Hazard Assessment and Control

Uncertainty of health and safety procedures is the risk facing individuals undertaking off-campus activities in high hazard areas. Training, supervision and demonstrated competencies are key to control the hazard and mitigate the potential risk.

All participants will receive and read all health and safety material during the initial training period. Field supervisor or designate will discuss and demonstrate all safety procedures. Participants will demonstrate competency with all required activities during the field trip/research. Participants will be frequently reminded and safety will be regularly discussed with the group during the project. Participants are encouraged to bring safety concerns to their immediate supervisors and opportunities will be provided for discussion with the greater group. All participants have option to contact and discuss health and safety issues with the Environmental Health and Safety office and/or Risk Management.

Physical Hazards	
Avalanche	
Risks	Injury/ Death
Potential Locations	Northern climates, Canada, Arctic
Control Measures	Training (e.g., Avalanche Skills Training , Back Country Avalanche Workshops); Check avalanche danger; Carry emergency locator beacon and recovery tools
Details	• Check Canadian Avalanche Centre's website (http://www.avalanche.ca/cac/) for avalanche bulletins and useful information.
Camp Hazards	
Risks	Various
Potential Locations	Worldwide
Control Measures	Training re: fire, safe drinking water, proper storage and cooking of food, fuel storage, fire extinguisher
Details	• Cook food thoroughly and keep perishable items cool. All fuel stored outside of tents, cabins or in exterior (box) of truck. Fire extinguishers kept readily available and all workers know locations and have been trained in their use. For drinking, cooking, teeth brushing etc. use only bottled/town water or boil/filter/treat water, dry wet cans or bottles before opening; Wipe clean surfaces with which the mouth may have direct contact; • Water containers should be cleaned with hot water and soap and rinsed with boiling water. • Hand hygiene-ALWAYS wash hands well with soap and water/hand sanitizer before handling food, eating, drinking, smoking, after using toilet facilities. • All participants will be trained in the proper hook-up of propane, white gas and open fuel appliances. • Prevent access to food by wild animals by storing it properly. • Sanitation in and around camp is paramount to good health. Keep a clean camp by establishing a latrine area over a nearby hill or ridge and set up a flag signal that tells everyone the area is occupied.

	• In winter, some snow contamination is unavoidable, but efforts should be made to keep pollutant to minimum. In a camp on the ice, soot from stoves will accelerate melting in the summer, while engine oil and fuel spills will be produce melt water ponds. All spills should be picked up and deposited in an empty fuel drum. An ice camp in particular should be kept clean from surface pollutants as this is your source of drinking water and it could become contaminated.
Camp site selection	
Risks	Various
Potential Locations	Worldwide
Control Measures	Planning / awareness; project/location –specific considerations.
Details	• The selection of campsites needs careful planning to combine safety considerations, ecological acceptability, easy access to the study area, and ready access by aircraft. Here are some suggestions – never camp in a ravine or creek bottom because a sudden shower or warm weather may release a lot of water into your campsite unexpectedly. Camping in a ravine may not only pose a water hazard, but almost certainly has the added inconvenience of poor radio or satellite telephone reception. For the best radio reception you want to be on flat land or on a hilltop. • On glaciers, check that the area is free of crevasses. The scenery may be fantastic, but never camp near the snout of a glacier, the katabatic winds will tear your tents apart. If you can do so, camp on the leeward side of a ridge out of the wind. • On sea ice, camp in a stable area on multi-year ice or on land fast ice. Always look for a source of water when you select your campsite. Organize material in your camp so that you can locate it after a snowstorm. Pile things in one location and cover them with a tarp. Poles or 2 x 4s can mark the four corners of your cache. Pile material up on empty drums if you are leaving a cache over winter. Fuel, tents, food, generators, and radios should be separated so that the breakup of camp by ice fracture will not become a disaster. • In case of an emergency evacuation of your camp, the following priorities should be followed: first, evacuate personnel, then scientific data and finally, equipment, based on value, weight and bulk. There is usually some warning for the breakup of an ice camp so that emergency procedures can be taken.
Cuts/lacerations	
Risks	Infection/ Disease
Potential Locations	Canada, North America, International
Control Measures	Standard First Aid Training
Details	• Wilderness First Aid is offered through individual departments. Please inquire within.
Danger Trees	
Risks	Injury/ Property damage
Potential Locations	Worldwide
Control Measures	Awareness; Work suspension; Personal Protective Equipment
Details	• Site survey to assess potential danger trees (signs of decay, large amounts of fungi, leaning or hung up tree trunks)

