

Safety Protocol and Information for Field Research

Michigan Technological University

**College of Forest Resources and
Environmental Science**

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Adapted from “Safety Guidelines for Field Researchers”, University of Texas at Austin, with permission

Introduction

Fieldwork is a necessary part of some research at Michigan Technological University. This guide is intended to help you plan and prepare for health and safety problems you might encounter while conducting fieldwork in North America. This guide is organized into several sections. The first section covers activities that all field researchers need to do to be prepared for work in the field. The following sections address some specific hazards that may be associated with field work in North America with a description of the cause, symptoms and prevention measures. This is a tool that can be used to develop a safety plan for each field activity. All hazards are not listed here, so some additional research may need to be done to discover the specific hazards of each study location. The last section of this guide provides you with some additional resources.

General Field Safety Guidelines

The following safety guidelines are for any type of fieldwork. Since each research project is unique, the specific hazards of each needs to be addressed in a specific safety plan. For more specific information on fieldwork hazards and precautions, talk to your supervisor, CFRES Chemical Hygiene Officer, or MTU Environmental Health and Safety.

Prepare a Safety Plan

Prepare a written *Safety Plan* of your trip before you leave. Provide a copy to each member of your team and leave a copy with a responsible party. Include the following:

- (a) **Your itinerary:** Locations, arrival and departure dates, names, addresses and phone numbers of all fieldwork participants.
- (b) **Contact person:** Name and phone number of a person to contact in case of emergency- a spouse, parent or friend, as well as a campus contact.
- (c) **Activities:** General nature of activities being conducted.
- (d) **Local contacts:** Names of people at or near your fieldwork site who can reach you if necessary, as well as your check-in/check-out arrangements.
- (e) **Possible Risks:** Potentially hazardous plants, animals, terrain and weather conditions where you plan to work.

A template for a Safety Plan is below. The Safety Plan should be shared with all the members of the field research team and kept on file with the PI. Multiple trips to the same location can be covered by a single Safety Plan.

Michigan Technological University Field Research Safety Plan	
Principal Investigator: _____	Department: _____
Phone Number: _____	E-mail Address: _____
Dates of Travel: <i>(List multiple dates if more than one trip is planned)</i>	
Location of Field Research:	
Name: _____ Phone: _____	
Address or coordinates: _____	
City: _____ State: _____ Country: _____	
Nearest Hospital: _____	
Field Research: (Include a brief description of the field work.)	
Contact 1:	Contact 2:
Name: _____	Name: _____
Address: _____	Address: _____
Phone: _____ Cell: _____	Phone: _____ Cell: _____
e-mail: _____	e-mail: _____
Emergency Procedures: (Include detailed plans for field location including evacuation and emergency communication)	
First Aid Training: (List any members who are first aid trained and the type of training they have.)	
Required Training: (List all required training, e.g. chainsaw training, SOP for a specific chemical, etc.)	

Physical Demands: (List any physical demands required for this field research, e.g., Climbing, Temperature Extremes, High Altitude).

Risk Assessment: List identified risks associated with the activity or the physical environment (e.g., extreme weather, wild animals, endemic diseases, firearms, chemicals). List appropriate measures to be taken to reduce the risks

<i>Identified Risk</i>	<i>Control of Risk</i>
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Field Team Membership names and phone:

Leader: _____

Preparation for Field Work

Assemble safety provisions and check everything *before* you leave. Examples of safety provisions may include the following. This list will vary depending on the type of work you will be doing. For more specific information on the safety provisions you will need, talk to your supervisor or MTU Environmental Health and Safety. Additionally, be sure that all required specific training on field equipment or chemicals be completed and filed.

- (a) First aid kit and manual. These should be taken on every trip, and everyone should know how to use it.
- (b) Compass, map, and whistle if going to a remote location
- (c) Protective clothing (sun hat, bug jacket, etc)
- (d) Water purification tablets or filter devices
- (e) Vehicle emergency kit
- (f) Flashlight
- (g) Personal protective equipment for fieldwork activities (safety glasses/goggles, gloves, hard hat, sturdy work boots, etc.).
- (h) Copy of Field Research Safety Plan

During the Work Day

- (a) Fieldworkers should check in with their supervisor regularly, and should notify the supervisor of any changes in schedule or points of contact.
- (b) After each day's work, the fieldworkers should notify the contact when they return.
- (c) The contact(s) should be provided with the telephone numbers of people to call (group office, university contact, etc.) if the workers do not return or report in within a predetermined interval of the scheduled return time. Do not rely on cellular phones. There are still many locations without cell phone signals.
- (d) Avoid working alone. Always make sure your supervisor knows where you will be and when you will return.

