex interactions between apex forces of nature—fire and wolves—on a landscape scale. Within this ecosystem, our research takes place in WLNP at the site of the 1200 hectare Y-Camp Prescribed Burn, which occurred in 2008, and the 2014 2,300 hectare Red Rock Complex Prescribed Burn. The Y-Camp site is scheduled to be re-burned in spring 2015. Our study sites lie in primary elk winter range in this park, where elk density is very high from September-May. Indeed, the elk density recorded here is among the highest recorded in North America.

To learn about how food web relationships between top predators and their prey - also known as “trophic cascades” - operate in a grassland-aspen community, we will measure the dynamics of each food web link in our study—wolves, elk, aspen—and the presence and severity of fire. Fire severity has a positive relationships with post-fire aspen sprout density. We are focusing on elk and wolves because they are key players in food web effects involving grasslands and aspen. None of the other large herbivores or carnivores in our study area play a significant role in the elk-aspen interaction.

We’ll achieve our goal of learning about how predation, fire, and herbivory operate in grassland-aspen communities via the following steps:

1. Test the effects of prescribed fire on aspen regeneration and recruitment
2. Measure elk presence and feeding behavior in WLNP
3. Investigate the effects of elk herbivory on post-fire aspen regeneration and recruitment
4. Examine the potential for wolves to influence elk feeding choices

Like most ecological communities, aspen forests are influenced by a synergy of bottom-up (resources-driven) and top-down (predator-driven) processes. Bottom-up effects that contribute to aspen ecology include drought, fire suppression, and disease. Top-down effects include ungulate herbivory and carnivore predation on ungulates.

Scientists have hypothesized that returning wolves to ecosystems enables aspen to grow into the forest overstory (called “recruitment”), via the effects of wolves on their ungulate prey, primarily elk. Further, with wolves present on a landscape scale, elk avoid burned areas, which may have higher predation risk due to the greater impediments to detecting and escaping wolves created by post-fire woody debris.

To study trophic cascades and fire science as it pertains to the WLNP Y-Camp Fire, we are asking the following scientific questions:

Q1 How has the aspen footprint changed?

Q2 How have fire and herbivory by elk changed aspen demography (e.g., the ability of aspen to grow into the forest canopy)?

Q3 How does the presence of an apex predator (the wolf) influence elk consumption of aspen?

Answering the above questions will help us meet our project objectives of learning how elk are responding to a prescribed fire in an aspen community, identifying the effects of elk herbivory on post-fire aspen regeneration and recruitment, and determining whether wolves may be moderating these relationships.

We are answering these questions by measuring the dynamics of each food web link in our study, as follows:

(Q1) by re-measuring an existing network of aspen plots; (Q2) by assessing aspen size/age structure spatially; and (Q3) by conducting wolf surveys and measuring elk presence and herbivory in this landscape on a fine scale.

Our study builds on a rich body of data previously gathered in WLNP, which includes pellet transect, elk GPS-collar, focal animal, and aspen ecology data



HOW YOU WILL HELP

From the inception of our research in 2007, we've incorporated volunteers on each field crew. As volunteers, you'll be conducting two types of surveys:

1. **Aspen Surveys:** These surveys can take place from early July to mid-September, after trees leaf out and begin to grow. Aspen surveys require 6-12 miles of walking per day on level terrain, working off-trail. Data collection involves measuring aspen sapling height, shrub diversity, shrub height and percent cover, aspen encroachment on the grassland, and forest community characteristics.
2. **Wolf Surveys:** Visits to wolf rendezvous sites and travel corridors can take place at any time throughout the project. However, wolf den surveys can only be done in August, to avoid these sites when the wolves could be present with their pups. We do all we can to avoid disturbing wolves on our project. Field days when we track would require 6-12 miles of walking per day on uneven terrain, working off-trail. We conduct wolf surveys one day per week.