	• Ensure that campsites are always a tree length or more from any unstable tree. • Tree falling hazards increase with high winds. If winds are extreme, work may need to be suspended. • Hardhats will be worn when participants are in forest stands.
Exposure – Cold	
Risks	Frostbite/ Hypothermia/ Snow Blindness
Potential Locations	Arctic, Northern climates
Control Measures	Training; Acclimatization; Physical fitness; Limit exposure time; Take rest breaks; Wear layers of thin loose clothing; Keep clothing dry and clean
Details	• See CCOHS Cold Environment webpage (http://www.ccohs.ca/oshanswers/phys_agents/cold_working.html) • A number of thin layers of clothing, which trap air between layers, is preferable to bulky items which restrict movement and are not as heat efficient. Keep all clothing clean and dry; it is important to prevent sweating as this takes heat away from the body and freezes when activity ceases. Tight clothes restrict circulation and chills you; layered clothing allows more freedom of movement and can be adjusted to conditions to avoid overheating. Never wear waterproof clothing that will not breathe. • Suggestions from PCSP for work in the arctic a) Parka, Anorak: For winter use, you need a warm, insulated, loose-fitting parka with a hood. If you are going to work around fuels, the outer cover of the parka should be of static-free material. For summer use, an anorak or shell, over layers of clothing will be required. These outer garments should be windproof but should allow moisture to migrate outward. Brightly coloured material will help pilots to spot you. b) Boots: For extended periods of outdoor work in the winter, mukluks with inner felt liners are recommended. Spare screens and insoles should be carried. Steel-capped work boots should not be worn outdoors in the winter. Bring waterproofing with you. c) Mitts, Gloves: A windproof leather mitt over a wool glove or mitten allows freedom to work in cold weather. If you handle fuels in cold weather, dedicate a pair of mitts to that job because fuel breaks down the insulating properties of cloth and leather. If you are handling instruments, it is possible to cut off the tips of the fingers of gloves so that there is dexterity in the fingers but the rest of the hand remains warm. d) Trousers: Wind pants with liner material over any trousers, or wind pants without a liner over wool trousers are recommended for winter fieldwork. In winter, it is not advisable to tuck the pant legs into boots as snow will work into the boot top. e) Sleeping bag: A good Arctic-approved bag is required for winter operations. f) Vest: A down-filled vest is a useful garment for cool or windy days. g) Underwear: Two pairs of winter underwear, woolen or thermal, are recommended. h) Shirts, Sweaters: Wool or flannel shirts or a cotton or synthetic shirt under a wool shirt/sweater.

	i) Socks: two pairs of socks; the top layer should be a larger size than the inner pair. j) Headgear: A tremendous amount of heat is lost from head and neck areas. A hat should be worn most of the time. A windproof hat that will protect the head and ears from heat loss, and, combined with a balaclava, will protect the face and neck. The parka hood is ideal protection in strong winds. An ear-band may be useful. Hard hats may be required on some jobs. k) Extra equipment: scarf, sunglasses (that blocks UV light)
Exposure – Hot	
Risks	Heat Exposure/ Heat Stroke/ Sunburn
Potential Locations	Worldwide
Control Measures	Training; Acclimatization; Fluid Replacement; Physical fitness; Limit exposure time; Take rest breaks; Wear permeable loose-fitting clothing; Wear sunscreen
Details	• Acclimatization is a process of adaptation that involves a stepwise adjustment to heat over a week or sometimes longer. An acceptable schedule for achieving acclimatization is to limit occupational heat exposure to one-third of the work day during the first and second days, one-half of the workdays during the third and fourth days, and two-thirds of A-10 the workday during the fifth and sixth days. To achieve acclimation, a person must work in the heat at the activity level required by the job. If the risk of heat stress is increased, additional acclimatization will be required. • Always drink plenty of water when in the heat. To replace the four to eight quarts of sweat that may be produced in hot environments, people require one-half to one cup of water every 20 minutes of the workday. Slightly cool water is preferable to ice water or warm water • Physical fitness is extremely important. The rate of acclimatization is a function of how physically fit the individual is. • Schedule as many hot activities as practical for the coolest part of the day (early morning or late afternoon). • Minimize heat exposure by taking advantage of natural or mechanical ventilation (even slightly increased air velocities increase the rate of evaporation and thus the rate of heat loss from the body) and heat shields when applicable. • Take rest breaks at frequent, regular intervals, preferably in a cool environment sheltered from direct sunlight. Anyone experiencing extreme heat discomfort should rest immediately. • Generally less clothing is desirable in hot environments, except when the air temperature is greater than 35°C or a person is standing next to a radiant heat source. Then covering exposed skin is beneficial to reducing heat stress. • Heat exhaustion results from the reduction of body water content or blood volume. The condition occurs when the amount of water lost as sweat exceeds the volume of water drunk during the heat exposure. Heat exhaustion usually develops after several days of exposure to high temperatures. The victim of heat exhaustion may have some or all of the signs or symptoms: heavy sweating; clammy, flushed, or pale skin; weakness; dizziness; nausea; rapid and shallow breathing; headache; vomiting; or fainting.

