

FIELDWORK SAFETY GUIDELINES

1.0 A CLIMATE OF CARE

The following guidelines focus on establishing a climate in which safety of University personnel has primacy, where faculty, staff and students know the policies, procedures and guidelines to help create safe practices. Principal Investigators (PIs) may elect to manage the risks involved with their fieldwork in a different manner to these guidelines, but alternative practices must provide at least equivalent or better level of safety.

There is no successful method of guaranteeing safety of personnel. These guidelines attempt to provide a framework in which it is customary and normal that all possible precautions have been taken and all proper responsibilities met. The major requirements - assessment of risk, planning, training, equipment, communication, responsibilities - are addressed in this document.

2.0 APPLICATION AND SCOPE

"Fieldwork" consists of activities authorized by the University, conducted for the purpose of study, research or teaching which are undertaken by faculty, staff, students, and authorized volunteers of the University at a location outside the geographical boundaries of the University campuses.

Fieldwork activities, such as those involving isolated or remote locations; extreme weather conditions; hazardous terrain; harmful wildlife; or lack of ready access to emergency services, can expose participants to significant risks to their health, safety or well-being, at locations outside the direct supervisory control of the University.

The intent of these guidelines is to ensure that prior to undertaking fieldwork:

- a) all concerned parties are aware of their responsibilities;
- b) a risk assessment is carried out to identify potential hazards associated with fieldwork and to establish appropriate controls to eliminate or minimize such hazards; and
- c) all participants have an informed understanding of the associated risks and provide their consent to the means for dealing with such risks.

Under normal circumstances, these guidelines are not intended for organized off-campus activities such as:

- Supervised study or work placements at external institutions which are affiliated with the University or which the University department has designated to be an approved placement center; or
- Travel for conferences, seminars, meetings or visits to other institutions.

For all off-campus activities conducted on the premises of or under the control of another organization or institution, Principal Investigators (PAIS) must ensure that the local safety procedures of that organization or institution are appropriate to the type of activities being conducted, are in compliance with local laws and regulations, and are consistent with the safety standards and practices of the University of Hawaii.

3.0 RESPONSIBILITIES

The responsibilities of the following: 1) Deans, Directors and Department Chairs; 2) Departmental Safety Coordinators; 3) Principal Investigators/Supervisors; 4) Employees and Students and; 5) Environmental Health and Safety should be consistent with the responsibilities set forth in the University of Hawaii at Manoa Departmental Health and Safety Guide.

For the purpose of fieldwork, the following additional responsibilities are:

TEAM LEADER

The Team Leader may be the Principal Investigator (PI) or may, in the absence of the PI, be another member of the team who has been designated as such by the PI. The Team Leader has the duties of a supervisor and in particular, the Team Leader is responsible for:

- a) ensuring implementation of the controls established by the PI, including the use of appropriate safety equipment, safety procedures and medical precautions by team members during fieldwork;
- b) conducting ongoing risk assessments during fieldwork and reporting any new hazards to the PI;

- c) dealing with and resolving any safety concerns which arise in the field;
- d) maintaining regular contact with the PI and/or departmental contact;
- e) informing the PI and/or departmental contact of all accidents, illnesses or emergencies which occur in the field; and
- f) ensuring team member have received adequate health and safety training as applicable and must retain training records.

TEAM MEMBERS

Each member of the fieldwork is responsible for:

- a) acknowledging the risks of the particular field project;
- b) using the appropriate protective equipment provided and following the procedures established by the PI;
- c) working safely and in a manner to prevent harm to themselves or to others;
- d) understanding the Requirements for Reasonable Care outlined in Section 4;
- e) reporting any identified hazards to the Team Leader or PI; and
- f) reporting all accidents, illness or emergencies to the Team Leader.