Specifically, you'll be able to assist with the following research tasks:

1. Pulling transect tapes and marking plots.
2. Measuring understory characteristics, such as aspen sapling heights, tree diameters, and shrub cover.
3. Measuring overstory characteristics, such as canopy cover, tree mortality, and tree diameters at breast height.
4. Tracking ungulates and carnivores in established transects.
5. Tracking wolves in high wolf-use areas.

Here is some detail on the data we'll be collecting together:

Aspen Sampling

Our project involves a resurvey of transects and plots in an aspen parkland burned by prescribed fire. We have been surveying some of these transects and plots since 2008. We are tracking the effects of fire over time and whether elk herbivory suppresses sprouting stimulated by the fire, particularly in plots that burned with a high severity, thereby diminishing the aspen footprint and increasing the grassland footprint. We have pre-burn data for all of the known aspen stands in WLNP to which we are able to compare post-fire data.

Aspen data is gathered in permanently marked transects that are surveyed annually. The transects are 4 meters wide and vary in length, based on the size of the stand. In these transects you'll collect data about how the forest is growing, called "overstory dynamics."

Within the transects we've placed circular plots that are 2 meters in radius, and are located 20 meters apart along the transect line. In the plots you'll collect data about the ecology of fear—whether predation risk by wolves is affecting the feeding choices elk make. To do this you'll measure elk browsing on understory sapling and shrubs.

Wolf Surveys

Wolf surveys consist of visits to sites identified by Parks Canada camera trap data as hotspots of wolf activity. Wolf activity data are gathered systematically, with periodic (e.g., bi-weekly) re-visits to wolf activity hotspots, using leave-no-trace methods. Data collected includes all evidence of wolf presence (e.g., scats, tracks, wolf hair, carcasses) and activity. We survey wolf dens in August, to determine whether a pack has denned and produced pups. If so, we estimate pack and litter size. The field crew performs all surveys as noninvasively as possible to avoid disturbing wolves. Project participants are required to keep all wolf survey data confidential, especially information about locations of wolf dens, to protect the wolves.

DAILY LIFE IN THE FIELD

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES

Upon arrival, we'll go grocery shopping as a group. The field site is remote, with no ability to get most of the foods we rely on, so group participation helps ensure that everyone's food needs are met. This is particularly important given the high caloric needs of this work. Upon arriving in Waterton, you'll receive an orientation to the research house and a room assignment. We'll put away groceries and prepare dinner together. After dinner you'll receive an introductory lecture on research methods and equipment. You'll also receive a safety and logistics briefing. In the morning you'll receive a bear safety briefing from Parks Canada staff.

Each day after breakfast we'll gather in one room and "gear up." Gearing up is a tradition on this project, during which the crew leader briefs everyone on logistics, weather, hazards, and field objectives and methods, and distributes field gear. The crew leader will also check in with everyone to ensure that each person is feeling well and able to go into the field.

Each day during lunch we'll discuss pertinent topics, such as the ecological history of the area how predator extirpation and fire suppression—and the return of both—are shaping the patterns we see in this landscape. In the field and once or twice per week after dinner we'll discuss data quality. On the last day after dinner, we'll talk about the results and trends we're finding and the relevance of the data collected. We'll also discuss coexisting with apex predators. In general, research days will include up to eight hours per day in the field, plus two hours of briefings/lectures.

DAILY ACTIVITIES

Each morning, we will make breakfast and prepare a packed lunch before going over the general schedule for the day to outline what you should bring into the field and when we anticipate returning back to the volunteer building. After a long day of field work and data collection, we will all return to the volunteer building for showers and relaxation. Then, we will convene for a group dinner and evening wrap up of the day's events.

Participants who are on the project for one week will spend all day for three days measuring plants (trees and shrubs) to document how fire and wolves are impacting that ecosystem

Volunteers will spend one day per week tracking wolves. We do not have any radio-collared individuals. We use only non-invasive methods of tracking wolves, in order to minimize impacts on wolves. This means relying on camera trap data to identify their travel corridors and other hotspots of wolf activity and then going there to further document wolf presence. At no time do we observe wolves, and we do all we can to avoid running into wolves, as we do not want to disturb and stress them. This is completely noninvasive wolf monitoring.