	• Be aware of First-aid treatments for heat exhaustion. • Factors that may increase the risk of heat stress include sleep distress, obesity, poor physical condition, lack of acclimatization, dehydration, and alcohol use. Many commonly used drugs may also interfere with the body's response to heat stress. Preexisting medical conditions, such as cardiovascular disease, diabetes, certain skin disorders, and some diseases of the central and peripheral nervous systems, can impair people's normal physiological response to heat stress. • Personnel should wear sunscreen with an SPF15 or greater
Electrofishing	
Risks	Injury/ Death/ Animal ethics issues
Potential Locations	Worldwide
Control Measures	Training & Certification
Details	• Be aware of the policies and requirements for electrofishing at the field location.
Forest Fire	
Risks	Injury/ Death
Potential Locations	Worldwide
Control Measures	Discussion re: forest fire safety; Contact with forest duty officer; Check-in system; Smoking precautions; Develop an evacuation plan
Details	• Participants will be briefed in forest fire safety. Field supervisor will keep in frequent contact with the district forest duty officer. When the fire hazard is high, the field supervisor and/or principal investigator will check in every 2 days with appropriate provincial fire centre to determine hazard at the specific work site. Participants will be aware of evacuation procedure in case evacuation is required due to a forest fire. If a worker needs to smoke in the forest, they must smoke on a gravelled area, stay in one spot and ensure that the cigarette butt is completely extinguished with the use of water. Smoking will not be permitted if there is a fire ban in effect • In Ontario, if you discover a forest fire, you should report it by calling (toll free) 310-FIRE (3473) • Before you ride, inspect your vehicle and clear out any debris that has built up near the exhaust and under the seat. After riding through muskeg or tall grassy areas, stop and remove any potential fire starting debris. Dispose of hot debris safely by MAKING SURE IT'S OUT! Always carry a small fire extinguisher and collapsible shovel. Ensure the muffler and spark arresters on your vehicle are in good working condition.
Glacier Travel	
Risks	Injury/ Drowning
Potential Locations	Arctic, Canada, North America, International
Control Measures	Training in standard glacier travel and crevasse rescue procedures; Develop a project-specific plan
Details	• Each field party contains at least one researcher certified in Standard First Aid and CPR. The camp is equipped with a field first aid kit and each researcher is equipped with a personal first aid kit. Each field researcher has been trained in standard glacier travel and crevasse rescue procedures. On skidoo trips, field crews will always carry tent, sleeping bags, snow shovels, and spare food as well