4.0 REQUIREMENTS FOR REASONABLE CARE

Those involved in fieldwork must exercise reasonable care to ensure safety include, but are not restricted to, the following:

- a) only staff, students, and approved volunteers authorized by the PI may assist with fieldwork. **Friends, pets and children are prohibited from accompanying field teams.** Employees of county, state and federal agencies on official business connected with the project may accompany people working in the field. **Researchers or other colleagues from other institutions not authorized by the PI are not allowed to accompany field teams.** Always consult with your PI if you are uncertain regarding someone's eligibility to accompany you in the field.

- b) availability of appropriate first-aid supplies and expertise; and accessibility to emergency medical treatment;
- c) availability of appropriate personal protective equipment (PPE) and field equipment to support the research;
- d) availability of appropriate food and accommodations, and during travel to and from the site;
- e) arrangements of appropriate transportation to, at and returning from the location of the fieldwork; vehicles must be operated in a manner consistent with Standard Operating Procedures(SOPs) for vehicles for the agency whose vehicle you are driving. Personnel should ask the PI for a briefing on the procedures before you operate the vehicle for the first time;
- f) prior to departure, and on a continuing basis on the site, the tasks and responsibilities assigned to each participant must be clearly communicated;
- g) knowledge of all health and safety standards and requirements applicable to the jurisdiction in which the fieldwork is being conducted;
- h) provision of appropriate information and training regarding the risks associated with fieldwork activities, materials, equipment and environment, and appropriate control measures for dealing with them;
- i) provision of appropriate information and training for responding to and reporting of accidents involving injuries, damage to property and equipment, and spills, leaks or release of hazardous materials;
- j) recognition of the right and responsibility of an individual to exercise personal judgement in acting to avoid harm in situations of apparent danger; in this regard, students should be informed of the general nature, requirements and location of their fieldwork; and
- k) availability of procedures for contacting the University to obtain assistance in an emergency.

5.0 SOLITARY FIELDWORK

Working alone is strongly discouraged, particularly when remote or hazardous locations, high-risk activities or other unusual

conditions are involved.

In situations where solitary work is deemed necessary and unavoidable, a stringent code of practice must be established to address worker competency, procedures for regular reporting, emergency procedures, and other precautions and procedures appropriate to the type of activities involved. In such situations, the Solitary Field Researcher will assume the responsibilities of Team Leader and Team Member. The field member must ensure that someone knows where he/she is and when he/she is expected to return.

6.0 REFUSAL OF UNSAFE WORK

Any individual member of a fieldwork team may refuse at any time to participate in any activity which they feel may endanger their health and safety or that of another person.

7.0 GENERAL GUIDELINES

Before fieldwork is conducted, the PI should develop standard operating procedures specific to their fieldwork. The SOPs should include at a minimum, information provided in sections 7.1, 7.2 and 9.0

7.1 Preparation - Before Individual(s) Leave

One of the most important phases of a fieldwork experience is planning and preparation before you leave. Here are some suggestions before a person leaves:

➤ Prepare a written plan of the trip and leave this 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.
- 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. Fieldworkers should check in with their group office regularly, and should advise the group office of any changes in schedule or points of contact. If possible, fieldworkers should also inform someone in their work locale (for example, local search and rescue personnel, police, sheriff or motel employee) each

day about the daily fieldwork location and the approximate time of return. The local contact should be provided with 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.

- Learn about potentially hazardous plants, animals, terrain and weather conditions in the areas where fieldwork is being conducted.
- Take a CPR/First Aid class.
- Assemble safety equipment and other provisions and check everything before you leave; these include:
 - First aid kit and first aid manual
 - Medications taken on a regular basis
 - Allergy treatments as needed
 - Sunscreen and hat
 - Water purification tablets or filter devices
 - Personal protective equipment (PPE) such as safety glasses/goggles, gloves, hard hat, work boots, etc.)
 - Vehicle emergency kit
 - Flashlight
 - Flares
 - Two-way radio (if you will be working alone in an isolated or dangerous area) and/or cellular phone as appropriate
- Whenever possible, fieldwork activities should be done in teams of at least two people. The "buddy" system is the safest way to work.
- Ask your health insurance provider about how your coverage applies to medical treatment in the fieldwork locale, should that become necessary. Find out where you can go for emergency care.
- Obtain authorization for access to state, federal and/or private lands.
- Obtain permits for any sample collection from respective agencies (i.e. DLNR, NFWS, etc.)

