

**LST reviewer:****Date:**

## Hazard Identification and Risk Assessment for Field Activities

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### 1. OVERVIEW

A **Hazard Identification and Risk Assessment** (HIRA) is required for each off-campus field activity related to research or teaching. Generally, one assessment is sufficient for a contiguous period away from campus, (a “field trip,” “field activity,” “fieldwork”) or for several related trips with the same hazard/risk profile or repeated trips to the same location.

Each fieldwork participant, whether faculty, staff or student, is expected to participate in the preparation of the HIRA. Best practice is for all fieldworkers and, if appropriate, related stakeholders, to meet as a group and collectively to describe and discuss the planned fieldwork, to identify hazards, then to assess and mitigate risks.

This hazard identification and risk assessment is one component of EOAS fieldwork safety procedures, described here: <https://www.eoas.ubc.ca/edi-and-safety/workplace-safety/field-safety>.

This assessment forms part of the EOAS Field Safety Policy and is in addition to the UBC Travel and Field Safety Policies and Procedures (<https://travelfieldsafety.ubc.ca/about/>) with which all individuals engaged in field studies must familiarize themselves.

### 2. CRITICAL COMPONENTS

- (a) A comprehensive appraisal of the hazards to be encountered on field activities and an assessment of the risks associated with these hazards must be undertaken during the planning for the trip.
- (b) Staff members in charge of field activities and supervisors of postgraduate students are responsible for ensuring that the risk assessment procedure has been completed and signed off before the commencement of the field activity.
- (c) Following identification of the hazards likely to be found during the field activity, risk control measures must be adopted to minimize the risk associated with each hazard.
- (d) Potential hazards and the control measures in place must be disclosed to all participants before departure.
- (e) This document is only valid for the dates specified and the following conditions apply:
  - i. Activity and participants must remain the same. *Any significant variation to the activity or number of participants will require the field trip supervisor to re-assess the risk and submit a new version.*

An addendum to the previously submitted assessment specifying the changes should be provided when minor changes to the submission occur.

- ii. The dates specified must be for a period of less than 12 months. For ongoing field trips (eg. long-term project that spans several years), the field trip supervisor is required to submit a new version each year).

**2.1. Hazard identification and risk assessment**

A hazard considered trivial to one participant may be significant to another – for example, insect stings or food allergies. This diversity in hazard identification may result from variation in personal experience, individual capabilities or bias associated with personal attitudes to field safety. It is therefore critical that all fieldworkers and stakeholders participate in the preparation of the HIRA.

Hazards may be site- or task-specific, they may be insidious or apparent, and they may have the capacity to affect individuals differently. The accepted method of ‘Risk Assessment’ is to score a hazard on the basis of ‘Consequence’ and ‘Likelihood’ (Table 1). These individual scores are then used with the ‘Risk Matrix’ (Table 2) to determine the level of risk; giving a score of high, medium or low.

*Table 1. Defining categories of Consequence and Likelihood*

Consequence	Description	Likelihood	Description
<b>Major</b>	Death or extensive Injury	<b>A</b>	Is expected to occur
<b>Moderate</b>	Medical treatment	<b>B</b>	Could probably occur
<b>Minor</b>	First aid treatment	<b>C</b>	Could occur but only rarely
<b>Insignificant</b>	No treatment	<b>D</b>	May occur but probably never will

*Table 2. Risk Matrix combining elements of Consequence and Likelihood*

		Consequence			
		Major	Moderate	Minor	Insignificant
Likelihood	A	H	H	H	M
	B	H	H	M	M
	C	H	M	M	L
	D	M	M	L	L

H: High risk, M: Medium risk, L: Low risk

## High and medium risk activities

If upon initial review a task or hazard is assessed to be high or medium risk, it is necessary to apply a systematic approach known as the 'Hierarchy of Control' to ensure that the risk is as low as reasonably practicable (Table 3). The hierarchy is subdivided into 5 levels of control, the first level of control being 'Elimination'. Elimination aims to remove a hazard or hazardous work practice from a worksite. An example may be to remove a trip hazard. However, it is not always practicable or possible to eliminate a hazard and therefore the next control, 'Substitution,' can be applied. An example of substitution may be changing from using a toxic chemical to a non-toxic alternative.