Medical Care

An opportunity to receive medical attention is available to all employees. The opportunity for medical attention will be made available to employees under the following circumstances:

- (a) Whenever an employee develops signs or symptoms associated with their work,
- (b) These medical consultations and examinations shall be provided without cost to the employees, without loss of pay and at a reasonable time and place.
- (c) These medical consultations and examinations shall be administered by or under the direct supervision of a licensed physician.
- (d) If a university employee suffers a job-related injury or illness, he/she must notify his/her supervisor within 24 hours. The employee's department/supervisor must complete an incident report. If the injury is "serious" (amputation, permanent disfigurement, overnight hospital stay, fatality) notify your supervisor immediately. <http://www.mtu.edu/ehs/report/injury-form/>

Physical & Environmental Hazards

There are many general physical and environmental hazards that exist in nearly every location worldwide. All field researchers, regardless of the work location, should read through this section to learn more about some general physical and environmental hazards.

Hazard	Location	Cause	Symptoms	Prevention
Vehicle Accident	Worldwide	-Fatigue -Impaired driving -Driver error -Roadway factors -Vehicle factors	-Various trauma injuries	-Obey traffic laws -Wear your seatbelt -Don't drive impaired -Don't speed or drive recklessly
Boating Accident	Worldwide	-Lack of proper training -Fatigue -Severe weather -Alcohol impairment Dangerous/unfamiliar conditions	-Various injuries or death	-Proper training and certification by appropriate authority -Don't drive while impaired - Don't speed or drive
Slips, trips, falls	Worldwide	-Loose, irregular or slippery surface -Wrong footwear -Poor lighting -Obstruction -Improper (or lack of) use of ladders -Inattention or distraction	-Strains, fractures, bruises and contusions (head, wrist, elbow, shoulder, back, hip, knee, ankle)	-Proper "housekeeping" -Wear proper footwear -Adequate lighting -Don't carry oversized objects -Use ladders properly
Dehydration	Worldwide	Not enough water intake	-Increased thirst -Dry mouth -Flushed face -Dizziness -Headache -Weakness -Muscle Cramps -Dark urine	-Drink plenty of water (at least 2 quarts per day), more if working strenuously or in a warm climate
Impure Water	Worldwide	Harmful organisms and pathogens living in water sources	-Gastrointestinal illness -Flu-like symptoms	-Carry your own water -Treat water before use with tablets, purifiers, or by boiling for > 3 minutes
Sunburn	Worldwide	Excessive exposure to the sun	-Irritated skin, pink or red in color	-Wear long sleeved clothing and a hat -Apply SPF ≥ 30 sun block
Heat Exhaustion	Worldwide	Prolonged physical exertion in a hot environment	-Fatigue -Excessive thirst -Heavy sweating -Cool, clammy skin	-Acclimate to heat gradually -Drink plenty of liquids -Take frequent rest breaks