7.2 Medical Care and First Aid

- The first aid kit must be maintained at all times during the

operation or exercise. At least one employee who is trained in first aid must be present during operations. At least one field crew member shall carry a first aid kit while in the field. Additionally, each vehicle should carry a fully stocked first aid kit and a survival kit.

➤ There shall be at least one (1) individual per field crew with a current standard first aid certificate.

7.3 Travel on Foot

➤ Wear proper safety gear

➤ Always carry a first aid kit, radio and water.

➤ Be sure that equipment and supplies are carried in a manner consistent with safe travel over rough terrain. Backpacks should be in good repair and fit properly; **DO NOT OVER-ESTIMATE YOUR LOAD CAPACITY.**

➤ Always be aware of what's around you (on ground and overhead).

➤ Be conscious of surroundings - when disoriented, familiar objects can set you on track. Carry a compass and an area (field) map showing locations of pertinent transect, roads and trails, and other landmarks, especially in unfamiliar surroundings and/or when fog, rain, or darkness can set in.

➤ Always be sure someone in the laboratory knows where you are and when you are expected to return.

➤ Never overextend your capabilities.

➤ Be sure permission is granted before entering private property.

➤ Report accidents immediately to your supervisor.

➤ Use common sense.

➤ If you do get lost or become disoriented **STAY WHERE YOU ARE.** You may be overcome by panic. Sit down and quietly organize your thoughts on where you are. A few moments of recollection may clarify your situation. If not, find a comfortable place to rest. Use your whistle or other means to attract the attention of anyone around you. Do not try to leave the area if there are no signs of where to go. Do not follow a stream down hill; it will

almost certainly go over a waterfall at some time. Do not travel at night. You can sometimes assist a helicopter search by starting a smoky fire but be extremely careful not to set the surrounding vegetation on fire.

7. 4 Other Transportation

7.4.1 Use of Vehicles

Only licensed and appropriately trained drivers should be in charge of field vehicles. The PI should ensure that there is a system in place for checking for appropriate and current driving licenses and placing restrictions on use of vehicles, e.g. for untrained or inexperienced persons, and giving express permission for vehicle use. It is advisable for the PI to have guidelines on use and limitations of vehicles.

Only registered vehicles are to be used. Vehicles used for fieldwork should be well-maintained according to the manufacturer's service specifications and equipped with adequate spare parts and tools, according to the area and length of trip. Care must be taken when loading vehicles to maintain as low a center of gravity as possible and to secure items adequately in a cabin. Vehicles must be driven with caution and attention to prevailing road and weather conditions.

The vehicle should be selected for the type of terrain likely to be encountered. Drivers should be familiar with the vehicle before setting out on the trip. Drivers intending to use four wheel drive(4WD) vehicles should have received training in 4WH or be able to demonstrate experience in driving such vehicles. Drivers should be familiar with routine maintenance procedures such as checking oil, water, tire pressure, coolant, and battery, and charging tires. Drivers should also be aware of the fuel capacity and range of the vehicle.

Prior to setting out on the trip, the driver should check the vehicle to ensure it has been adequately maintained and has all necessary tools, spare parts and special equipment for the trip. A check should be made that luggage and other equipment are secure.

Rest stops and fuel stops should be used to check that the vehicle is operating normally with respect to tire pressure, engine leaks, etc. and that luggage and equipment remain secure. Everyday, before setting out, check oil, water, fuel, battery fluid, coolant, brake fluid and tire pressures and that controls are working.

Driving times and distances should be planned to prevent fatigue. A driver should take periodic breaks after driving for a few hours. During the break some light physical activity such as walking should be incorporated. Driving at night is more hazardous than during daytime because of reduced visibility, and fatigue and should be minimized.