	as an emergency locator transducer or satellite telephone and equipment required to perform a crevasse rescue. Climbing harnesses with karabiners will be worn at all times when crews are away from camp. Skidoo travel will always be in pairs, never alone. Routes are navigated by GPS and selected based on analysis of aerial photography and satellite imagery so as to avoid areas of major crevassing. While in the field, each camp is in twice daily radio contact with the base camp. National Resources Canada coordinates field logistics through the Polar Continental Shelf Program (PCSP). For further information, visit (http://www.nrcan.gc.ca/the-north/polar-continental-shelf-program/polar-shelf/10003) • Working alone will not be permitted except in the immediate vicinity of the main campsite. Field clothing appropriate to the conditions encountered on the ice cap will be worn at all times and spare clothing will be carried on all trips away from camp sites.
Hazardous sites (e.g. exploration sites, trenches, open pits, quarries, underground facilities)	
Risks	Injury
Potential Locations	Worldwide
Control Measures	Planning; Identify hazards and bring attention to participants; Hold safety briefing
Details	• The research leader will identify all hazards at these sites, and bring them to the attention of the participants • At active exploration sites, open pits, quarries, diamond drill sites, and underground facilities, the research leader will ask the site supervisors to provide a safety briefing for all participants. The research leaders and participants will be under the full supervision of the site managers and supervisors.
High Altitudes	
Risks	High Altitude Illness
Potential Locations	Mountain regions
Control Measures	Allow your body to acclimatize by gaining elevation slowly
Details	• Recognize signs & symptoms of altitude sickness a) Headache that is worse during the night and in the morning b) Nausea and potential vomiting c) Lethargy d) Waking up during the night and not sleeping well e) Feeling dizzy • Severe altitude sickness can affect your lungs and brain. When this happens, symptoms include being confused, not being able to walk straight (ataxia), feeling faint, and having blue or gray lips or fingernails. When you breathe, you may hear a sound like a paper bag being crumpled. These symptoms mean the condition is severe. It may be deadly. • Prevention: a) Climb the mountain gradually. Stop for a day or two of rest for every 2,000 feet (600 meters) above 8,000 feet (2,400 meters). b) Sleep at a lower altitude when possible c) Learn how to recognize early symptoms of high altitude illness d) If you are traveling above 9,840 feet (3,000 meters), you should carry enough oxygen for several days.

	e) Consult with your doctor before climbing to high altitudes • While climbing, drink plenty of fluids, avoid alcohol, eat regular meals, high in carbohydrates • Treatment of high altitude illness includes: a) Early diagnosis is important. b) The main treatment for all forms of mountain sickness is to climb down (descend) to a lower altitude as rapidly and safely as possible. You should not continue climbing if you develop symptoms. c) Extra oxygen should be given, if available.
Hunters	
Risks	Gunfire
Potential Locations	Canada, North America, International
Control Measures	Education; Awareness, Bright clothing during hunting season
Details	• Bright clothing (e.g. orange reflective safety vests) and bells will be worn during periods of active hunting seasons. Notify landowners (e.g., farmers) if you are on their land, especially if it is hunting season. You may also wish to notify fish and wildlife wardens in the area.
Industrial Activity	
Risks	Injury/ Falls
Potential Locations	Worldwide
Control Measures	Follow instructions of site owners/supervisors
Details	• In areas of industrial activity, such as active logging, active oil and gas exploration, or large forestry/energy equipment being used, all participants will wear hard hats and high visibility vests outside the vehicle. • No worker will leave their vehicle in areas of active industrial equipment unless they have approval from the site manager. Whenever large vehicles are encountered on roads, such as log-hauling trucks, water trucks, low bed trailers, oil tankers, etc., drivers will slow their vehicles to facilitate safe passage.
Lifting	
Risks	Musculoskeletal Injuries
Potential Locations	Worldwide
Control Measures	Awareness
Details	• Be aware of appropriate lifting and carrying techniques; Ask for assistance if load is too heavy; Training in good body mechanics
Lightning	
Risks	Getting struck by lightning
Potential Locations	Worldwide
Control Measures	Awareness, Planning
Details	• If you hear thunder, lightning is close enough to strike you. Immediately move to safe shelter: a substantial building with electricity or plumbing or an enclosed, metal-topped vehicle with windows up. Stay in safe shelter at least 30 minutes after you hear the last sound of thunder. • Immediately get off elevated areas such as hills, mountain ridges or peaks, never lie flat on the ground, never shelter under an isolated tree, never use a cliff or rocky overhang for shelter, immediately get out and away from ponds,