The final level of control, Personal Protective Equipment (PPE), is considered the lowest, least effective control because it assumes that the employee involved in a task will be exposed to some level of risk. Where long-term exposure is likely, PPE may not be sufficient to mitigate risks to fieldworkers.

*Table 3. Hierarchy of control*

	<b>Example</b>
<b>1. Elimination</b>	<b>Remove the hazard</b> - move field camp from fire-risk area
<b>2. Substitution</b>	<b>Use an alternative:</b> - replace conventional truck with all-wheel drive model - use sample collection process / analysis that does not require hazardous materials or handling. - alternate route to site that avoids natural hazards (fire, animals, terrain)
<b>3. Engineering Controls</b>	<b>Separation / isolation of hazard</b> - establish safety perimeter around equipment, eg, drilling rig, winch, davit
<b>4. Administrative Controls</b>	<b>Change the work practice</b> - schedule frequent hypo / hyperthermia assessments / breaks - limit maximum time on task, eg driving, operating hazardous equipment - assign more personnel to task (hauling heavy equipment) - dedicated dangerous animal sentry - provide/seek methodology or safety training, eg off-road vehicle, small-boat operation; (see EOAS safety website for training resources)
<b>5. Personal Protective Equipment</b>	<b>Provide protective clothing and or equipment.</b>

### **3. ACCIDENT/INCIDENT REPORTING, INVESTIGATION AND RECORDING**

(a) Before commencement of the field activity, the staff member in charge must be familiar with the UBC policy on Accident/Incident Reporting, Investigation and Recording Procedures.

(b) An Accident/Incident Report must be completed for all incidents, no matter how minor. *The supervisor of the group or the staff member in charge of the field activity should undertake an investigation of the incident on site and assist with the completion of the CAIRS incident report form. A thorough investigation of the immediate and underlying causes of an incident is essential to prevent a recurrence.* Refer to the UBC Incident Site Investigate Guide for details. The CAIRS report is on-line and should be completed as soon as on-line access is possible.

## APPENDIX A: FIRST-AID TRAINING ASSESSMENT

Use the table below to assess the minimum first-aid training for fieldwork, as required by WorkSafeBC. Required training depends upon the size of the team and distance to the nearest hospital. Each fieldwork location may require a distinct first-aid assessment.

If someone is trained in first aid, they are able to give first-aid to students in good faith under the Good Samaritans Act. This could be any type of first aid, including Occupational First Aid. Although we would have no legal obligation under the Act to have first aid for students who are not UBC employees, we would still have a moral duty of care for these students. It is recommended that we eliminate the distinction between faculty and students, and have them grouped together. When completing the first aid assessment, the total number of faculty and students on the expedition will help determine the level of first aid and equipment required.

The minimum levels of first aid are outlined in *Schedule 3-A Minimum Levels of First Aid*.

<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-03-rights-and-responsibilities#Schedule3A>

The table below from WorkSafeBC applies to a workplace that an employer determines under section 3.16 (2)(b) of the Regulation creates a **moderate risk** of injury and that is more than 20 minutes surface travel time away from a hospital. If the mitigated risks are all **low**, find the first-aid training requirements in Schedule 3-A at the WorkSafeBC link in the previous paragraph.

Item	Column 1 Number of workers per shift	Column 2 Supplies, equipment, and facility	Column 3 Level of first aid certificate for attendant	Column 4 Transportation
1	1	- Personal first aid kit		
2	2-5	- Level 1 first aid kit	Level 1 certificate	
3	6-15	- Level 1 first aid kit ETV equipment	Level 1 certificate with Transportation Endorsement	
4	16-50	- Level 3 first aid kit Dressing station ETV equipment	Level 3 certificate	ETV
5	51-100	- Level 3 first aid kit First aid room ETV equipment	Level 3 certificate	ETV
6	101-300	- Level 3 first aid kit First aid room - Industrial ambulance equipment	Level 3 certificate	Industrial ambulance
7	301 or more	- Level 3 first aid kit First aid room - Industrial ambulance equipment	2 attendants, each with Level 3 certificates	Industrial ambulance

It is beneficial for faculty and students to take *wilderness* first-aid training, but it is not a WorkSafeBC requirement.