Drivers should always heed applicable road rules, including those pertaining to consumption of alcohol. Driving should always be done at safe and legal speeds. Safe speeds depend upon the road and weather conditions, experience of the driver, time of day, alertness of the driver and the vehicle itself. Unfamiliarity with the road or conditions and the presence of nocturnal animals contribute to driving hazards.

7.4.2 Use of Boats

When boats are used, the PI in charge must be familiar with relevant state and federal boating laws. Personnel in charge of boats are responsible for ensuring that the appropriate licenses and any appropriate boat registrations are obtained.

Boats should be well-maintained and equipped with adequate spare parts and tools, according to the area worked and the length of the trip. Care must be taken when loading boats. The maximum capacity that the boat can carry must be displayed on the boat and must not be exceeded. Boats must contain adequate safety devices such as distress flares, personal flotation devices, etc.

Only licensed and appropriately trained personnel should be in charge of boats. Boats must be driven with caution and attention to prevailing conditions. Only those personnel necessary and trained for the fieldwork may be carried in boats. No one may go out boating alone.

Before setting out on boating trips, check prevailing and predicted weather conditions. Boat trips should not be undertaken in poor weather (e.g. high winds, rough seas) or when poor weather is predicted over the period of the planned trip. Even when good weather is predicted, changing weather should be anticipated in planning the trip.

Prior to setting out, check the vessel for safety equipment, personal flotation devices, fully charged battery, fuel, spare plugs, cotter pins, anchor and small bucket for bailing.

7.4.3 Helicopter Operations

- All field personnel involved in work that requires use of helicopters must have completed a National Park Service B-1 Helicopter Safety Course within the last 3 years.
- All field workers involved in sling-load helicopter operations must have also completed the appropriate course within the last 3 to 5 years.
- Personnel may only fly Department of Interior Office of Aircraft Safety certified helicopters flown by OAS certified pilots.
- For helicopter operations involving flight over the ocean, all persons involved must have had training in the ocean-ditching protocol within the last two years. Taking the course for two years in a row is recommended for new employees.
- All personnel involved in any way with helicopter operations must use the appropriate Nomen flight suits, gloves, hard hats with chin straps or helmets, leather boots and other prescribed protective and safety clothing. Personnel flying a helicopter must wear appropriate fire-repellent clothing and communication helmet.

7.5 SCUBA Diving

Diving can only be authorized when done in accordance with the University of Hawaii Diving Safety Manual administered by the University's Diving Safety Officer.

Before diving, the PI must contact the University's Diving Safety Officer to ensure the requirements set forth in the UH Diving Safety Manual can be met.

7.6 Use of Firearms

- If your work requires you to carry a firearm you must have passed the federal firearms certification provided by the National Park Service or other federally approved program, e.g., N.R.A. This test must be repeated each year. You must obtain approval from the landowner to carry a firearm on their property.
- You must abide by all state and federal laws.
- Firearms must always be returned to the firearm's cache on returning from the field.

- You must ensure that the firearm is properly maintained.
- You must account for all ammunition used.

7.7 Use of Pesticides/Other Chemicals

- If your work requires you to use pesticides, you must either work under the supervision of a person who has a certificate for pesticide application or have a current certificate yourself. You must abide by the instructions on the pesticide label.
- You must wear the appropriate safety equipment and clothing at all times and are responsible for maintaining your equipment and clothing.
- Know the requirements of the University's Chemical Hygiene Plan and/or Hazard Communication Program as it applies to your work; contact UH EHSO Chemical Hygiene Officer or Industrial Hygienist for these requirements.
- In case of an accident, especially where you get chemicals on the skin, you must notify your supervisor immediately.

7.8 Working In Water

7.8.1 Coastal and Estuarine Work

When planning coastal and estuarine work, information about tides, currents, weather and other factors affecting safety must be considered. Work on rock-platforms can be particularly hazardous and adequate precautions must be taken to prevent anyone from being swept from rocks or injured by unexpected waves. Ensure that appropriate clothing, including footwear is worn by all personnel.