The following itinerary is subject to change due to weather, and wildlife hazards.

ITINERARY

DAY 1: ARRIVAL AND INTRO

- Arrive at the rendezvous airport and meet project staff
- General intro to research background during drive
- Grocery shopping for team en route to accommodations
- Arrive at accommodations in Waterton
- Unpack and settle before having a welcome dinner in the volunteer building
- Briefing on research, field methods and equipment

DAY 2: TRAINING

- Introduction to field work
- AM: bear safety training
- PM: data collection techniques

DAYS 3-5: FIELD WORK: DATA COLLECTION

- Plant/ecosystem surveys

DAY 6: FIELD WORK: OBSERVATION

- Wolf tracking
- Evening: program summary

DAY 7: DEPARTURE

- Depart for the airport @ ~6:00 am
- Pick-up of b team, if applicable
- 2-week participants have a recreation day, and the repeat this schedule with b team volunteers.

ACCOMMODATIONS AND FOOD

ABOUT YOUR HOME IN THE FIELD

SLEEPING

You will be staying at the Waterton Lakes National Park research house, which is located in a premiere site in town. This Parks Canada property is only available for researchers to use. This house is fully-furnished and has a large kitchen for group cooking. There are 5 bedrooms with a total of 10 beds. Genders will be roomed separately. Couples accommodation may be able to be accommodated, depending upon availability.

BATHROOMS

There are two shared bathrooms with hot water showers and conventional toilets. There is also a laundry room with a washer and dryer available to volunteers at no additional cost.

ELECTRICITY

You are welcome to bring electrical equipment. All lodging facilities have standard electrical outlets.

INTERNET AND COMMUNICATIONS

There is unreliable WIFI access at the accommodations. WIFI is available at a local café - please bring your own laptop if you plan to use this. If you plan to use your cell phone, please obtain an international data plan through your cell service provider. Depending on your mobile phone carrier, cell service can be found near the accommodations, but is highly variable in the region.

Please note that personal communication with outsiders is not always possible while participating in an expedition. Earthwatch encourages volunteers to minimize outgoing calls and immerse themselves in the experience; likewise, family and friends should restrict calls to urgent messages only.

FACILITIES AND AMENITIES

There is no television in this house (movies can be watched in the evening on laptops if desired). Within walking distance of the research house are numerous restaurants, boutiques, and other attractions.

DISTANCE TO THE FIELD SITE

Our primary field site for 2015 is about 2.5 miles from the accommodations. Another site is about 4 miles away—you are never very far from home!

FOOD AND WATER

Everyone will take turns to help prepare and clean up from meals. Planned menus will be provided, and will include as many local ingredients as possible, including bison, elk, and salmon. Due to the high caloric demands of this project's hiking-based fieldwork, a strong focus is placed on providing volunteers and staff with plenty of quality high-protein, high-fat, and mineral-rich foods. The following is a sample menu, which may change with dietary preferences of the team and ingredient availability.

TYPICAL MEALS

BREAKFAST	Cereal or granola, yogurt with fruit, eggs/egg dishes, juice, fair-trade coffee
LUNCH	Sandwiches (peanut butter or deli meats), dinner leftovers
DINNER	Salad, antipasto, maple-baked wild salmon, parmesan risotto, bison spaghetti, roasted vegetables, homemade pizzas, elk loaf with caramelized onions, garlic mashed potatoes, Thai curry with organic free-range chicken, jasmine rice, elk lasagna, crepes Provencale, various delicious veggies
DESSERT	Oatmeal chocolate chip cookies, Carrot cake, baked lemon pudding, homemade apple pie, fruit cobbler, ice cream
BEVERAGES	Water (tap water comes straight from a glacial aquifer), juice, coffee, tea

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, gluten-free and lactose-free diets can be accommodated with advance notice.

