epiGeneral Local (Maine, New England, etc.) Fieldwork Safety Training

Instructions for this training guide:

You should download and print this training guide to review it. At the end of this document is a 10-question exam to which you should pass with 80% accuracy. When completed, sign and date the exam and provide a copy of the test pages to your supervisor. This will serve as your record of completion.

General Local (Maine, New England, etc.) Fieldwork Safety Training

Introduction

This training module (also available in its entirety on the Safety Management Training webpage and is based on the UMS Fieldwork Safety Program. It is designed to cover many types of hazards that one may encounter in the field in the local area (Maine, New England). However, this training is only a basic awareness training course and does not completely cover all of your training. The Team Leader is required to ensure that training is conducted on appropriate hazards as addressed in the Fieldwork Hazard Assessment / Safety Plan (located on the Safety Management documents webpage on the UMS MyCampus Portal.

For fieldwork occurring outside the local area: The Team Leader must ensure that all team members have reviewed the relevant topics that may pertain to their research/fieldwork.

Planning a Safe Trip / Emergency Preparedness

One of the most important phases of the fieldwork experience is planning and preparing for the trip. Several issues must be considered prior to and during these operations. These issues include completion of a hazard assessment, notifying your designated contact person if you plan to perform in solitary fieldwork, establishment of appropriate or adequate communication systems or procedures, and procurement and assembly of necessary equipment and supplies.

Hazard Assessment

Prior to beginning the fieldwork, a hazard assessment should be completed to evaluate the potential hazards associated with the project. Information that you obtain from this assessment should assist you in determining the appropriate equipment and training required for the fieldwork.

Solitary Fieldwork

Solitary fieldwork is strongly discouraged, particularly those involving remote or hazardous locations, high-risk activities, or other unique conditions. In situations where solitary work is deemed necessary and unavoidable, a stringent code of practice must be established to address worker safety.

Principal Investigators or Faculty Members are required to notify their designated contact person (i.e. spouse, coworker, etc.) prior to leaving and upon safely arriving

back to campus. The designated contact person should know the location of the fieldwork site, what route(s) will be taken to and from the site, and when the Principal Investigator or Faculty Member is due back. A list of designated contacts will be kept by the Department Chair or School Director and shall be readily accessible in case of an emergency.

Technicians and Students are required to notify their Principal Investigator or Faculty Member with the same information prior to leaving campus. They are also required to check-in upon safely arriving back to campus. In addition, any individual performing solitary fieldwork is required to have a communication device on their person at all times.

Communication

Communication systems, such as radio or cellular phone, must be appropriate for a specific operation and location. For example, a cellular telephone may not be an adequate or appropriate form of communication if there is a lack of range or repeater towers in the area of operation.

Once a form of communication has been selected, all personnel involved in the operation must be trained on the operations of the communication device.

The Principal Investigator shall obtain the local emergency phone numbers prior to performing the fieldwork. Usually, 911 will reach emergency services in most parts of Maine. However, some locations still do not have 911 service. In that case, locate the local emergency telephone numbers in the local phone book.

Procurement and Assembly of Necessary Equipment


Necessary equipment, not just for the completion of a specific operation, but for safety and emergencies, should be chosen for need and appropriateness to the task and environment. This equipment should become apparent after the risk assessment is performed. The safety equipment may include, but are not limited to the following:

- First aid kit and manual
- Allergy/Epi Pen or other prescribed medications
- Sharps container
- Insect repellent
- Extra pair of eyeglasses
- Cold or hot weather gear
- Navigational tools (maps, compass, GPS, etc.)
- Water purification tablets or filter devices
- Personal Protective Equipment
- Sunscreen and hat
- Electrically rated gloves
- Flashlight/headlamp with extra batteries
- Extra food and water
- Soap / antibacterial
- Communication devices
- Spare tire (maybe two)
- Automobile jack
- Road flares
- Batteries
- Driver's license
- Fire extinguisher
- Multi-tool

Injury Reporting

Unfortunately, sometimes injuries happen while you're conducting fieldwork. If you do sustain an injury during fieldwork, it must be reported to the University within 24 hours of occurrence. Notify your Team Leader, who will in turn submit the injury report to the University Risk Management. Note: Injuries and illnesses that require hospitalization and/or deaths must be reported immediately to the Fieldwork Chain of Command and the UMS Risk Manager.

Field Hazards

A variety of field hazards can be encountered while in the field. The following recommendations and practices are provided as general guidelines to minimize or eliminate exposure and adverse health problems.

Bees and Wasps

Bees, wasps, hornets and yellow jackets may be attracted to scented materials (body fragrances, perfumes, lotions, deodorants, and scented soaps) and food. These insects can inflict stings that can cause serious or fatal allergic reactions in some people. This is the most frequent cause of serious medical problems among field workers, after trauma, e.g., falls and vehicular accidents. If there are known or suspected allergies to these insects, a physician should be consulted to determine if special precautions should be taken.

Ticks

There are over 13 different species of ticks found in Maine. However, the Deer Tick also known as the "black-legged tick", is the principal vector of the Lyme disease spirochete in the northeastern United States. Lyme disease is an illness caused by a corkscrew-shaped bacterium called a spirochete that is transmitted to humans, dogs, horses, and other animals by tick bites. Frequently starting with a rash and flu-like symptoms, Lyme disease, if untreated, may progress to cause arthritis and neurological problems. The first symptom of Lyme disease in humans is usually an expanding, bull's-eye like, red rash at the site of the tick bite, which may occur within a few days or several weeks later. The rash may be preceded or accompanied by flu-like symptoms such as fever, headache, chills, nausea, facial paralysis, or pain in the muscles and joints. If Lyme disease is suspected, call your doctor immediately.

Early antibiotic treatment is very effective and can prevent later, more serious complications. Not all patients develop the rash, however, and many do not recall a tick bite.