Hazard	Location	Cause	Symptoms	Prevention
Heat Stroke	Worldwide	Prolonged physical exertion in a hot environment	-Exhaustion -Light-headedness -Bright red warm skin	-Acclimate to heat gradually -Drink plenty of liquids -Take frequent rest breaks
Frostbite	Worldwide	Exposure to cold temperatures	-Waxy, whitish numb skin -Swelling, itching, burning, and deep pain as the skin	-Dress in layers -Wear warm clothing
Hypothermia	Worldwide	Prolonged exposure to cold temperatures	-Shivering -Numbness -Slurred speech -Excessive fatigue	-Dress in layers -Wear appropriate clothing -Avoid getting damp from perspiration
Carbon Monoxide	Worldwide	Running a vehicle or burning a fuel stove in an enclosed space	-Severe headaches -Disorientation -Agitation -Lethargy -Stupor -Coma	-Keep areas adequately ventilated when burning fuel -Ensure that vehicle tailpipe is not covered
Extreme Weather	Worldwide	Snow squalls, blizzards, heavy rains, lightning, tornadoes, hurricanes, flash floods	Severe weather can result in physical injury and/or death	-Be aware of special weather concerns -Bring appropriate equipment to deal with severe weather -Seek shelter
High Altitude Illness	Worldwide – high altitudes	Decreased oxygen intake and increased breathing rate	-Headache -Nausea -Weakness	-Allow your body to acclimatize by gaining elevation slowly
Water	Worldwide	-Currents, waves, turbulent, fast moving water -Drop-offs	-Drowning or near drowning -Injuries	-Familiarize yourself with water safety practices and techniques -Use proper gear including flotation devices -Protective footwear for wading, marsh, reef, or rocky bottom research
Hunting Season	United States	Local hunting seasons and regulations vary	-A hunting accident may result in serious injury or death	-Wear appropriately colored safety clothing -Avoid animal like behavior (e.g. hiding in thickets)
Poisonous Plants	North America	Exposure to poison ivy, poison oak, or poison sumac plants	-Itchy rash -Red, swollen skin	-Avoid contact with poisonous plants -Use pre-exposure lotion -Wash clothes and skin with soap and water after exposure

Animals

There are many general safety hazards pertaining to animals and other indigenous creatures that exist in nearly every location worldwide. All field researchers, regardless of the work location, should read through this section to learn more about some general guidelines to prevent injury from animals.

General Safety Guidelines

A number of animals and pests may be encountered in fieldwork. Follow these general guidelines to prevent injury or disease

- (a) Wear insect repellent and/or clothing designed to prevent insect bites.
- (b) Use netting to keep pests away from food and people.
- (c) Keep garbage in rodent-proof containers and stored away from your campsite or work area. Food crumbs and debris may attract insects and animals.
- (d) Thoroughly shake all clothing and bedding before use.
- (e) Do not camp or sleep near obvious animal nests or burrows.
- (f) Carefully look for pests before placing your hands, feet or body in areas where pests live or hide (wood piles, crevices, etc.).
- (g) Avoid contact with sick or dead animals.
- (h) Wear clothes made of tightly woven materials, and tuck pants into boots.
- (i) Minimize the amount of time you use lights after dark as they may attract pests and animals.
- (j) Carry a first aid kit with you on any excursion so you can treat bites or sting and seek medical attention as needed.
- (k) Be aware of the appearance and habitat of pests likely to be found, such as those described in the following pages.

Proper Rodent Handling

Steps can be taken to reduce the risk of rodent-borne diseases:

- (a) Most importantly, make the area unattractive to rodents.
- (b) Cover or repair holes into a building to prevent unwanted rodents.
- (c) If camping, keep the area clean of trash and store food carefully to prevent attracting rodents.
- (d) Don't camp near rodent burrows.
- (e) If rodent feces or dead rodents are discovered, some precautions will help reduce the risk of exposure to rodent-borne diseases when cleaning the area:

Indoors: **Do not stir up dust.** Ventilate the area by opening the doors and windows for at least 30 minutes to diffuse potentially infectious aerosolized material. Use cross-ventilation and leave the area during the airing-out period.

Dead Rodent: Using gloves, soak the rodent, droppings and nest with a solution of 1 part bleach to 9 parts water, let soak for at least 5 minutes before picking it up with a plastic bag. Place bag in a second plastic bag.

Rodent Feces: Don't sweep or vacuum rodent droppings. Spray the droppings with 1 part bleach to 9 parts water, let soak for at least 5 minutes then wipe up the droppings. If possible, wet mop the area with the bleach solution.