NOTE: This project cannot easily cater for the full nutritional needs of vegan diets in this high-intensity work environment. Please plan to bring a supply of supplemental high-fat, high-protein foods to allow for an approximately 7000-calorie day.

TRAVEL TIPS

SUGGESTIONS FOR THE ROAD

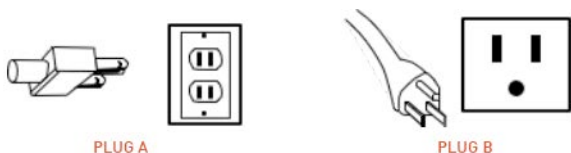
YOUR DESTINATION

LANGUAGE: English

TIME ZONE: Mountain Standard Time (MST), which equals GMT/UTC -6 hours in the summer months.

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



MONEY MATTERS

LOCAL CURRENCY: Canadian dollar (CAD). US dollar can also be used at most locations, but the exchange rate is not the best.

PERSONAL FUNDS: \$100 should suffice if you'd like to purchase additional food or supplies. You can walk to an ATM from the field house, and most locations accept credit cards. International volunteers should plan to exchange currency at the airport before joining the project. Because we will return to Waterton each day, you will always have access to an ATM.

PASSPORTS AND VISAS

Passport and visa requirements are subject to change. Check with your travel advisor, embassy or consulate in your home country for requirements specific to your circumstances. Generally, passports must be valid for at least six months from the date of entry and a return ticket is required.

Citizenship	Passport Required?	Visa Required?
United States	Yes	No
United Kingdom	Yes	No
Europe	Yes	No
Australia	Yes	No
Japan	Yes	No

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.



PROJECT CONDITIONS

THE FIELD ENVIRONMENT

GENERAL CONDITIONS

Summer conditions can be hot, with thunderstorms in the afternoons. However, because the research site is in the Rocky Mounts, and lies on the Continental Divide, the weather can change unexpectedly and without any prior warning. We have had snow in our field site during every month of the year, except July, so hypothermia is a risk year-round. Frost has occurred in our field site during every month of the year. Mosquitoes are present, mainly in July, and are moderate. Research is conducted on rolling terrain, off-trail. Research will be conducted if it is raining, but we do not work during thunderstorms.

GENERAL CONDITIONS

HUMIDITY: 25%-90%

TEMPERATURE RANGE:

DAY: 50° F to 95° F (10° C to 35° C)

NIGHT: 20° F to 45° F (-7° C to 7° C)

RAINFALL: Summer average: 3 in (76 mm)

ESSENTIAL ELIGIBILITY REQUIREMENTS:

All participants must be able, independently or with the assistance of a companion, to:

- ☐ Follow verbal and/or visual instructions closely at all times.
- ☐ Enjoy being outdoors all day in all types of weather.
- ☐ Hike throughout the day, off-trail, or uphill on slippery vegetation and uneven terrain. Totalling about 6-12 miles per day. Light week ("Aspen" team) involves hiking throughout the day, off-trail, or uphill on slippery vegetation and uneven terrain for 3-6 miles per day.
- ☐ With training provided, be prepared for likely encounters with wild animals, including grizzly bears. This involves carrying bear spray and a radio, and during an encounter following instructions exactly in order to leave the area calmly, but quickly, in a group, so as to not upset the bear and not to endanger teammates.
- ☐ Be able to keep up with the team as we move in and out of the field, for safety reasons (eg, avoiding grizzly bear encounters).
- ☐ Complete all required transects in timely manner to avoid putting strain on the rest of team
- ☐ Tolerate the presence of insects such as mosquitos and wasps.
- ☐ Independently carry personal equipment (food, water, various layers of clothing), as well as a small amount of research equipment (up to ten additional pounds per person), totaling 30 lbs. Be able to wear pack all day, including while gathering data, for safety reasons (see packing list suggestions for appropriate backpacks for this).
- ☐ Protect oneself from dehydration and exposure to sun and heat by carrying two liters of water and drinking plenty of water throughout the day and wearing appropriate clothing and sunscreen.
- ☐ Sit on the ground to eat lunch or record data; designated rest places (e.g., benches) are not available.
- ☐ Get low to the ground while taking measurements, while wearing a pack.
- ☐ Be comfortable with the idea of encountering, and investigating, animal carcasses in the field. They will provide important information about the carnivores in the area.
- ☐ Get oneself up into and down out of a vehicle and ride, seated with seatbelt fastened.
- ☐ Remain respectful of the wildlife we are studying, as well as their habitat. This includes not approaching any wildlife we see, such as elk, grizzly bears, or wolves, and not photographing wildlife during field work (you will have non-research-time opportunities to photograph local wildlife).
- ☐ Be comfortable to be trained in the use of a GPS, compass, rangefinder, clinometer, diameter-at-breast-height tape, leveling rod, and other equipment.