By far, the best way to avoid the misery of Lyme disease is to be aware of the risk of tick bites and to act accordingly. The good news is that deer ticks usually do not transmit Lyme bacteria until they have been attached for at least 24 hours — up to 48 hours for adult ticks

Diagnosed in its early stages, Lyme disease is easily and effectively treated with oral antibiotics. The bad news is that if unrecognized and untreated, it may progress to cause arthritis and neurological problems for which treatment is more difficult. If you discover a tick attached to your body, the Maine Medical Center Research Institute has established a program that will identify ticks at free of charge.

Precautions to Avoid Tick Bites

- Tuck your pant legs into your socks and your shirt into your pants when walking in woods, brush, or tall grass.
- Deer ticks attach to clothing and then walk upward.
- Wear light-colored clothing so ticks may be seen more easily.
- Use a repellent containing DEET according to label directions -- particularly on shoes, socks, and pant legs. Avoid applying high-concentration products to the skin, especially on children.
- People who must be in areas where ticks are prevalent may pretreat protective clothing with a permethrin-containing product which both repels and kills ticks. Caution: this is not for use on skin; use only as directed on the label.
- Inspect yourself, your clothing, your children, your companion, and your pets for ticks when you get in from the field. Ticks often attach in body folds, behind ears and in the hair. If possible, shower and wash clothes immediately. Heat drying is effective in killing ticks.

For more information about ticks, please visit:

- UMaine Cooperative Extension webpage about ticks.
- Maine Medical Center Research Institute

Snakes

According to the United State Food and Drug Administration, there are only three states in the United States that do not have poisonous snakes. Luckily, Maine is one of the three (Alaska and Hawaii). However, if you are bitten by a snake, you should have it looked at by a medical professional.

Bears

According to Maine Department of Inland Fisheries & Wildlife, the current estimate of black bears in Maine is between 24,000 and 36,000 bears. Maine bear range covers about 86% of the State's land area, with bears present in all but the heavily settled southern and central-coastal portions of Maine.

Here are some helpful tips if you encounter a Maine Black Bear:

- Remember bears are unpredictable, so avoid confrontations at all costs.
- Do not run from a bear! This may trigger a chase response. Black bears can run over 30 mph.
- Identify yourself. Let the bear know you are human. Talk to the bear in a normal voice. Wave your arms. Help the bear recognize you. If a bear cannot tell what you are, it may come closer or stand on its hind legs to get a better look or smell. A standing bear is usually curious, not threatening. You may try to back away slowly diagonally, but if the bear follows, stop and hold your ground.
- If a bear actually makes contact, surrender! Fall to the ground and play dead. Lie flat on your stomach, or curl up in a ball with your hands behind your neck. Typically, a bear will break off its attack once it feels the threat has been eliminated. Remain motionless for as long as possible. If you move, and the bear sees or hears you, it may return and renew its attack. In rare instances, particularly with black bears, an attacking bear may perceive a person as food. If the bear continues biting you long after you assume a defensive posture, it likely is a predatory attack. Fight back vigorously.

Moose

According to state wildlife biologists, Moose are not normally aggressive, however, they can be very aggressive in fall during rut or in winter when they are hungry, tired of walking in deep snow, or harassed by people, dogs, and traffic. Here are some helpful tips if you encounter a moose:

- Attempt to avoid the moose if possible.
- Never get between a cow and her calf.
- Try to get behind a tree if a moose charges. You can run around the tree better than it can.

- Remember, if you see its ears laid back and/or the hair on its "hump" stand up, it's angry or afraid and may charge.
- Moose can kick with their front legs as well as their back.

Rabies

Rabies is a viral disease of the central nervous system (brain and spinal cord) that is almost always fatal. Rabies in humans is very rare in the United States, but rabies in animals, especially wildlife, is common in some parts of the country. The rabies virus lives in the saliva (spit), brain, and spinal cord tissue of animals and is spread when they bite or scratch. The virus can also be spread if saliva or nerve tissue touches broken skin or a mucous membrane in the mouth, nose, or eye.

The rabies virus can infect any mammal, but infection is most common among bats, skunks, fox, and raccoons. Rabies is very rare among rodents (squirrels, rats, mice, and chipmunks). Thanks to vaccines, rabies is extremely rare among pets and farm animals.

If you think you have been exposed to a rabid animal, follow these steps:

- Immediately wash the wound with soap and water, and continue washing for at least 10 minutes.
- Seek medical attention immediately.
- Contact your town office or local law enforcement agency.

Plants

Poison Ivy (left photo), Poison Oak (center photo) and Poison Sumac (right photo)

Click here to go to the Poison Ivy, Oak, and Sumac information center website.

There are varieties of poisonous plants that can cause adverse reactions when contacted or ingested. To prevent contact exposure, learn to recognize and avoid poisonous plants. Wearing long pants and long-sleeved shirts to eliminate or minimize

potential exposures. If you come in contact with a poisonous plant, carefully remove contaminated clothing and thoroughly wash the affected skin with soap and water as soon as possible. You may need to seek medical attention for extreme exposures.

Vector-Borne Field Hazards

Vectors are mosquitoes, ticks, fleas, etc., that spread pathogens.

https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/index.shtml

West Nile Virus

West Nile Virus (WNV) is a disease that can lead to an infection called encephalitis (swelling of the brain). West Nile virus is commonly found in Africa, West and Central Asia, and the Middle East. It is not known how the virus was first introduced into the United States, but since the initial appearance (New York City, Summer of 1999) it has spread rapidly, and since then, it was found throughout the eastern half of the country, including Maine - where several birds were found with the virus, although no humans were affected.

Resources:

- Click on the link to go to the Maine Center for Disease Control & Prevention for information about West Nile Virus for the latest data on the Maine positive West Nile Virus counts for human, bird, horse, and mosquitoes.
- Recommendations for Protecting Laboratory, Field, and Clinical Workers from West Nile Virus Exposure (pdf)
- For updates on the geographic range of West Nile Virus, the number of human cases, and other current information are available on the Centers for Disease Control and Prevention (CDC) West Nile Virus Home Page

What are the symptoms of West Nile Virus infection?