## APPENDIX B: EXAMPLE HAZARD IDENTIFICATION AND RISK ASSESSMENT FORM (WATER-BASED)

### Description of fieldwork activity and travel plan:

Fieldwork using EOAS boat “Kraken” on the North Arm of the Fraser River, 4-5 days total over July 5-16 2021. On days when fieldwork occurs:

- Participants will meet at the McDonald Park boat launch in morning (near low tide)
- Boat operations will take place in the North Arm between the Strait of Georgia and New Westminster.
- Boat will return to boat launch in afternoon and participants will return home.

Fieldwork will consist of observations using a Biosonics echo sounder, boat-mounted acoustic

Key Activity/Task	Hazards and possible outcomes	Pre-Control Risk			Controls	Post-Control Risk		
		Consequence	Likelihood	Risk Level		Consequence	Likelihood	Final Risk Level
Exposed to elements during field work on water	Extremes of Hot or Cold – hyper / hypothermia; sever sunburn; dehydration	Moderate	Major	Moderate	<p>In hot weather use sun hat/ sun screen/ drink water</p> <p>In cold weather bring toque/mitts/snacks</p> <p>Each person is responsible to bring extra food/water/clothing in a backpack for on the boat.</p> <p>Participants told to bring appropriate PPE.</p> <p>-boats operators (EOAS sea-technicians) are Marine Basic First Aid certified; the boat is equipped with a Level 1 First Aid kit.</p>	Low	Low	Low
On water	Immersion, falling off boat – drowning, hypothermia	Major	Moderate	Moderate	<p>All personnel wear PFDs at all times when over water;</p> <p>appropriate protective clothing;</p> <p>dry clothing on board;</p> <p>EOAS boat is</p>	Moderate	Low	Low

					<p>operated by EOAS sea-technician staff, who have certifications for Small Vessel Operator Proficiency, and Marine Basic First Aid; the boat is equipped with a Level 1 First Aid kit.</p> <p>- EOAS boat is equipped with VHF radio. Technicians have Restricted Operator's Certificate (Maritime) with DSC Endorsement.</p>			
Hygiene	Personal (eg , cleaning and toilet facilities)	Moderate	Moderate	Moderate	There is a public washroom near the McDonald Park boat launch. Disinfectant will be provided on boat.	Low	Low	Low
Foods / chemical handling	Allergies and allergic reactions (specify)	Moderate	Moderate	Moderate	Check to be made during planning and participants asked to be prepared with any required allergy medicine.	Low	Low	Low
Gear deployment / handling	Cutting, stabbing, puncturing	Moderate	Moderate	Moderate	Handle knives with care when being used.	Low	Low	Low



					<p><i>-deploying equipment from boats may result in cuts from winch wire.</i></p> <p><i>Awareness and rules (e.g., don't touch wire when it is being spooled or unspooled)</i></p>			
<i>Gear deployment / handling</i>	<i>Entanglement</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<p><i>Use two persons for all deployment activities to provide continuous checks. Don't "stand in the bight".</i></p>	<i>Low</i>	<i>Low</i>	<i>Low</i>
<i>Working on boat / dock</i>	<i>Slipping, tripping and falling</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<p><i>Maintain tidy and organized boat / dock space. Put away tools and neatly organize lines in totes. Wear steel-toes footwear. Maintain watch for large waves from passing vessels. Hold onto boat while standing, or sit. Visual awareness when working, while underway, while on dock.</i></p>	<i>Low</i>	<i>Low</i>	<i>Low</i>
<i>Using electrical equipment</i>	<i>Electrical</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<p><i>Power supply on the boat is GFI protected. Maintain electrical cords in good condition. Do not use</i></p>	<i>Low</i>	<i>Low</i>	<i>Low</i>

					<i>electrical power in wet conditions.</i>			
<i>Operating Vehicles, machinery</i>	<i>Accidents (crashing, capsizing)</i>	<i>Major</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Transport to/from Boat Launch to UBC through Vancouver streets</i> <ul style="list-style-type: none"> <li>• <i>Sea-tech drives EOAS department vehicle</i></li> <li>• <i>Sea-tech carries a cell-phone for emergencies.</i></li> </ul> <i>-All boats are operated by EOAS seagoing technical staff, following their long-standing safety protocols. Boat is equipped with VHF radio. Technicians have Restricted Operator's Certificate (Maritime) with DSC Endorsement.</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>
<i>Handling heavy equipment, getting on and off boat</i>	<i>Crushing</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>steel-toed boots (provided by EOAS Dept., free of charge) are required for all participants during fieldwork (on dock, or on the boats).</i> <ul style="list-style-type: none"> <li>-<i>loading/unloading of vehicles occurs under</i></li> </ul>	<i>Low</i>	<i>Low</i>	<i>Low</i>