	lakes and other bodies of water, stay away from objects that conduct electricity (barbed wire fences, power lines, windmills, etc.) • Indoor Lightning Safety – Stay off corded phones, computers and other electrical equipment that put you in direct contact with electricity, avoid plumbing, including sinks, baths and faucets, stay away from windows and doors, and stay off porches, do not lie on concrete floors, and do not lean against concrete walls.
Remote Work/ Back Country	
Risks	Getting lost/ Stranded/ Injury in remote location
Potential Locations	Worldwide
Control Measures	Training; Carry appropriate personal and safety equipment (e.g. navigational aids, means of communication)
Details	• Always dress appropriately and carry a map, GPS and/or compass, first aid kit, extra water and food, an emergency shelter (space blanket), a means of communication (including handheld radio or satellite phone). • Learn operation of all specialized equipment and how to properly read a map of the area of the field work. • All participants must have a means of communication. Field crews will remain close together at all times while travelling to/from work sites. Prior to going into the field each day, the safety bearing will be established should one become lost. This generally is the direction that will cause you to cross a linear feature like a road or river and is where searchers will look first if trying to locate a missing team. • All workers will carry a whistle for signalling and codes for whistles will be established.
Rock Slides	
Risks	Injury/ Death
Potential Locations	Mountain regions
Control Measures	Training; Check rock slide danger; Consult park officials to see if they have more information; Carry emergency GPS locator, first aid kit and recovery tools.
Details	• Check Park bulletins to make sure that there are no rock slides in the area. If you come upon a rock slide that is underway, seek shelter well away from the slide. If rock slide appears fresh, do not continue across the path of the slide but rather wait in safe area for 24 hours until you are sure that rock slide activity has passed. • Check the park site where you are working as the National Parks post emergency bulletins and will post if a rock slide has occurred.
Roped Climbing	
Risks	Falling/ Injury
Potential Locations	Worldwide
Control Measures	Training
Details	
Ice	
Risks	Injury/ Drowning
Potential Locations	Arctic, Northern climates

Control Measures	Check sea ice conditions; Awareness (e.g. proper PPE, vehicle and equipment, ice cracks, develop emergency plan)
Details	• Prevent falls through the ice by crossing only when necessary, ensuring its proper thickness and avoiding situations such as; a) Water on the ice b) Currents and fast-moving water c) Dark patches d) Cracks e) Snow cover f) Objects protruding through the ice • Environment Canada's Ice Service provides information about sea ice (http://www.ec.gc.ca/glaces-ice/default.asp?lang=En&n=D32C361E-1) • See CCOHS Working on Ice Covered Water: Reducing Risks (http://www.ccohs.ca/newsletters/hsreport/issues/2013/01/ezine.html?id=33164&link=1#ontopic) • See the Work Safe Alberta Field Guide to Working Safely on Ice Covers (http://humanservices.alberta.ca/documents/WHS-PUB_sh011.pdf)
Slips and Falls, Foot Travel	
Risks	Injury
Potential Locations	Worldwide
Control Measures	Care and attention when walking; Awareness of hazards
Details	• Hazard awareness discussion regarding "bush whacking", that includes icy sections on trails, slippery and sloughing bar on downed trees, hidden downed wood, shrubs, whip back of branches, risk of impalement, twisting ankles, walking on uneven terrain. Watch for tripping hazards (e.g. branches, roots); Go under high barricades. All participants to wear sturdy boots/hiking boots. • Protective eyewear may be necessary to avoid injury when traversing terrain with varying densities of vegetation or when working in relatively open areas (e.g. prairie grasslands) to protect against wind-driven dust or debris.
Tree Climbing	
Risks	Injury
Potential Locations	Worldwide
Control Measures	Awareness and training in safety procedures proper technique
Details	• Climbing trees will only be done in pairs. • Safe climbing procedures will be discussed and demonstrated to the crew. • Sturdy boots and leather gloves should be worn and a climbing helmet is highly recommended. • For heights above 3 m, a full body harness and fall protection system is required. • Participants must be trained in fall prevention and harness use.
Water Hazards	
Risks	Injury/ Drowning
Potential Locations	Worldwide
Control Measures	Training; Demonstrate swimming competency (if necessary); Awareness of hypothermia; Check ice conditions
Details	• Participants will wear a personal floatation device (pfd) whenever using a canoe, boat, etc.