Most people who are infected with West Nile virus will not develop symptoms. Some people may become ill 3 to 15 days after the bite of an infected mosquito. Evidence suggests that a minority of infected persons will develop a mild illness with fever, headache, body aches, and sometimes skin rash and swollen glands. According to the Centers for Disease control (Mother to Baby during Pregnancy, Delivery, or Breast Feeding webpage), the risk appears to be very low that a woman who is infected with West Nile virus during pregnancy will transmit the virus to her fetus or newborn.

West Nile virus infection infrequently results in a severe illness, however, known as West Nile encephalitis. Encephalitis is an inflammation of the brain that may be marked

by headache, high fever, stiff neck, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. A small number of cases have been fatal.

Who is at risk for West Nile virus infection?

People are only at risk for becoming infected with West Nile virus when in areas where the virus is circulating in nature. In northern states, this is during the summer months, but in southern states transmission may occur year-round. The risk of West Nile encephalitis (the severe form of disease) is higher for persons 50 years of age and older.

Even in areas where West Nile virus transmission is occurring, infection of humans is still relatively rare. As noted earlier, most infected persons have no or only mild symptoms. There is no documented evidence that a pregnancy is at risk due to a mother's infection with West Nile virus.

How is West Nile virus infection treated?

No specific therapy is available for infection with West Nile virus. In the case of West Nile encephalitis, intensive supportive therapy may be required–such as hospitalization, intravenous fluids, respiratory support (ventilator), prevention of secondary infections (such as pneumonia, urinary tract infections, etc.) and good nursing care. Persons with severe or unusual headaches should seek medical attention as soon as possible.

What can we do to prevent West Nile infection?

Personal and Household Prevention to avoid mosquito bites

- Apply insect repellent to exposed skin when you go outdoors. The most effective repellents contain DEET (chemical name, N,N-diethyl-m-toluamide). The more DEET a repellent contains, the longer time it gives protection from mosquito bites. DEET concentrations higher than 50% do not increase the length of protection.
- Use care in applying repellent to children: don't put repellent on their hands, and be careful to avoid their mouths and eyes. Products containing 10% or less DEET are the most appropriate for children aged 2 - 12 years.
- Whenever possible, wear protective clothing such as long sleeves, long pants, and socks while outdoors.
- Spray clothing with repellents containing DEET or permethrin, because mosquitoes may bite through thin clothing.
- Consider staying indoors between dusk and dawn, which is peak mosquito biting time. Avoid activities in areas where mosquitoes are plentiful.

How is West Nile virus transmitted?

The principal transmission cycle of West Nile virus involves several species of mosquitoes and various species of birds. Most mosquito bites do not lead to WNV because very few mosquitoes are infected. Mosquitoes become infected with West Nile virus when they feed on a bird carrying the virus in its blood. After 10 to 14 days, the virus can be transmitted to another bird, person, or other animal that the mosquito bites.

During blood feeding the mosquito injects the virus, contained in its saliva, into the bird, animal, or person where the virus replicates and may cause illness.

Although humans and some other animals may get sick when infected with West Nile virus, it is thought that they usually do not develop enough virus in the bloodstream to infect mosquitoes. For this reason, humans and animals such as horses are referred to as incidental hosts. West Nile virus is not spread from person to person.

Eastern Equine Encephalitis

Eastern Equine Encephalitis (EEE) is a disease that can lead to an infection called encephalitis (swelling of the brain). It is a rare disease known in the U.S. primarily on the eastern and gulf states. Prevention methods are the same as for West Nile Virus.

Resources:

- Updates on the geographic range of Eastern Equine Encephalitis (EEE), the number of human cases, and other current information are available on the Centers for Disease Control EEE webpage.

Brown Tail Moth

Other hazards in the outdoor environment include the Brown Tail Moth that is a human health hazard according to the Maine Center for Disease Control and Prevention. Participants in fieldwork activities should always check the website for infectious disease reports and prevention.

https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/index.shtml

Aquatic / Marine Hazards

The following policies and procedures apply to field operations conducted on both inland and coastal bodies of water (ponds, lakes, rivers, streams, bays, open-ocean, etc.).

Watercraft Operations

All persons engaged in watercraft operations (motorized or non-motorized) form the University of Maine or any of its remote sites must meet the requirements of the UMaine Watercraft Operations Policy. The basic elements of this policy include:

- Designation of a Boating Safety Coordinator or other responsible person (i.e. Primary Investigator, Supervisor, Dept. Chair/ Director).
- Responsibility of vessel operator to ensure the safety of the vessel and all persons on board.
- Boat safety training for all vessel operators, specific to the type of vessel and operating environment.
- Required use of appropriate Personal Floatation Devices (PFD).

- Float plan established with designated contact persons on shore.

Snorkeling

All persons engaged in snorkeling activities from the University of Maine or any of its remote sites are encouraged to adhere to the following guidelines:

- Objectively evaluate your level of personal fitness and swimming/ snorkeling ability.
- Evaluate any specific hazards associated with the area of operation.
- Use of the buddy system is recommended.
- Training in appropriate rescue and self-rescue skills is recommended.
- Personal floatation devices are recommended.
- Appropriate exposure protection is recommend.
- Monitor local weather and marine forecasts and be aware of changing conditions.
- Be aware of and monitor vessel traffic.
- High contract apparel, signaling devices, and shorefront spotters are recommended to provide maximum visibility of persons in the water.
- A cutting device or tool is recommended.
- Follow all local regulations pertaining to the area of operation.

Free-Diving/ Breath-hold Diving

If free-diving is to be conducted in conjunction with snorkeling, the Dive Operations Manager/Dive Safety Officer (DSO) must be consulted. The DSO phone: 207-563-8273 or email:crigaud@maine.edu.