7.8.2 Streams

When working in streams, always be aware of the weather conditions, especially when heavy rains are forecast. Other precautions to consider are:

- Wear footwear appropriate for the tasks, e.g., rubber boots, tabis (i.e., those designed for wading). Do not jump from rock to rock. Always ensure that your footing is safe.
- If, after working in a stream or in some way associated with water, you come down with flu-like symptoms that persist consult your physician and inform him/her that you may have been exposed

to leptospirosis. If you have a break in your skin that could be exposed to water let your supervisor know so that protective measures can be taken or you can be assigned to other duties.

► Never drink untreated water from streams or any source other than a municipal supply. If you suffer from diarrhea and have a hydrogen sulphide taste in your mouth after belching consult your doctor and inform him/her of the possibility of your having **Giardiasis or amoebic dysentery or other waterborne diseases**. If your doctor confirms that you are suffering any such disease you must notify your supervisor immediately. You will not be allowed to work in the field until your doctor has confirmed that you are free of the disease.

7.9 Terrestrial Fieldwork

Precautions required for terrestrial fieldwork vary according to the type of environment and likely weather conditions, including possible weather extremes which may be encountered. Rainforest, caves and mountain environments present different hazards. The PI should develop standard operating procedures (SOPs) for each type of terrestrial fieldwork it conducts. Fieldwork personnel should receive training on SOPs relevant to the environment being visited.

7.9.1 Working In Caves

Field personnel depending on the nature of their research, may from time to time need to enter cave systems to survey, monitor, sample or evaluate cultural and natural organisms and their habitats.

Caves in Hawaii occur primarily in volcanic substrates and consist of lava tubes or lava blisters that have formed in pahoehoe (smooth lava) flows. Tube widths can range from a few feet to thirty (30) feet and tubes or systems of tubes can extend up to several miles. Skylights or collapsed roof sections are common in tubes, which rarely extend intact for more than 100 m. All tubes and blisters that are entered by field researchers should be prehistoric and have long since attained a cooled, non-toxic and stable condition. Tubes near active volcanic structures, as on Big Island should not be entered without special training. If there is any question about the safety of the tube, do not enter it. Do not enter a cave or tube if you are claustrophobic. Always file a Cave Work Plan with your supervisor/PI or local law enforcement.

A variety of animals may use caves. Honey bees and paper wasps

may nest under overhangs at entrance. Move slowly and stay 10-15 feet away. Goats, sheep and pigs resting in caves may bolt for the entrance when startled and may dispute your right to stand in it, so approach a cave slowly.

Protocol for cave visits:

General Concepts:

- Treat caves with respect. Many are sacred places.
- Move slowly and softly. Careless movement may damage irreplaceable archeological, geological or biological resources.
- Do not move or remove cave material, except recent garbage. Do not dig as this may destroy stratified deposits. Do not change air flows as this may alter the cave's climate.
- Do not smoke in the cave.
- Do not leave anything in the cave.
- Take extreme care in transition and deep (lightless) cave environments; do not touch mineral deposits, animals, organic ooze, cave slime or tree roots.

Procedures:

- Approach cave entrances carefully and do not make a trail or trample vegetation. Avoid stepping on stone structures or plants.
- Allow 10 to 15 minutes for your eyes to adjust to the cave.
- Carry or wear the following (each cave): durable trousers, light jacket, shirt, hard hat, leather gloves and good quality walking shoes with reasonable ankle support and thick soles. Knee and elbow pads, if rough or confining conditions are expected.
- Each person should have a whistle and at least one flashlight (at least two D or four C cell flashlights) plus an extra set of batteries. Chemical light sticks (Cyalumes) should be carried as backup because they provide several hours of illumination. There should be at least one strong, extra flashlight for each three people. Headlights should be used in preference to hand lamps. Carry one-quart of water and food snacks.