					<i>direct supervision of UBC staff. Do not embark / disembark vessel unless tied at dock.</i>			
<i>Handling heavy equipment, getting on and off boat</i>	<i>Struck by or striking against</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Potential for being struck by swinging instruments/sampling devices/meter blocks hanging on wire as part of shipboard operations. Risk mitigated by proper training in deck operations</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>

**APPENDIX C: EXAMPLE HAZARD IDENTIFICATION AND RISK ASSESSMENT FORM (LAND-BASED)**

Note: This example is in a different format (old version) than the current form (version above).

HAZARD CHECKLIST	<u>Possible source/agent</u>	<u>Initial risk level before control measures</u>	<u>RISK CONTROL measure</u>	<u>Final risk level</u>
		Low, Med, High or N/A	<b><u>MUST BE FILLED IN IF THERE IS ANY RISK</u></b>	
<b>Temperature</b>	<input checked="" type="checkbox"/> Fire <input type="checkbox"/> Hot environment <input type="checkbox"/> Cold environment <input type="checkbox"/> Other _____	Med	Ensure the generator is away from any vegetation or other combustible materials, Low fire extinguisher on hand at all times near the generator.	
<b>Water or Immersion in</b>	<input type="checkbox"/> Boating <input type="checkbox"/> Swimming <input type="checkbox"/> Diving <input type="checkbox"/> Collecting or travelling near water bodies <input type="checkbox"/> Other _____	N/A		
<b>Stress</b>	<input checked="" type="checkbox"/> Thermal – heat <input type="checkbox"/> Thermal - cold <input type="checkbox"/> Repetitive activity/motion <input type="checkbox"/> Other _____	Med	Be prepared for summer conditions, appropriate clothing, have lots of water on hand, seek shade when needed.	Low
<b>Hygiene</b>	<input checked="" type="checkbox"/> Food preparation <input checked="" type="checkbox"/> Food storage <input checked="" type="checkbox"/> Personal (eg , cleaning and toilet facilities) _____ <input type="checkbox"/> Other _____	Med	Food will be prepared by each team member for their own consumption, stored in their own bag. Each team member will have a personal supply of hand sanitizer while in the field. If washroom facilities are required public washrooms are available within a 15 minute drive from field sites.	Low
<b>Allergies and allergic reactions (specify)</b>	<input type="checkbox"/> Chemical _____ <input type="checkbox"/> Animal _____ <input type="checkbox"/> Food _____ <input type="checkbox"/> Other _____			

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<b>Cutting, stabbing, puncturing</b>	<input type="checkbox"/> Blades/knives <input type="checkbox"/> Sharpened tools <input type="checkbox"/> Equipment <input type="checkbox"/> Environment (eg. thorny bushes) _____ <input type="checkbox"/> Other (specify) _____	N/A		
<b>Entanglement</b>	<input type="checkbox"/> Rope/wires <input type="checkbox"/> Grass <input checked="" type="checkbox"/> Clothing <input type="checkbox"/> Other _____	Med	Don't wear loose clothing which could be caught on branches.	Low
<b>Slipping, tripping and falling</b>	<input type="checkbox"/> Rope/wires <input checked="" type="checkbox"/> Uneven surface <input type="checkbox"/> Wet environment/surface <input type="checkbox"/> Muddy environment/surface <input type="checkbox"/> Working at heights/ladder use <input type="checkbox"/> Tree climbing <input type="checkbox"/> Other _____	Med	Wear appropriate footwear (sturdy hiking boots with ankle support). Watch footing and go slow, especially when carrying equipment. Do not do fieldwork when there are wet/muddy conditions.	Low
<b>Site specific Animal hazards</b>	<input type="checkbox"/> Bites <input type="checkbox"/> Stings <input checked="" type="checkbox"/> Bears <input type="checkbox"/> <input type="checkbox"/> Other (specify species if known and identified hazard) _____	High	Make noise while away from the vehicle, stay with at least one other person, carry bear deterrent spray.	Med
<b>Electrical</b>	<input checked="" type="checkbox"/> Power generation equipment <input type="checkbox"/> Plant and Equipment <input type="checkbox"/> High Voltage <input type="checkbox"/> Other _____	Med	Ensure the generator is working properly before going to the field, make sure all extension cords are free of damage, ensure electrical equipment is away from any water on site.	Low