Free-diving or breath-hold diving is a potentially hazardous activity which can result in serious injury or death! Repetitive free-diving and/or excessive hyperventilation can cause physiological oxygen deficiencies resulting in a condition known as ‘shallow-water blackout’. Shallow-water blackout occurs when oxygen concentrations fall below the level required to maintain consciousness. As a breath-hold diver ascends and oxygen concentrations drop, they may become unconscious. If support personnel are not properly trained and equipped to handle the situation, the diver will likely drown.

Scuba Diving

All persons using scuba diving in conjunction with any scientific, academic, or work-related activity associated with The University of Maine or any of its remote sites must contact the UMaine Dive Safety Officer (DSO) well in advance of beginning any diving operations. The University of Maine is a member of the American Academy of Underwater Sciences (AAUS) and follows AAUS guidelines for the conduct of diving operations. Basic elements of the UMaine Scientific Diving Program include: administrative documentation for all divers including but not limited to: medical exams, certification credentials, documentation of experience, equipment inspections.

Training beyond entry-level including but not limited to:

- CPR, First Aid, Oxygen Administration, Rescue Diver, Diving Physics/Physiology, Underwater Sampling Methods.
- DSO evaluation of diver ability, skills, and experience.
- DSO authorization of all diving operations.

Click here to go to the UMaine Scientific Diving website. For more information, please contact the UMaine Dive Operations Manager/Dive Safety Officer, Chris Rigaud, at 207-563-8273 or email crigaud@maine.edu.

Lightning

Lightning can injure or kill in three ways, direct strikes, side flashes, and ground potentials. Generally, direct strikes occur when the individual is the highest object or best pathway between air and ground. It is often fatal. Side flashes are described as a portion of the energy passing through a nearby object jumps sideways and passes through the victim. Due to the high energy passing through the primary pathway, the victim may or may not be a better conductor than the primary pathway – for example:

- Side flashes often occur when lightning is moving through a building's plumbing system or wiring. You can be standing in the basement of a building and be struck by lightning! In the outdoors, side flashes can occur when lightning travels through a tree trunk or fence. When a group of people standing together is struck by lightning, the tallest individual is often killed by a direct strike, and shorter individuals injured by side flashes.
- Ground potentials occur when lightning strikes an object, powerful electrical potentials (voltage gradients) are established in the surrounding ground (or ice, water, etc.). This electrical current can be as many as thousands of volts per lineal foot. Ground potentials can extend tens to hundreds of feet from the struck object. Animals standing in a pasture near a tree that are struck by lightning are often killed by the ground potential between their front and rear legs.

Lightning Safety

If you hear thunder or see lightning in the distance stop work immediately and seek appropriate shelter. Lightning can strike under a clear sky several miles ahead of an approaching storm. Most strikes that cause injury or death occur before the storm is overhead, even under a clear sky! Storms can travel at 45+ mph, and may follow unpredictable paths. Plan fieldwork to avoid being caught in an electrical storm. If the potential exists for thunderstorms, work in close proximity to vehicles.

The best shelter is a large, sturdy building. Small buildings or open-sided structures in the open are usually poor choices unless protected with a lightning grounding system. Always stay clear of windows. The center of a room offers the smallest probability of side flashes. A hard-topped vehicle with windows rolled up is often the best field shelter available. Avoid contact with metal components. If caught in a storm in the forest, the best protection is offered by thick growth of relatively small trees (compared to average canopy height). In open terrain: avoid trees, choose the lowest point of ground, such as a ditch or depression. However, avoid standing water, which can transmit ground potentials farther.

Should you perform the lightning crouch?

The National Weather Service (NWS) stopped recommending the crouch in 2008. Why? The crouch simply doesn't provide a significant level of protection. Whether you're standing or in the crouch position, if a lightning channel approaches from directly overhead (or very nearly so), you're very likely to be struck and either killed or injured by the lightning strike. Additionally, according to the NWS, the crouch gives people the false impression that crouching will provide safety. Even to promote the crouch as a last resort when a person's hair stands on end gives people the impression that they will get a warning sign or that there is something that they can do in that situation which would

prevent them from being struck. These beliefs could cause people to become apathetic and not seek a safe shelter before the lightning threat becomes significant.

For more information about lightning safety, please visit the National Weather Service Lightning Safety webpage.

Confined Spaces

Confined spaces are locations which populate field sites throughout Maine and elsewhere. The definition of a confined space can be found in 29 CFR 1910 Subpart J. Confined space regulations are considered one of “the big three” which include some of top-most-cited and most dangerous scenarios that an employee can be put into. To understand what a confined space is when you’re evaluating your locale, take a look at the three criteria below:

A confined space is defined as a space which includes all of the following criteria:

- Limited means of entry/exit; and
- Is large enough for bodily entry and to perform work; and
- Is not designed for human occupancy. (most field work locations are not “designed’ for occupancy)

Examples of Potential Confined Spaces in Fieldwork

Caves, animal burrows/dens, excavations, archaeological digs, fissures, sections of structures, sections of vessels, manholes, yokes of radars, crawl spaces, and crevasses are just some examples of potential confined spaces.

Any of the examples above have the potential to become hazardous depending upon the physical conditions of the space and the work to be performed.

If you think you meet the three criteria above, please contact Safety Management to discuss the space, potential additional training (third party) and examples of unforeseen hazards that are somewhat (but not entirely) covered below.

Examples of Unforeseen Confined Space Hazards

- Hazardous atmospheres – Decaying material may generate sulfides, CO2 buildup or reduced oxygen levels below 19.5%, use of CO (carbon monoxide) generating equipment nearby or within the confined space, use of solvents near or within the confined space, animal feces, fungal spores
- Engulfment – Cave-ins, side wall collapses, mud slides, water level changes in the space

- Entrapment – Narrow constricted passages in caves or dens particularly at the end of downward slopes
- Other safety/health hazards – Rabies exposure (bats), psittacosis (bird feces), and impalement hazards.