- Each group should carry: 1) two-way radio; 2) compass; 3) flagging tape; 4) first aid kit 5) Insect sting kit; 6) navigation log book; 7) watch; 8) entrance-marker flag.
- Never enter a cave alone. Minimum crew is two.
- Leave a filled-out Cave Work Plan with a responsible individual. Plan should include who is in field party, vehicle use, location of cave (if known only on arrival, call in on radio to your supervisor/PI), date, planned times to depart and return to base camp, planned time inside cave and purpose of cave mission.
- Mark cave entrance with visible flag before entering.
- Never separate in the cave, stay within eyesight of one another.
- Move slowly and stand up even slower. Watch for hazards overhead and underfoot.

7.10 Working on State or Federal Lands

If you are working in a national park, wildlife refuge or state forest reserve and there is an emergency, e.g., volcanic eruption, wildfire, you may be required to participate in emergency operations. Obey the incident commander or other responsible official. Participation in such emergencies is optional but you are encouraged to support the emergency operation. During the period of the emergency you will be covered under the emergency regulations.

7.11 Working With or Around Animals

Check with the UH EHSO, Biological Safety Office and the IACUC (Institutional Animal Care Use Committee) for additional approval and guidance when anticipating working with or around animals.

Rodents (rat and mice), cats and other animals are known to carry a variety of diseases, most of which have not been reported from Hawaii. There is a known risk of leptospirosis and murine typhus in Hawaii. If you are working with animals or areas that may have been contaminated by their dropping, you are required to take the following precautions.

Exposure to body fluids:

If you may be exposed to body fluids from these animals, during

trapping, tagging or removal, you must take a variety of precautions. First, all direct contact with animals should be through barriers. Use protective bite-proof gloves with disposable gloves underneath, if you must handle live animals (this should be avoided except when absolutely required). Use non-allergic disposable gloves for handling carcasses. Dispose of gloves afterwards by enclosing in plastic bag, like a "ziploc" bag.

If you are not leaving the carcass in the field, place it in a sealed bag. If you are examining stomach samples or other body parts, use disposable gloves, use eye or lab glasses with side covering and a mask to prevent fluids from hitting your eyes, nose and mouth. Any contact with fluids on skin should be washed off with an antibacterial soap. Contact with eyes, nose or mouth should be washed out with saline solution (eyes) or regular water (mouth). Such examinations should take place in a well-vented room or outside. People who have suppressed immune systems or are pregnant should avoid close contacts with cats, alive or dead, because of the risk of toxoplasmosis.

Exposure to Airborne Disease:

If you are cleaning an enclosed area (cave, historical structure) with rodent, bat or cat dropping, **DO NOT** sweep it. Use disposable gloves if touching contaminated areas. The area should be mopped down with commercial chlorine bleach solution. The person doing the cleaning should wear gloves and respiratory protection. Similarly, any bedding from mouse or cat traps should be handled only in the open, not inside an enclosed area. The droppings may carry leptospirosis and other diseases, so they should be treated as potentially infectious and buried away from streams and water courses or double-bagged and disposed of according to local regulations at sanitary landfills.

7.12 Pests

A number of pests may be encountered in fieldwork. Follow these general guidelines to prevent injury and illness:

- Keep garbage in rodent-proof containers and stored away from your campsite or work area. Food crumbs and debris may attract insects and animals.
- Thoroughly shake all clothing and bedding before use.
- Do not camp or sleep near obvious animal nests or burrows.

- Carefully look for pests before placing your hands, feet or body in areas where pests live or hide (e.g. wood piles, crevices, etc.)
- Avoid contact with sick or dead animals.
- Wear clothes made of tightly woven materials, and tuck pants into boots.
- Wear insect repellent.
- Minimize the amount of time you use lights after dark in your camp or work site, as they may attract pests and animals.
- Use netting to keep pests away from food and people.
- Carry a first aid manual and kit with you on any excursion so you can treat bites or stings. If the pest is poisonous or if the bite does not appear to heal properly seek medical attention immediately.
- Be aware of the appearance and habitat of pests likely to be found.