	• Participants will discuss preventing, recognizing, and practice treating hypothermia. • Participants will dress for the water temperature, not the air temperature. • Participants will be advised on the potential of foot and leg entrapment as well as avoiding and escaping other hazards on the river such holes and strainers.
Working Alone	
Risks	Injury/ Getting lost
Potential Locations	Worldwide
Control Measures	Awareness of procedures; Develop a communication plan
Details	• All participants will be trained in working alone procedures, including all hazards that may be encountered, appropriate communication methods and check-in procedures and emergency procedures. • All participants will wear visibility vests or carry them in an easily accessible location, such a field back pack, whenever they are working alone. • No swimming allowed when someone is alone.

Biological Hazards	
Invertebrates (e.g. Insects, Spiders, Bees, Wasps, etc.)	
Risks	Allergens
Potential Locations	Worldwide
Control Measures	Awareness of allergic individuals; Declaration of allergies; Decrease exposure; Avoid scented products
Details	• Pay attention to surroundings to avoid these insects. • People who have a history of allergy/ anaphylaxis to insect bites/stings must declare the allergy to the field supervisor and should carry (and use) an emergency kit consisting of injectable epinephrine and a chewable antihistamine. They should advise all participants of its location. Emergency assistance must be called if signs of anaphylaxis appear. • Anaphylaxis causes constriction of the airways and develops rapidly. • Any person stung must be monitored closely. • It is best practice for every field crew to have access to injectable epinephrine.
Microorganism – Clostridium tetani	
Risks	Disease/ Tetanus
Potential Locations	Worldwide
Control Measures	Awareness; Vaccination every 10 years
Details	• Consult the Pathogen Safety Data Sheet (http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/clostridium-tetani-eng.php) • Symptoms of tetanus include muscle spasms, severely progressing tightness and swelling of neck muscles.
Microorganism – Hantavirus	
Risks	Disease/ Hantavirus
Potential Locations	Worldwide
Control Measures	
Details	•

Microorganism – Yersinia pestis	
Risks	Disease/ Plague
Potential Locations	Worldwide
Control Measures	
Details	●
Microorganism – Mosquito-borne (e.g. West Nile Virus, Plasmodium)	
Risks	Disease/ West Nile/ Malaria
Potential Locations	Worldwide
Control Measures	
Details	●
Microorganism – Food and Water-borne (e.g. Campylobacter, E. coli, Giardia, Leptospira, Salmonella, Cryptosporidium, Listeria, Toxoplasma, Trichinella, Francisella tularensis)	
Risks	Disease/ Sickness/ Campylo-bacteriosis/ Leptospirosis/ Salmonellosis/ Cryptosporidiosis/ Listeriosis/ Toxoplasma/ Trichnellosis/ Tularemia
Potential Locations	Worldwide
Control Measures	Awareness; Wash hands frequently with soap and water; Do not eat meat of infected animals; Always cook food thoroughly; Never drink water from impure sources; Do not drink unpasteurized milk, Wash fruits and vegetables before consuming
Details	●
Microorganism – Soil-borne (e.g. Histoplasma)	
Risks	Disease/ Histoplasmosis
Potential Locations	Worldwide
Control Measures	Awareness;
Details	●
Microorganism – Tick-borne (e.g. Borrelia burgdorferi, Rickettsia rickettsia)	
Risks	Disease/ Lyme/ Rocky Mountain Spotted Fever
Potential Locations	Worldwide
Control Measures	
Details	●
Microorganism – Feces-borne (e.g. Echinococcus)	
Risks	Disease/ Echinococcosis (hydatid disease)
Potential Locations	Worldwide
Control Measures	
Details	●
Parasites – Tapeworms (Taenia saginata) and Roundworms (Toxocara)	
Risks	
Potential Locations	
Control Measures	
Details	●
Plants (Poisonous, Noxious, Irritant)	
Risks	
Potential Locations	
Control Measures	

Details	•
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Chemical Hazards	
Carbon Monoxide	
Risks	Injury/ Death
Potential Locations	Worldwide
Control Measures	Training
Details	• Keep areas adequately ventilated when burning fuels, including propane powered coolers and stoves.