Confined Space Safety Basics

- Provide safe means for entry/exit into space
- Direct and immediate means of communication/rescue external to the space
- Test and monitor atmosphere
- Limit/prohibit activities that generate hazardous atmospheres (welding, blasting, etc.)
- Immediately leave the space if hazardous conditions are detected

Cave Safety

- Do not exceed your level of training (horizontal cave entry, rope-access in caves, vertical cave entry)
- DO NOT use ropes to access the space unless you have been trained in the proper use
- Do not cave alone
- Communicate your plans
- Carry minimum three lights with fresh batteries (hands free preferably)
- Do not cave in rainy weather as caves water levels may change unexpectedly
- Leave if you experience shortness of breath, dizziness, headache, nausea, or burning in the throat or lungs as this may be signs of hazardous atmosphere
- Dress appropriately as caves may be damp
- Always wear a helmet with chin strap fastened.

Confined Space Summary

Determining whether your fieldwork will involve confined spaces can be confusing. Hazardous confined spaces, if not properly identified and managed, can lead to fatalities. The guidance above is to assist you in understanding what a confined space is, what types of hazards may be present, and when they may be present. If you feel that your work may involve a confined space contact SM at 581-4055 for assistance in evaluating the risks.

Cold Weather Exposure

Workers who must brave the outdoor conditions face the occupational hazard of exposure to the cold. Prolonged exposure to freezing temperatures can result in health problems as serious as trench foot, frostbite, and hypothermia. Workers in such industries as construction, commercial fishing and agriculture need to be especially mindful of the weather, its effects on the body, proper prevention techniques, and treatment of cold-related disorders.

Preventing Cold-Related Disorders

- **Wear a Minimum of Three Layers of Clothing**
  - An outer layer to break the wind and allow some ventilations (Gore-Tex® or Nylon)
  - A middle layer of wool or synthetic fabric to absorb perspiration and retain insulation in a damp environment. Down is a useful lightweight insulator, but ineffective once it becomes wet.
  - An inner layer of cotton or synthetic weave to allow ventilation.
- **Pay special attention to feet, hands, face, and head** – Footgear should be insulated to protect against cold and dampness. Avoid safety boots/shoes with steel toes or shanks.
- **Avoid exertion** – Cold weather puts an extra strain on the heart. If you have heart disease or high blood pressure, follow your doctor's advice about shoveling snow or performing other hard work in the cold. Otherwise, if you have to do heavy outdoor chores, dress warmly and work slowly. Remember, your body is already working hard just to stay warm, so don't overdo it.
- **Select the warmest part of the day** – Reduce the amount of activities performed outside. When employees must brave the cold, select the warmest hours of the day (10:00 am – 2:00 pm).

- **Remain hydrated** – Fluid replacement is important while working in cold temperatures, because significant dehydration can occur. In addition, employees should be encouraged to eat a normal, well balanced diet.
- **Take breaks** – Set up a work-rest cycle for employees working outside in cold temperatures.

Hypothermia

When exposed to cold temperatures, your body begins to lose heat faster than it can be produced. Prolonged exposure to cold will eventually use up your body's stored energy. The result is hypothermia, or abnormally low body temperature. Body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and won't be able to do anything about it.

Hypothermia is most likely at very cold temperatures, but can occur even at cool temperatures (above 40°F) if a person becomes chilled from rain, sweat, or submersion in cold water.

Victims of hypothermia are most often (1) elderly people with inadequate food, clothing, or heating; (2) babies sleeping in cold bedrooms; and (3) people who remain outdoors for long periods -- the homeless, hikers, hunters, etc.

Recognizing the Warnings Signs of Hypothermia

- shivering / exhaustion
- confusion / fumbling hands
- memory loss / slurred speech
- drowsiness
- glassy look in their eyes

What to Do

If you notice any of these signs, take the person's temperature. If it is below 95°, the situation is an emergency – call 911 (or your local emergency number)!

- Get the victim into a warm room or shelter.
- If the victim has on any wet clothing, remove it.
- Warm the center of the body first -- chest, neck, head, and groin -- using an electric blanket, if available. Or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets.
- Warm beverages can help increase the body temperature, but do not give alcoholic beverages. Do not try to give beverages to an unconscious person.

- After body temperature has increased, keep the person dry and wrapped in a warm blanket, including the head and neck.

Frostbite

Frostbite is an injury to the body that is caused by freezing. Frostbite causes a loss of feeling and color in affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage the body, and severe cases can lead to amputation. The risk of frostbite is increased in people with reduced blood circulation and among people who are not dressed properly for extremely cold temperatures.

Recognizing Frostbite

At the first signs of redness or pain in any skin area, get out of the cold or protect any exposed skin – frostbite may be beginning. Any of the following signs may indicate frostbite:

- a white or grayish-yellow skin area
- skin that feels unusually firm or waxy
- numbness

A victim is often unaware of frostbite until someone else points it out because the frozen tissues are numb.

What to Do

- If you detect symptoms of frostbite, call 911 (or your local emergency number)!
- Get into a warm room as soon as possible.
- Unless absolutely necessary, do not walk on frostbitten feet or toes – this increases the damage.
- Immerse the affected area in warm -- not hot -- water (the temperature should be comfortable to the touch for unaffected parts of the body).
- Do not rub the frostbitten area with snow or massage it at all. This can cause more damage.
- Don't use a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming. Affected areas are numb and can be easily burned.

These procedures are not substitutes for proper medical care. Hypothermia is a medical emergency and frostbite should be evaluated by a health care provider. It is a good idea to take a first aid and emergency resuscitation (CPR) course to prepare for cold-weather health problems. Knowing what to do is an important part of protecting your health and the health of others.

Heat Exposure

As temperatures rise, so can problems related to heat. As outdoor workers, we need to be aware of how serious heat related illnesses can be and how to avoid them. If the body does not rid itself of excess heat fast enough, it cooks the brain and other vital organs. Heat stroke is often fatal, and those who survive may have permanent damage to their vital organs.

Preventing Heat-Related Disorders

Acclimatization (to heat)

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 workday during the third and fourth days, and two-thirds of the workday during the fifth and sixth days. The acclimatization procedure must be repeated after days off due to illness or a vacation of one week or more. 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.