7. 13 Other Environmental Hazards

In addition to pests, other fieldwork exposures can be hazardous:

- **Poisonous Plants** - plants like "poison oak" may contain a potent allergen that can cause a reaction anywhere from several hours to two(2) weeks after exposure. The allergen may spread by: contact with the plant itself, touching other objects which have touched a plant(tools, for example); inhaling smoke from burning plant; and/or touching other areas of the body after touching the plant.

To prevent exposure, learn to recognize and avoid the plant and wear clothing such as long pants and long-sleeved shirts. If you come in contact with these plants, wash clothes and skin with soap and water as soon as possible.

- **Impure Water** - A variety of potentially harmful organisms and pathogens can live in "natural" water sources such as streams, lakes and rivers. Drinking impure water can cause more than just gastrointestinal problems. Waterborne toxins can also cause hepatitis, giardia, and certain viral diseases. If you are not going to be near a municipal or treated water source, carry your own water. Never drink straight from a "natural" source. If you

must use these sources, treat the water first by using water purification tablets, boiling it for three minutes, or using a special purification filter (available from sporting good stores).

➤ Exposure to the Elements - Sunburn is a common and easily preventable hazard. Chronic exposure to the sun can increase one's risk of skin cancer. People differ in their susceptibility to sun due to their skin pigmentation. Certain drugs, such as sulfonamide, oral antibiotics, certain diuretics, most tetracycline, barbiturates, and biothionol (ingredient in soaps and many first aid creams) can also increase susceptibility to the sun. To prevent sunburn, cover exposed skin and liberally apply sunblock creams. Wearing a long-sleeved shirt and hat will also provide protection from the sun.

➤ Heat Exhaustion - which can even affect individuals in excellent physical condition, is caused by prolonged physical exertion in a hot environment (such as strenuous hiking in the desert during the summer). Heat exhaustion symptoms include fatigue, excessive thirst, heavy sweating, and cool and clammy skin and are similar to shock symptoms. If these symptoms are present, cool the victim, treat for shock, and give water or electrolyte replacement slowly but steadily if the victim can drink. If heat exhaustion is not treated, the victim can suffer heat stroke. Heat stroke is far more serious than heat exhaustion. The blood vessels in the skin can become so dilated that the blood supply to the brain and other vital organs is reduced to inadequate levels, causing the individual to become exhausted and faint; the skin becomes bright red and very warm to touch. This is a potentially fatal condition that requires immediate attention. Cool the victim at once, in any way possible, replenish fluids as with heat exhaustion, and seek medical attention immediately. Failure to gradually acclimate to heat, or even minor degrees of dehydration or salt deficiency make an individual more susceptible to heat exhaustion. To prevent heat exhaustion, drink plenty of liquids (electrolyte replacers) and take frequent rest breaks.

➤ Excessive Cold- On any trip, even a one-day excursion, where sudden changes in weather can occur, adequate clothing must be worn or carried. Prolonged exposure to excessive cold can lead to hypothermia, a lowering of the body temperature; symptoms include shivering, numbness, slurred speech and excessive fatigue. Long pants, a long-sleeved shirt or sweater, a wind-breaker or down jacket, and a cap are the minimal essentials. In cold or icy water, it is best to wear clothing made of material that will wick moisture away from the body (e.g. wool or poly-

propylene instead of cotton). Wear several layers of clothing to allow adjustments to differing levels of physical activity. Avoid getting damp from perspiration.

8.0 EQUIPMENT AND COMMUNICATIONS

8.1 Equipment

Safety equipment used in the field must be inspected and/or tested prior to the trip to ensure that it is in good operating condition, with fully charged batteries, sufficient fuel and that all appropriate parts, tools and manuals are available.

8.2 Special Safety Equipment

Depending on the type of work, the area to be visited and the likely weather conditions, special safety equipment may be required. This will include personal protective equipment (PPE) such as coveralls, proper footwear or boots, sunglasses, safety goggles, insect repellent, sunscreen, hats, wetsuit, gloves, respirators or personal flotation devices. Other suggested items include: water canteen, matches, whistles and flashlights.