POTENTIAL HAZARDS

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES

HAZARD TYPE	ASSOCIATED RISKS AND PRECAUTIONS
Transportation	Only project technicians and principal investigator will transport participants in project vehicles. Seatbelts must be worn at all times. Volunteers are not permitted to drive. Field staff will avoid driving at night or while tired. While driving, staff will maintain appropriate distance between vehicles and travel at safe speeds to allow stopping when necessary. Cell phone, first aid kit and water will be in vehicle in case of accident/break down on road. No operation of cell phone is permitted while driving. Participants susceptible to motion sickness to consider taking medication as appropriate.
Hiking	Participants will be advised to walk carefully, wear heavy-duty hiking boots (suitable for backpacking) with ankle support. Persons with existing injuries (e.g., knee injuries) will not be allowed in the field. Staff will encourage participants to inform a staff member immediately if feeling tired or ill, and to take regular breaks and to avoid overexerting themselves. Participants will be monitored for general health and ability to keep up with the group at all times.
Altitude	Participants sensitive to small altitude changes may need a few days to acclimatize. Participants will be reminded frequently to stay well hydrated and to apply sunscreen regularly. Participants to not overexert themselves and to inform a staff member when feeling tired or ill. Monitor participants for general health at all times. Staff will encourage participants to carefully monitor their own condition and report any symptoms (headaches, lethargy, appetite loss, nausea, etc.) to project staff. Participants should be aware of illnesses that may be aggravated by altitude (sickle cell and chronic heart and lung diseases) prior to fielding.
Dehydration	All project staff are Wilderness First Aid certified (at a minimum). One field staff member is Wilderness First Responder certified. Participants will be instructed (and reminded frequently) to drink plenty of water throughout the day and to bring at least two liters of water into the field each day; to wear high-factor sunscreen and appropriate clothing, including sunglasses, a wide-brimmed hat and/or scarf; to not overwork when jetlagged or tired, and to inform a staff member when feeling tired or ill. Team will take regular breaks as needed, and monitor participants for general health at all times.
Animals	Project staff will explain protocols and safety measures during orientation for addressing any encounters with wildlife such as grizzly bears, cougars, elk. No photography is allowed in the field when encountering wildlife. Radios are to be worn at all times to communicate about wildlife hazards. Participants are encouraged to carry binoculars to help spot wildlife hazards (e.g., bears) at a safe distance. Trained staff will carry pepper spray. Additionally, adult participants will be trained in the transport and use of wildlife pepper spray, and will be encourage to carry pepper spray canisters in the field.
Personal Security	Participants should take standard precautions such as keeping aware of money and personal belongings, especially in crowded places (e.g. airport).