Fluid Replacement

Always drink plenty of water when in the heat. Simply relying on feeling thirsty will not ensure adequate hydration. 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. Water at 55°F is preferable to ice water or warm water. Do not drink ice water quickly.

Physical Fitness

Physical fitness is extremely important. The rate of acclimatization is a function of how physically fit the individual is. The unfit worker takes longer to acclimate than one who is fit.

Limit Exposure Time

Schedule as many hot activities as practical for the coolest part of the day (early morning or late afternoon). Employ additional help or increase mechanical assistance if possible.

Minimize Heat Exposure

Minimize heat exposure by taking advantage of natural or mechanical ventilation (increased air velocities up to 5 mph increase the rate of evaporation and thus the rate of heat loss from the body) and heat shields when applicable.

Take Rest Breaks

Take rest breaks at frequent, regular intervals, preferably in a cool environment sheltered from direct sunlight. Anyone experiencing extreme heat discomfort should rest immediately.

Wear Permeable, Loose Fitting Clothing

Generally less clothing is desirable in hot environments, except when the air temperature is greater than 95 degrees Fahrenheit or a person is standing next to a radiant heat source. Then covering exposed skin is beneficial to reducing heat stress.

Heat Exhaustion

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 consumed 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.

First-aid treatments for heat exhaustion consist of the following:

- Call 911 (or your local emergency number), especially if victims faint or vomit.
- Move the victims to a cool area.
- Place them on their backs with their feet raised.
- Loosen clothing and apply cool, moist cloths to the body, or fan the victim.
- Slowly administer sips of salt water (plain water for those with heart or blood pressure problems).

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. Consult your physician for more information concerning the above conditions.

Hazardous Materials and Hazardous Wastes

Select Hazardous Materials Carefully

- Reduce your use of hazardous materials as much as possible.
    - Hazardous materials are by definition dangerous.
    - What happens to the chemicals you bring?
- Consider doing a less hazardous field preparation, saving the hazardous work for back in the laboratory.
    - Ask yourself if you really need to do this in the field.
    - Is there a field prep protocol that is acceptable (check the literature)?

Obtain a Safety Data Sheet (SDS) for each chemical you will bring.

- When you use a hazardous material a SDS must be immediately available.
    - You may not be able to get proper medical care without the SDS.
    - SDS contain valuable information for Emergency Responders.
- Collecting the SDS will help in identifying precautions needed on the trip.

Select Appropriate Safety Precautions

- Ensure you have the necessary PPE.
- An eye wash bottle / emergency shower must be available if working with chemicals that are potentially harmful.
- Ensure that the chemicals are stored outside the vehicle's passenger compartment. This is especially important in the event that toxic vapors/fumes are released from the material or a broken bottle could volatilize and asphyxiate the occupants of the vehicle.
- Ensure chemical compatibility.

Transportation of Hazardous Materials

Material of Trade exemption applies to small quantities of hazardous materials transported for use by the carrier (e.g., gasoline for use by lawnmower service). Check your Safety Data Sheets (Section 14, Transport Information) for packing group and guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.

- The container size limit for flammable liquids, flammable solids, corrosives, oxidizers (other than organic peroxides), poisons (not hazardous by inhalation), and miscellaneous regulated material is as follows:
    - 1 pound (1 pint) for DOT Packing Group I (PG I) materials, or
    - 66 pounds (8 gallons) for DOT Packing Group II or III materials.

    - Cylinder limits for non-inhalation hazard gasses is 220 pounds.
    - For 'Dangerous When Wet' materials in PG II or III the limit is 1 ounce (30 ml).
    - The total quantity that can be transported is 440 pounds.
    - All hazardous materials must be:
        - Leak-tight (for gases and liquids) sift-proof (for solids) and securely closed.
        - Packages must be stored secure from movement and protected from damage.
        - Each material must be packaged in the manufacturer's original packaging or a packaging of equal or greater strength.
        - Packages must be properly labeled with a common name or proper shipping name to identify the materials it contains, including the letters "RQ" if it contains a reportable quantity of a hazardous substance.
        - Cylinders must have proper DOT shipping labels.
- The operator (driver) of the motor vehicle must be informed of the presence of hazardous materials and must know whether any exceed a reportable quantity (RQ). They must also be aware of the DOT requirements (40 CFR 173.6) governing transportation of materials of trade as outlined above.

Hazardous Waste

Hazardous wastes must not be transported from one University owned facility site to any other location! The facility where a waste is generated is where it must stay until shipped by a licensed waste transporter.

The only exception is for waste, which is generated in the field.

- The 'generator location' for field-generated waste is the laboratory where the field operation is based.
- Used chemicals should not be labeled with 'Hazardous Waste' labels until returned to the laboratory.
- If waste is accumulated then Accumulation records should be kept and the waste should be stored in properly labeled containers that are suitable for transportation (as outlined in the transportation section).

Design your experiments upfront so that they do not generate any hazardous waste.

Emergency Procedures for Spills

Off campus emergency numbers are not all the same you must look up the local emergency number for the field site before you need them!

Reporting requirements depend upon the type and quantity of spilled material:

- Oil and petroleum product spills
  - Report any Oil Spill into navigable waters that produces a visible sheen or discoloration to the National Response Center at 800-424-8802.
  - Report within 2 hours any oil spill of 10 gallons or more even indoors or to the sewer to the Maine DEP at 800-482-0777.
- Hazardous chemical spills
  - Report within 1 hour any quantity of hazardous matter or hazardous waste spilled onto land, air, or water to the Maine DEP via the State Police at 800-452-4664.
  - Report immediately any spill that equals or exceeds the Reportable Quantity of hazardous substance or hazardous waste spilled onto land, air, or water to the National Response Center at 800-424-8802.

Report immediately spills equal to or exceeding the Reportable Quantity of an extremely hazardous substance or hazardous substance to the Local Emergency Planning Committee via the County Sheriff, and the Local Fire Department (these numbers vary by location).