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<b>Chemicals (specify)</b>	<input checked="" type="checkbox"/> Handling and use <input checked="" type="checkbox"/> Transport <input checked="" type="checkbox"/> Storage <input type="checkbox"/> Name of chemical(s) <u>gasoline</u> <hr/> <hr/>	Med	Use proper precautions for handling gasoline (for generator). Keep the Jerry can away from vehicle occupants while driving. Do not store the generator or jerry can with fuel in them (drain both at the end of each trip).	Low
<b>Radiation</b>	<input type="checkbox"/> Ionising source <input type="checkbox"/> Non-ionising source <input type="checkbox"/> Plant and Equipment (laser) <input type="checkbox"/> Electromagnetic <input type="checkbox"/> Ultraviolet (lamps/solar) <input type="checkbox"/> Other _____	N/A		
<b>Pressurised vessels or equipment (includes compressed air and gas bottles)</b>	<input type="checkbox"/> Handling and use <input type="checkbox"/> Transport <input type="checkbox"/> Storage <input type="checkbox"/> Name of gas(es) _____ <hr/>	N/A		
<b>Vehicles, plant and machinery</b>	<input type="checkbox"/> Four wheel drive <input type="checkbox"/> Quad bike <input type="checkbox"/> Boat <input type="checkbox"/> Trailer <input type="checkbox"/> Bus <input type="checkbox"/> Heavy vehicle _____ <input checked="" type="checkbox"/> Scientific equipment <input type="checkbox"/> Motorised equipment <input type="checkbox"/> Pressure equipment <input type="checkbox"/> Conveyors <input type="checkbox"/> Sampling equipment <input type="checkbox"/> Other _____	High	Only trained and Transport Canada certified people can pilot the RPAS-lidar system. All Transport Canada regulations will be followed when operating the system (i.e. informing any nearby airports prior to operations, not flying within 5 m of ground crew members or any bystanders. All internal procedures for operating the aircraft will be followed at all times.	Low

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<b>Vibration</b>	<input type="checkbox"/> Plant and Equipment <input type="checkbox"/> Environment (eg earthquake) <input type="checkbox"/> Other _____	N/A		
<b>Crushing</b>	<input type="checkbox"/> Equipment <input type="checkbox"/> Plant <input checked="" type="checkbox"/> Environment (eg rock fall) _____ <input type="checkbox"/> Other _____	Med	Do not set up equipment in potential rock fall areas, within active channels on fans, or below cut banks.	Low
<b>Noise</b>	<input type="checkbox"/> Plant and Equipment <input type="checkbox"/> Vehicle _____ <input type="checkbox"/> Environment _____ <input type="checkbox"/> Other _____	N/A		
<b>Inhalation</b>	<input type="checkbox"/> Fumes <input type="checkbox"/> Smoke <input type="checkbox"/> Dust <input type="checkbox"/> Welding vapours <input type="checkbox"/> Chemicals (specify) _____ _____	N/A		
<b>Suffocation</b>	<input type="checkbox"/> Tunnels <input type="checkbox"/> Avalanches <input checked="" type="checkbox"/> Land slippage <input type="checkbox"/> Confined space <input type="checkbox"/> Other _____	High	Do not conduct field work after heavy rains or snowmelt (times of increased debris flow activity). Set up field equipment away from fresh debris flow impacts.	Med



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<b>Struck by or striking against</b>	<input type="checkbox"/> Plant and Equipment <input type="checkbox"/> Vehicle <input checked="" type="checkbox"/> Lightning <input checked="" type="checkbox"/> Environment (eg rock fall, tree branch) _____ <input type="checkbox"/> Other _____		Do not conduct work during electrical storms. If thunder is heard, stop work and do not resume until there has been 30 minutes since the last thunder heard. Do not set up equipment in potential rock fall areas, below cut banks, and set up away from trees (especially dead trees) and do not conduct fieldwork in high winds.	Med
<b>Other factors</b>				

<b>Completed by: (Name)</b>	
<b>Completed by: (Signature)</b>	<b>Date:</b>
<b>Signed: (Supervisor)</b>	<b>Date:</b>
<b>Signed: (Dept Head or delegate)</b>	<b>Date:</b>