POTENTIAL HAZARDS

TRACKING FIRE AND WOLVES THROUGH THE CANADIAN ROCKIES

HAZARD TYPE	ASSOCIATED RISKS AND PRECAUTIONS
Forest fires	Participants should be aware of the risk of forest fires, particularly later in the season during dry conditions. Smoke from fires can make breathing more difficult and can cause a minor burning sensation in the eyes, throat and lungs. Participants will be instructed in the prevention of forest fires; Pls and staff will model appropriate behavior.
Plants	Participants will be instructed on identification and avoidance of barbed vegetation. Participants with allergies to hay, sage, or other common Western US plants should bring appropriate medications (antihistamines, etc.).
Insects	Participants will be instructed to check carefully for ticks after they've been outside, checking places such as the back of the neck and the backs of legs and clothing where ticks might hide. Everyone will use insect repellant containing DEET or picaridin in order to prevent insect bites. Participants with allergies to biting and/or stinging insects must bring medications (antihistamines, at least two EpiPens, etc.) as appropriate.
Distance to Medical care	The nearest full-service hospital is 80 miles from most field sites (1.5 hr drive), with a smaller hospital located 30 miles away (40 minute drive). It may take up to 2 hours to arrange transport and reach the full-service hospital. If you have a chronic condition, which could require immediate urgent medical care (e.g. heart conditions, kidney problems, severe asthma, etc.) or if you are pregnant, please discuss your participation on this expedition with your physician.
Distance from Medical Care	<p>The nearest hospital is from 22-35 kilometers (13-21 miles) away from the project site by boat (depending on base location), and it may take up to two hours to arrange transport and reach the hospital. If you have a chronic condition which could require immediate medical care (e.g., heart conditions, kidney problems, severe asthma, etc.), or if you are pregnant, please discuss your participation on this expedition with your physician.</p> <p>It is important to keep in mind that the Glover's Reef site is the more remote site, and it is not easy to get to, even in the event of an emergency.</p>



SAFETY

HEALTH INFORMATION

PROJECT VACCINATIONS

REQUIRED: If traveling from countries or regions where yellow fever is endemic, you must have a certificate of vaccination. You may need to present this certificate when you arrive in country.

EMERGENCIES IN THE FIELD

Accommodations and 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 cellphone. While in the field, the scientists will carry portable two-way radios and each will carry a cell phone for emergency communication. Volunteers will also be encouraged to bring cellphones into the field for emergency use. 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).

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

Please be sure your routine immunizations are up-to-date (for example diphtheria, pertussis, tetanus, polio, measles, mumps, rubella and varicella). Medical decisions are the responsibility of each volunteer and his or her doctor, and the following are recommendations only. Visit the Healix Travel Oracle website through the "Travel Assistance and Advice" page in your Earthwatch portal, cdc.gov or who.int for guidance on immunizations.



PROJECT STAFF

YOUR RESOURCES IN THE FIELD



EARTHWATCH SCIENTIST DR. CRISTINA EISENBERG Cristina Eisenberg is a conservation biologist and science writer who for has spent more than a decade studying wolves and their effects on whole ecosystems. She is not only the Lead Scientist at Earthwatch, but is also a Principal Investigator (<http://earthwatch.org/scientific-research/our-scientists/cristina-eisenberg>). She holds a PhD in forestry and Wildlife from Oregon State University and an MA in Conservation Biology from Prescott College. Her post-doctoral research was on how restoring two keystone forces of nature—wolves and fire—creates healthier ecosystems. A Smithsonian Research Associate and Boone and Crockett Club professional member, for four years she served as the research director on the High Lonesome Ranch. Her books for Island Press include *The Carnivore Way* and *The Wolf's Tooth*. She has authored a variety of journal articles and book chapters and is currently at work on a book about climate change and wildlife. **TEAMS 1a and 1b**



EARTHWATCH SCIENTIST DR. DAVID HIBBS' interests focus in forest community ecology and extend into the application of ecology: silviculture. He has worked in both tropical and temperate forest systems. Current research is focused on ecological processes of riparian forests, ecology of post-fire forest dynamics, and management of red alder (Hardwood Silviculture Cooperative). He has had a finger into projects on scale-effects on plant diversity controls, food webs in riparian systems, and the autecology of Willamette Valley savanna tree species.