Animals:

Type	Location	Most Dangerous Species	What to do if encountered	Prevention
Mosquitoes	Worldwide – especially wet areas	Refer to Section IV: Diseases		<ul style="list-style-type: none"> -Use insect repellent -Don't leave standing pools of water -Use head nets, gloves and/or other clothing designed to prevent insect bites
Rodents	Worldwide		<ul style="list-style-type: none"> -Don't touch a rodent, dead or alive 	<ul style="list-style-type: none"> -Keep areas clean to avoid attracting rodents -Store food in sealed containers
Flies	Worldwide	Flies can serve as vectors for many diseases	<ul style="list-style-type: none"> -Remove insects from the area if possible -Avoid areas with heavy fly infestations 	<ul style="list-style-type: none"> -Use insect repellent -Use head nets, gloves and/or other clothing designed to prevent insect bites
Bears	North America	Black Bear (North America), Grizzly Bear (Alaska, Western Canada, Pacific Northwest), Polar Bear (Arctic)	<ul style="list-style-type: none"> -Do not run -Move slowly and speak in a low soft voice -If attacked, lay in the fetal position and protect head -Play dead 	<ul style="list-style-type: none"> -Keep food out of sleeping areas -Never approach a bear (or bear cub) -Wear a bell or other noisemaker -Stay away from the bear's food supply
Mountain Lions	North, Central, and South America		<ul style="list-style-type: none"> -Do not run, back away slowly, do not corner it - Do not play dead, look it in the eyes -Make yourself look larger (arms overhead), do not bend down -Use a loud voice -Throw sticks or rocks -Fight back -Protect your neck 	<ul style="list-style-type: none"> -Do not leave children or pets unattended -Do not feed deer -Avoid hiking, biking, jogging alone or other outdoor activities when mountain lions are most active, dawn, dusk, and at night -Avoid walking near dense growth, rock outcroppings, ledges -Always look up and behind you -Carry pepper spray
Snakes	North America, Mexico	Rattlesnakes, Cottonmouths, Coral Snakes, Moccasins, and Copperheads	<ul style="list-style-type: none"> -Back away slowly while keeping an eye on the snake -Do not make fast movements 	<ul style="list-style-type: none"> -Walk in open areas -Wear heavy boots -Use a stick to disturb the brush in front of you - Do not pick up, disturb, or corner a snake -Back away from a snake -Avoid locations where snakes may be
Spiders	North America	Black Widow and Brown Recluse	<ul style="list-style-type: none"> -If you cannot leave/avoid the area, remove the spider from the area without using hands directly 	<ul style="list-style-type: none"> -Use care around rock piles, logs, bark, gardens, outdoor privies, old buildings -Wear gloves when working outside -Shake out clothing and bedding -Do not pick up or disturb a spider -Avoid locations where spiders may be such as dark places

Type	Location	Most Dangerous Species	What to do if encountered	Prevention
Wolves	North America		<ul style="list-style-type: none"> -Do not run or turn away -If approached, act aggressively -maintain eye contact -use rocks sticks or pepper spray to discourage wolves -make a lot of noise -climb a tree 	<ul style="list-style-type: none"> -keep a clean campsite
Moose	North America		<ul style="list-style-type: none"> -back away -look for something to duck behind -run 	<ul style="list-style-type: none"> -do not feed them -avoid moose with young calves and avoid bulls during mating season
Scorpions	North America – especially Arizona, Southeast California, Utah and Mexico	All	<ul style="list-style-type: none"> -If you cannot leave/avoid the area, remove the scorpion from the area without using hands directly 	<ul style="list-style-type: none"> -Shake out clothing and bedding before use -Avoid lumber piles and old tree stumps -Wear gloves when working outside --Do not pick up or disturb a scorpion -Avoid locations where scorpions may be
Bees, Wasps, etc	North America	Bees, wasps, hornets, and yellowjackets, Africanized Killer Bees (Southeast United States)	<ul style="list-style-type: none"> - Do not swat or kill – this may elicit an attack response from other bees/wasps -Leave the area immediately and quickly -If being chased move into a closed area if possible -Cover face 	<ul style="list-style-type: none"> -Bring medication if you have an allergy (the sting may be fatal) -Keep scented foods, drinks and meats covered -Wear shoes outside - Avoid wearing bright colors, flower prints and perfume -Move slowly or stand still (don't swat at insects)
Fleas & Ticks	North America	Refer to Section IV: Diseases	<ul style="list-style-type: none"> -Brush away if not attached -If attached remove quickly -Remove from premises 	<ul style="list-style-type: none"> -Wear long clothing with tightly woven material and tuck pants into boots or wear clothing designed to prevent insect bites -Wear insect repellent -Drag cloth across campsite to check for fleas/ticks -Avoid shrubbery -Stay on widest part of path

Diseases

There are diseases caused by viruses, bacteria, fungi, and parasites in nearly every location worldwide. This guide is not intended to cover every health risk in every location, but it provides information about some more common diseases in the field. Always learn about specific health risks for the region in which you will conduct your research. General safety rules are avoid drinking water from an impure source, wash and cook your food, and wash your hands with soap and water.