Ensure that the equipment and material you need has been carefully thought about, made available and that everyone involved knows how to use it. If anyone in the group has specific medical conditions requiring medication, or has allergies to anything that may occur during the work, make sure someone else knows. The first aid officer should be made familiar with appropriate treatment for the condition.

8.3 Communications Equipment

Training and licensing are required for use of certain types of radios. Where these are the main form of communication, all members of the fieldwork group must be trained and licensed in their use.

If cellular phones are to be used, everyone must know how to use them properly and must have access to the relevant contact numbers. Battery power for communication equipment should be sufficient to last beyond the expected duration of the fieldwork.

8.4 Contacts and Continuity of Contact

No trip may take place without there being properly informed and competent designated contacts both within the fieldwork team and at the University base.

Before setting out on fieldwork, the schedules and methods for maintaining contact with the University and/or other contacts must be established and understood by everyone involved.

Contacts at the University and elsewhere must be informed about the location of the fieldwork, the expected duration of work, how to contact field personnel, the planned time of return and at what time subsequent to this an alarm will be raised.

For long fieldwork, arrangements must be made to make contact on a regular basis, such as daily, or some other regular interval if daily contact is impractical. The frequency of the regular contacts will depend on the length of the trip and where it is, how many personnel are involved and what sort of communication is actually available.

If a scheduled contact is not made, the contact at the University or home must be able to raise the alarm. If plans change, members of the fieldwork team should alert their designated contact to prevent false alarms and waste of time.

Before any trip, contacts and members of the field team must have agreed how an alarm would be given under any worst case scenario (e.g. the boat sinks, a vehicle fire) when the planned means of communication is no longer feasible. If it is appropriate to organize alternative means of communication this should then be conducted.

The University campus security telephone number (956-6911), which is monitored 24 hours a day, should be displayed in all vehicles and can be used as a last resort should other University-based contacts fail.

9.0 EMERGENCY PLAN

Contacts at the University, at home and/or at location near to the fieldwork should be notified of the intended route(s), timing and number of people involved in the work, etc., so that they can provide the information and help to direct search and rescue attempts. Maps and plans showing the locations of work should be provided to PAIS or designated contact person.

Anyone designated as the contact person for a particular fieldwork must be organized and know exactly what is required. Schedules for contact, the timing and method of raising alarms if contact is not made, the circumstances of the work (e.g. the registration numbers of vehicles, or boats, the place where boats are to be launched) should be documented so that the contact can find them quickly if required.

No designated contact may pass on the responsibility simply by leaving a message for someone else to take over - if something changes, the new contact must be told personally and all the relevant information provided so that there is no break in the continuity of contact. The fieldwork team leader must also be informed of the change of contact person.

Suggested SOP for emergencies may follow the following:

a) Contact person initiates the emergency alert, if fieldwork team fails to return when scheduled. The response may involve the following steps:

- Call 911, give your name, location of emergency, type of emergency and type of help required.
- Notify any supervisory personnel and provide them with the same information. If you are working in a national park or wildlife refuge notify the local manager.

b) Thirty (30) minutes from call-in time, an alert is issued. Contact person or another person should stay near the phone at the fieldworker's office or lab.

c) One hour from call-in time, search procedures should begin.

d) One person should remain near the phone, and one person familiar with the field area should begin tracking the scheduled route.

e) Tracking person should call back to the lab/office every 20 minutes to see if field worker has made contact.

f) Tracking continues until the person is found or word is received that she/he is safe.

ACKNOWLEDGEMENT OF RESPONSIBILITIES

Please detach and return to supervisor/PI (to be kept for his/her file) :

I have read and fully understand the standard operating procedures for working in the field. I agree to comply with these procedures at all times. Furthermore, I understand that if I endanger my own or a colleague's safety I will be subject to disciplinary action, including the possibility of termination of employment.

Employee's Signature

Date