	• Ensure that vehicle tailpipe is not blocked with snow or debris. • Symptoms of exposure can include; a) Severe headache b) Disorientation c) Agitation d) Lethargy e) Stupor f) Coma
Chemicals – General	
Risks	Injury/ Death
Potential Locations	Worldwide
Control Measures	Training
Details	• Workplace Hazardous Material Information System training is required. • Transportation of Dangerous Goods training may be required. Contact EHS. • Consult the Material Safety Data Sheet (http://carleton.ca/ehs/programs/working-lab/laboratory-health-and-safety/msds-sheets/)
Fuels (e.g. gas, propane, motor/ chainsaw oils)	
Risks	Injury/ Death
Potential Locations	Worldwide
Control Measures	Training
Details	• Consult the Material Safety Data Sheet (http://carleton.ca/ehs/programs/working-lab/laboratory-health-and-safety/msds-sheets/) • Transportation of Dangerous Goods training may be required. Contact EHS. • All containers must be properly labeled. • Emergency equipment must be available (e.g. spill kit, fire extinguisher).
Hydrogen Sulfide	
Risks	Injury/ Death
Potential Locations	Worldwide
Control Measures	Training
Details	• Consult the Material Safety Data Sheet (http://carleton.ca/ehs/programs/working-lab/laboratory-health-and-safety/msds-sheets/) • See Work Safe BC H2S bulletin (http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/hydrogen_sulfide.pdf) • Ontario's acceptable occupational exposure is 10 ppm (average over an 8 hour period) and 15 ppm (average over a 15 minute period). • If a project hazard assessment identifies the potential presence of hydrogen sulfide, a personal detector along with appropriate training is required.
Bear/ Pepper Spray	

Risks	Injury/ Death
Potential Locations	Worldwide
Control Measures	Training
Details	• Transportation of Dangerous Goods training may be required. Contact EHS. • Consult the Material Safety Data Sheet (http://carleton.ca/ehs/programs/working-lab/laboratory-health-and-safety/msds-sheets/) • Always follow the use directions provided by the manufacturer. • Try to purchase bear spray from a local store near the field site to avoid having to bring on a plane. An airtight sealed container should be used for ground transport. In the field, the spray should be carried on your person and be readily available.

Equipment Hazards	
Aircraft	
Risks	Crash/ Emergency Landing
Potential Locations	Worldwide
Control Measures	Awareness
Details	• Regulations and instructions must be followed • Wear appropriate field attire and have on hand appropriate emergency equipment • As per Canadian government regulations, an transmitter will be carried on board and standard Search and Rescue operations upon failure to check-in by the time specified in each individual flight log will be undertaken. • Training and safety briefing should be provided by the aircraft operator to the passengers
Axe	
Risks	Injury
Potential Locations	Worldwide
Control Measures	Training
Details	• Always wear required Personal Protective Equipment (e.g. gloves, steel-toed footwear, and protective eyewear). • Use only in daylight. • Use an appropriate sized axe for the job at hand. • Do not stand near someone who is using an axe.
Chainsaw	
Risks	
Potential Locations	
Control Measures	
Details	•
Firearm	
Risks	
Potential Locations	

Control Measures	
Details	•
Off-road Vehicles	
Risks	
Potential Locations	
Control Measures	
Details	•
On-road Vehicles	
Risks	
Potential Locations	
Control Measures	
Details	•
Scuba Diving	
Risks	
Potential Locations	
Control Measures	
Details	•
Sharps (e.g. needles, biopsy punches, cutting tools)	
Risks	
Potential Locations	
Control Measures	
Details	•
Watercraft	
Risks	
Potential Locations	
Control Measures	
Details	•
Winches	
Risks	
Potential Locations	
Control Measures	
Details	•

Psychosocial Hazards	
Substance Abuse	
Risks	Addiction/ Injury
Potential Locations	Worldwide
Control Measures	Awareness
Details	• Field supervisor must clearly communicate rules and regulations regarding use of alcohol at the field location and a clear prohibition of use of illegal drugs.
Human Conflict among participants	
Risks	Emotional injury/ Injury

Potential Locations	Worldwide
Control Measures	
Details	•
Risks	
Potential Locations	
Control Measures	
Details	•
Risks	
Potential Locations	
Control Measures	
Details	•