Type	Location	Exposure Route	Symptoms	Prevention
<i>E. coli</i> O157:H7 and Shiga toxin-producing <i>E. coli</i> Gastroenteritis	Worldwide	Foodborne – beef, unpasteurized milk, unwashed raw vegetables, water contaminated	-Diarrhea -Gastrointestinal symptoms	-Always cook food thoroughly -Wash vegetables before consuming -Never drink water from an impure source -Wash hands with soap and water
Giardiasis		Ingestion of contaminated water, food or soil.	-Severe diarrhea -Gas -Abdominal cramps -Nausea -Dehydration	-Wash hands with soap and water -Thoroughly cook food -Treat water before drinking
Histo-plasmosis	Worldwide (especially Miss. & Ohio River Valleys)	Inhalation of fungus <i>Histoplasma capsulatum</i> from soil contaminated with bat or bird droppings	-Mild flu-like -Rarely can be acute pulmonary histoplasmosis	-Use caution when disturbing dry soils or working near bat or bird droppings -Personal protective equipment may be needed
Influenza (seasonal)	Worldwide	-Inhalation of influenza virus -Contact with birds or other animals infected with influenza	-Fever (usually high) -Headache -Extreme tiredness -Dry cough -Sore throat -Runny or stuffy nose -Muscle aches -Gastrointestinal symptoms	-Annual flu vaccination -Cover your nose and mouth with a tissue or your elbow when you cough or sneeze -Wash hands with soap and water frequently -If you are not near water, use an alcohol based hand cleaner -Try not to touch your eyes, nose, or mouth. -Stay away from people who are sick

Type	Location	Exposure Route	Symptoms	Prevention
Leptospirosis	Worldwide	Ingestion, swimming, or other activities in water contaminated with <i>Leptospira</i>	-Flu-like -Occasionally more serious symptoms	-Use care when working in the water, especially after a flooding event -Avoid entering the water with open wounds
Plague	Worldwide	Flea-borne, from rodents infected with <i>Yersinia pestis</i> to humans -Direct contact with infected tissues or fluids from sick or dead animals	-Flu-like -Non-specific -Swollen and painful lymph nodes (bubonic)	-Use care when working in areas where plague is found -Use caution when working with wild rodents
Rabies (Vaccine Available)	Worldwide	-Infection from bite of an animal (e.g., raccoons, skunks, bats, foxes, coyotes, dogs, cats) infected with the rabies virus	-Fatal (within days of the onset of symptoms) without immediate treatment -Early symptoms: fever, headache, malaise -Later symptoms: insomnia, anxiety, confusion, paralysis, hallucinations, hypersalivation, difficulty swallowing, fear of water	-Obtain a vaccine if you will be working with high rabies risk species -Use extreme caution handling these animals -Vaccinate pets -Do not handle or feed stray animals or wild mammals
Tetanus (Vaccine Available)	Worldwide	A wound that is infected with <i>Clostridium tetani</i> ; tetanus toxin is produced by the bacteria and attacks nerves	-Early symptoms: lockjaw, stiffness in the neck and abdomen, difficulty swallowing -Later symptoms: muscle spasms, seizures, nervous system disorders	-Obtain a vaccine for tetanus every 10 years or immediately following a suspect wound or injury -Once the disease starts it must run its course
Typhus Fever	Worldwide	Infection from bite of lice, fleas, ticks, or mites infected with <i>Rickettsiae</i> species	-Headache -Fever -Rash	-Use insect repellent -Wear long sleeve shirts -Tuck pants into boots
Coccidioidomycosis “Valley Fever”	North and South America semiarid regions	<i>Coccidioides</i> species fungus is inhaled when soil is disturbed	-None in most people -Flu-like (fever, cough, rash, headache, muscle aches) -Occasionally, chronic pulmonary infection or widespread disseminated infection	-Wet soil before digging -If you are immunocompromised, wear a mask when digging -Stay inside during dust storms in areas where <i>Coccidioides</i> fungus is present