Written follow-up reports are also required! (Contact Safety and Environmental Management at 581-4055 for assistance).

Driving

Respect for Logging Trucks

Remember, the logging trucks have the right-of-way on the logging roads. You should pull over to the side of the road when they approach you from both directions. Remember that the logging roads are private roads for the most part.

- Logging trucks ride the center of the road, which gives them more stability in carrying their loads.
- They carry a tremendous amount of weight, and therefore, require much more time to stop than you do.
- Don't get too close to the truck. Stones and rocks can break your windshield and lights. Logs and debris may fall off the truck. Loader arms, chains and logs may move on the truck trailer, which may strike your vehicle.
- On dusty roads, try to travel at a safe distance behind the truck so that you can see the whole road. If a truck passes you from either direction, visibility is impaired - pull over to the side of the road until the dust clears. It may help to turn on your lights.
- Park on an incline if possible, well off the traveled way. Especially on dusty roads during heavy hauling periods, trucks often travel together or in convoys.
- Never assume a truck operator knows you are there, especially when overtaking a truck from the rear. They have a large blind spot next to the truck.
- Truck drivers and Woods Workers know each other's location by communicating over radio.
- Stay on the right side of the road when traveling around curves. Remember, trucks will ride the crown even around the curves!

Animals and Night Driving

Animals, animals, animals… need we say more? Some animals don't like to move off the road very quickly and often try to cross in front of the vehicle. The eyes of every animal may not reflect headlights as well as deer. When you see one cross the road always be alert for one or two more.

As you can see from the timestamp of the dash-cam, from the time the deer just appeared outside the bushes to the time of the strike/collision, only one second has passed. At highway speed, this vehicle was traveling approximately 78 feet per second. The one-second elapsed timestamp shows that there was not enough time for perception and reaction time to slow down before ultimately striking the deer.

According to the Maine Department of Transportation, if a crash with an animal is imminent, apply the brakes and steer straight. Let up on the brakes just before impact to allow the front of your vehicle to rise slightly and aim to hit the tail end of the animal. This can reduce the risk of the animal striking the windshield area and may increase your chances of missing it. Duck down to protect yourself from windshield debris.

Safety and Vehicle Maintenance

Before leaving for the research activity, make sure your vehicle is equipped with a spare tire, jack, and lug wrench (etc.). You should always leave with a spare tire (two is better!) and check them before leaving

After the roads are graded, there are many sharp rocks uncovered which can destroy tires. It's safer to drive slower on newly graded roads. Stay alert for uncovered rocks. Washouts, sink holes, culverts, frost heaves, soft spots and heaved rocks are all dangers of driving in the spring or after heavy rains.

Be careful pulling over to the side of the road in the spring, the shoulders are usually very soft.

If you have car trouble, guide your vehicle to the side of the road to a safe area. Once you're off the road an in a safe area, turn on the hazard flashers and summon help. If you plan to change a tire, ensure that you first consult with the vehicle owner's manual for instructions. Not only will the owner's manual provide guidance on how to safely change the tire, but also will explain any vehicle warning lights and alarms.

General Safety Tips for Driving a Vehicle Dirt, Forest, or Logging Roads

Always wear your seat belts. Administrative Practice Letter, Section II-B, *Motor Vehicle Administration and Guidelines* states that all operators and passengers of University vehicles must wear seat belts whenever seatbelts are available. It is the driver's responsibility to make sure that all passengers wear their seat belts. The driver should refuse to take any passenger who refuses to cooperate and may not operate the vehicle if passengers do not have seat belts properly fastened.

- Two sets of vehicle keys, with different crew members is helpful in case one set gets lost.
- Always have your vehicle headed (pointed) home before you park and begin work. Don't plan to turn it around after work is done.
- Check unknown water holes, beaver flowages, etc. before driving through them.
- Don't park under snags or limbs of nearby trees.
- Don't leave food in such a manner that it will tantalize wildlife (especially bears)!

Check Your Vehicle Over Before Leaving for the Field

- Check the tires (spares also), fluid levels (gas, oil, antifreeze and windshield washer fluid).

- All vehicles should have a first aid kit, blank injury report forms, fire extinguisher, tool box, jack (handle and lug wrench), tow rope or chain, jumper cables, gloves, flashlight, shovel and flares or markers for marking an accident or breakdown.
- Fire extinguisher should be charged. Make sure first aid kit is complete.
- Essential tools are: crescent wrench, pliers, screwdrivers (Phillip's and flat blade), duct tape and wire.
- Take a Gazetteer and compass if you'll be traveling off the main logging roads. Check town line designations as you cross them.
- Do a double check on the equipment you'll need in the field. Make sure the equipment is secured or fastened down in the vehicle.

Personal Protective Equipment

Normal Work Clothing

Appropriate regular work attire should be chosen according to the environment and type of work to be performed. If employees are subject to having their legs, feet, and arms scraped (by rocks, thorns, tree branches, etc…) then long pants, shirts with sleeves, socks and shoes (no sandals) are required. Other factors that could affect the selection of normal work attire include temperature, biological activity (indigenous pests, ticks, and plant life), and excessive exposure to the sun's ultraviolet rays. A full Tyvek® (or similar type) suit may be useful in weather that is not too hot.

High Visibility Clothing

Exposed to traffic/equipment hazards: OSHA standards required employees to wear high visibility garments in two specific circumstances: when they work as flaggers and when they are exposed to public vehicular traffic in the vicinity of excavations. However, if you are exposed to the danger of being struck by the vehicles or equipment operating near you then you must be adequately protected.

During hunting season, working hunting areas the U.S. Fish and Wildlife Service (Tips for Hunters and Non-Hunters) recommends that you wear bright clothing (like blaze orange). Make yourself easily visible. Choose colors that stand out, like bright, fluorescent red, orange or green. Avoid earth-toned and animal-colored clothing.

Eye and Face Protection

Eye and face protection should be selected when an individual is exposed to hazards from flying particles, molten metal, liquid chemicals, gases or vapors, or potentially injurious light radiation.