FIELD TECHNICIAN NICK BROMEN hails from Washington State, and has worked for twelve different studies over the past six and a half years as a field biologist, studying flora and fauna from the sub-zero boreal forest to the searing desert heat and in many places in between across the intermountain west. In 2008, he earned a B.S. degree from the Evergreen State College in Olympia, Washington and out of necessity for the field, has adopted life as a vagrant gypsy biologist since. Nick has a keen affection for the topics of biogeography, evolutionary ecology, habitat connectivity, carnivore ecology, trapping eradication, human sterilization, and analog recording media. **ALL TEAMS**



FIELD TECHNICAN CHRIS ANDERSON is currently a bachelor of science student in the Wildlife Biology program at the University of Montana in Missoula. His interests lie in the terrestrial side of biology with much of his focus leaning towards trophic cascades. He is interested in predator-prey interactions of large mammals and how these relationships affect an ecosystem. He also enjoys food and wine. Before he began studying biology he worked in the restaurant industry. You could say his three loves are biology, the outdoors, and food/ wine. When not working or studying, you can find Chris exploring the mountains of Western Montana with his girlfriend Maureen and their dog Nyack. **ALL TEAMS**



FIELD TECHNICAN CORWIN SCOT hails from Springfield, Oregon, and has just received a bachelor of science from Oregon State University in Fisheries and Wildlife Science. His studies have focused on large carnivore ecology and conservation. Corwin has some experience as a wildlife tracker and a bit of experience identifying plants. He will be supporting the crew as a wilderness first responder. Corwin is fond of wolves, wilderness, and whiskey. He is very excited for his third field season in beautiful Waterton Lakes National Park. **ALL TEAMS**

NOTE: All staff schedules are subject to change.

RECOMMENDED READING

YOUR RESOURCES AT HOME



ARTICLES

- Eisenberg, C., D. E. Hibbs, W. J. Ripple, and H. Salwasser. 2014. *Context dependence of elk vigilance and wolf predation risk*. Canadian Journal of Zoology 92:727-736.
- Eisenberg, C., S. T. Seager, and D. E. Hibbs. 2013. *Wolf, elk, and aspen food web relationships: Context and complexity*. Forest Ecology and Management 299:70-80.

BOOKS

- Cristina Eisenberg. *The Carnivore Way: Coexisting with and Conserving America's Predators*
- Cristina Eisenberg. *The Wolf's Tooth: Keystone Predators, Trophic Cascades, and Biodiversity*
- Doug Peacock. *Grizzly Years*.

PROJECT-RELATED WEBSITE

- Cristina Eisenberg's website: cristinaeisenberg.com/
- Cristina Eisenberg's Huffington Post blog: huffingtonpost.com/cristina-eisenberg/

EARTHWATCH SOCIAL MEDIA

Get to know Earthwatch better at:

- FACEBOOK: facebook.com/Earthwatch
- YOUTUBE: youtube.com/earthwatchinstitute
- TWITTER: twitter.com/earthwatch_org

EMERGENCY NUMBERS

AROUND-THE-CLOCK SUPPORT

EARTHWATCH'S 24-HOUR EMERGENCY HOTLINE

Call Earthwatch's 24-hour on-call duty officer in the U.S.:

+1 (978) 461.0081

+1 (800) 776.0188 (toll-free for calls placed from within the U.S.)

After business hours, leave a message with our living answering service. State that you have an emergency and give the name of your expedition, your name, the location from which you are calling, and if possible, a phone number where you can be reached. An Earthwatch staff member will respond to your call within one hour.

TRAVEL ASSISTANCE PROVIDER: HEALIX INTERNATIONAL

+44.20.3667.8991 (collect calls and reverse charges accepted)

U.S. TOLL FREE: +1.877.759.3917

U.K. FREE PHONE: 0.800.19.5180

E-MAIL: earthwatch@healix.com

You may contact Healix International at any time. They can assist in the event of a medical or evacuation emergency or for routine medical and travel advice, such as advice on visas and vaccine requirements.

FOR VOLUNTEERS BOOKED THROUGH THE EARTHWATCH AUSTRALIA OFFICE:

Earthwatch Australia 24-Hour Emergency Helpline

+61.0.3.8508.5537

NOTES

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NOTES

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