Type	Location	Exposure Route	Symptoms	Prevention
St. Louis Encephalitis	North and South America	-Mosquito-borne - infection from bite of a mosquito infected with St. Louis Encephalitis virus	-Mild - fever and headache -Severe - headache, high fever, stiff neck, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and rarely death	-Use insect repellent -Many mosquitoes are most active at dusk and dawn, consider staying indoors during these hours -Wear long sleeves and pants -Avoid areas of standing water where mosquitoes breed
Lyme Disease	United States, Europe and Asia	Infection through the bite of a tick infected with <i>Borrelia burgdorferi</i> <i>Borrelia afzelii</i> or <i>Borrelia garinii</i>	-Spreading rash (“bullseye”) -Early symptoms: flu- like -Later symptoms: arthritis and neurologic problems	-Avoid tick infested areas -Wear long sleeves and pants -Use insect repellent -Check clothing and hair for ticks and remove any ticks
Rocky Mountain Spotted Fever	United States, southern Canada, Mexico, Central and South America	Infection through the bite of an infected tick <i>Rickettsia rickettsii</i>	-Sudden onset of fever -Headache -Muscle pain -Spotty rash	-Avoid tick infested areas -Wear long pants, shirts -Use a repellent -Check clothing and hair for ticks and remove any ticks
Hantavirus Pulmonary Syndrome (HPS) – Sin Nombre Virus	North America	Inhalation of dusts or aerosols from the infected rodent’s feces, urine, or saliva -Vector: Deer mouse (<i>peromyscus maniculatus</i>)	-(Early, 1-5 weeks) fatigue, fever, aches, chills, headaches, dizziness, sometimes abdominal problems -(Late, 4-10 days after early) coughing, shortness of breath	-Avoid contact with rodents, especially their feces -See section on dealing with rodent infested areas
Arenavirus (White Water Arroyo)	North America	Inhalation of dusts or aerosols from a rodent’s feces, urine, or saliva -Vector: Woodrats and other <i>Neotoma</i> species	-Fever -Headache -Muscle aches -Severe respiratory distress (occasionally)	-Avoid contact with rodents, especially their feces -See section on dealing with rodent infested areas
West Nile Virus	North America	-Mosquito-borne - Infection from the bite of a mosquito infected with West Nile Virus -Handling infected birds	-None in most people -Mild - fever, headache, body aches, nausea, vomiting, and sometimes swollen glands or a rash -Severe - high fever, stiff neck, stupor, muscle weakness, coma, disorientation, tremors, convulsions, vision loss, numbness, paralysis	-Use insect repellent -Many mosquitoes are most active at dusk and dawn, consider staying indoors during these hours -Wear long sleeves and pants -Avoid areas of standing water where mosquitoes breed -Don’t handle dead birds with your bare hands

Resources

There are many resources available that may provide more in depth information regarding your research environment. Please use the references in this section for further information on many of the topics discussed.

Environmental Health and Safety:

906-487-2118

<http://www.mtu.edu/ehs/>

Public Safety and Police Services:

906-487-2216 or 911

<http://www.mtu.edu/publicsafety/>

First Aid/CPR Training: First Aid and CPR training are available from a number of locations

General: The Centers for Disease Control and Prevention (CDC) offers a website that describes many topics related to travel, both domestic and international:

<http://www.cdc.gov/travel/default.aspx>

Weather: More information on extreme weather and how to protect yourself can be found from the National Weather Service.

<http://weather.gov/safety.html>

Impure Water: The CDC provides information waterborne diseases.

<http://www.cdc.gov/healthywater/>

Diseases: The CDC offers more detailed information about many diseases related to travel on their website: <http://www.cdc.gov/travel/content/Diseases.aspx>

General Outdoor Safety: For more information on outdoor and recreational safety. 800-832-1355 <http://www.fs.fed.us/safety/outdoor/>

Hantavirus: The CDC has detailed information about hantavirus.

http://www.cdc.gov/ncidod/diseases/hanta/hps/noframes/genera_linfoindex.htm

Lyme Disease: The American Lyme Disease Foundation provides information about the disease. <http://www.aldf.com>

Powassan Virus: The CDC has detailed information about the Powassan virus. <https://www.cdc.gov/powassan/>