Proper eye and face protection should be selected and used whenever the employee is exposed to an eye or face hazard. All eye and face protectors shall meet the requirements found in American National Standards Institute (ANSI) Z87.1. Approved eye or face protection will be marked with ANSI Z87, denoting that is meets ANSI standards for a particular hazard.

Hazards to Consider Include:

- Field repairs
- Chemical splashes
- Sprung trees and equipment
- Smoke, fumes, dusts, and vapors
- Projectiles
- Welding
- Heat
- Glare
- Biohazards
- Tree/bush branches
- Pesticides

Respiratory Protection

Selection of respirators is based upon contaminants, exposure level, and work rate. You must consult with your campus safety personnel prior to selecting any respiratory protection. This includes voluntary and required use of respirators by all system-wide university employees.

Hearing Protection

Selection of hearing protection should be based on Time Weighted Average. If you believe that you or your employees are exposed to noise in excess of 85 dBA (A-weighted decibels) averaged over 8 hours (or equivalent) or if you have no idea as to the noise levels, contact the University of Maine System Safety Management at 581-4055 or sem@maine.edu for a noise assessment.

Head Protection

If individuals work in areas where they are exposed to falling objects (large enough to cause injury) or overhead electrical hazards, then the individual is required to utilize the appropriate head protection. Head protection should meet ANSI Z89.1 requirements and will be marked appropriately. Hard hats break down over time. An OSHA hard hat expiration date does not exist, but manufacturers may set a specific date for expiration.

Refer to the manufacturer's instructions regarding service life guidelines for your particular hard hat.

Hand and Arm Protection

Appropriate hand protection should be selected for individuals whose hands are exposed to hazards such as those form skin absorption of harmful substances, sharp edges, severe abrasions, punctures, chemicals burns, thermal burns, harmful temperatures, splinters, animal teeth, and claws.

Drinking Water Treatment and Sanitation for Backcountry/Fieldwork

According to the Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention (CDC), if you work in a location where clean/potable water is not available, it is important to find safe water or disinfect water for drinking, cooking, and brushing teeth. You should:

- Use bottled water or water you have properly prepared and stored as an emergency water supply.
- Boil water, if you do not have bottled water. Boiling is sufficient to kill pathogenic bacteria, viruses and protozoa (WHO, 2015).
    - If water is cloudy, let it settle and filter it through a clean cloth, paper boiling water towel, or coffee filter.
    - Bring water to a rolling boil for at least one minute. At altitudes above 5,000 feet (1,000 meters), boil water for three minutes.
    - Let water cool naturally and store it in clean containers with covers.
- Disinfect water using household bleach, if you can't boil water. Only use regular, unscented chlorine bleach products that are suitable for disinfection and sanitization as indicated on the label. The label may say that the active ingredient contains 6 or 8.25% of sodium hypochlorite. Do not use scented, color safe, or bleaches with added cleaners. If water is cloudy, let it settle and filter it through a clean cloth, paper towel, or coffee filter.
    - Locate a clean dropper from your medicine cabinet or emergency supply kit.
    - Locate a fresh liquid chlorine bleach or liquid chlorine bleach that is stored at room temperatures for less than one year.
    - Use the table below as a guide to decide the amount of bleach you should add to the water, for example, 8 drops of 6% bleach, or 6 drops of 8.25% bleach, to each gallon of water. Double the amount of bleach if the water is cloudy, colored, or very cold. Glass containers with droppers
    - Stir and let stand for 30 minutes. The water should have a slight chlorine odor. If it doesn't, repeat the dosage and let stand for another 15 minutes before use.

- If the chlorine taste is too strong, pour the water from one clean container to another and let it stand for a few hours before use.

Fieldwork Safety Training Exam

The following questions are designed to test your understanding of Fieldwork. To get credit, you must score at least 80 %.

When completed, sign and date and provide a copy of the test pages (pages 28 through 30 only) to your supervisor. This will serve as a record of completion. It is not necessary to print the entire document.

Question 1: This is the only safety training required if you are to participate in Fieldwork.

True

False

Question 2: What is the best method of preventing heat stress (over-heating) during the summer months?

a. Drink plenty of non-alcoholic fluids

b. Take ample rest breaks.

c. Wear permeable, loose fitting clothing.

d. All of the above.

Question 3: When driving on logging roads, the logging trucks have the right of way.

True

False

Question 4: What is the best method to prevent ticks from embedding into your skin?

a. Wear light-colored clothes.

b. Use tick repellents that contain DEET.

c. Inspect yourself when you leave the field.

d. Tuck your pant legs into your boots and tuck your shirts into your pants.

e. All of the above.

Question 5: What should you do if you are bitten by an animal?

a. Immediately wash the wound with soap and water.

b. Seek medical attention.

c. Contact your town office or law enforcement agency.

d. Report the incident to your supervisor.

e. All of the above.

Question 6: If you are caught in a storm in the forest (and a structure or vehicle is not available) the best protection from lightning is offered by thick growth of relatively small trees.

True

False

Question 7: If you spill a chemical in the field (regardless of quantity) you are unable to properly clean-up, you should?

a. Cover with at least 6" of soil.

b. Pour water on the spill or dilute it.

c. Contact your safety department, Maine DEP, National Response Center, and Local Fire Department.

d. All of the above.

Question 8: If the nature of your research requires you to perform solitary fieldwork, you are required to inform your designated contact person with the following information:

a. Location of Fieldwork site(s).

b. Route(s) taken to and from the site(s).

c. When you are due back.

d. All of the above.

Question 9: The West Nile Virus can be transferred between humans.

True

False

Question 10: If you are required to use a non-motorized boat to conduct your research, you must also meet the requirements of the UMaine Watercraft Operations Policy.

True

False

Signature:

Date:

(you may check your answers on the next page)

Answers to exam:

1. False
2. d
3. True
4. e.
5. e.
6. True
7. c.
8. d.
9. False
10. True