



## FINAL HSE FRAMEWORK

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### 1.0 HEALTH AND SAFETY TOOLKIT

This toolkit provides you and your team with resources to better protect you while conducting climate and environmental monitoring activities.

This document includes details on:

- Project health and safety plans – Describes what they are and the important things to think about when one is developed.
- Health and safety training – Describes training to help team members stay up to date with appropriate skills and knowledge.
- Emergency preparedness – Provides details on how to handle a fieldwork emergency, including having a plan and the right skills and supplies in place to handle an emergency.
- Field research safety – Provides information to help team members understand their rights and responsibilities related to project safety. Also provides information on possible fieldwork hazards, and basic activities and precautions that can be taken to improve fieldwork safety.
- Additional resources – Provides other information that may assist with the health and safety planning process.

### 2.0 PROJECT HEALTH AND SAFETY PLANS

This section will help you develop your health and safety plan prior to heading out for fieldwork. A health and safety plan will help the team conduct climate and environmental monitoring activities more safely.

#### 2.1 WHAT IS A HEALTH AND SAFETY PLAN?

A project health and safety plan or “HASP” (also called a “project-specific safety plan” or “site-specific safety plan”) is a tool that can be used to reduce the risk of team members being harmed, injured, or developing an illness from doing fieldwork. Creating a HASP will help you to identify health and safety hazards, determine their risk, and plan safer ways to do your fieldwork.

#### 2.2 WHY CREATE A HEALTH AND SAFETY PLAN?

Protecting the health and safety of you and your team is very important when carrying out climate or environmental monitoring projects, and a plan that supports the health and safety of the team is good for everyone working on the project.

Climate monitoring work can take place on water, ice or in rugged terrain, in remote areas, and under potentially hazardous conditions. The risk of harm, injury or illness can be significant, even including the possible loss of life, and if something goes wrong, help can be a long distance away.

An injury or illness can seriously affect the life of the injured or sick person, but can also be upsetting to the entire team. Morale can decrease, schedules can be disrupted, and the project may even be delayed or cancelled.

Decrease risk of harm or injury by:

- Thinking of ways you or your team could be harmed, injured or become ill on a project,
- Developing a plan for conducting the fieldwork more safely, and



- Telling others on the team what the plan is.

Planning to work more safely also has other benefits, such as:

- Protecting expensive equipment from damage,
- Reducing the chance of losing important supplies, or
- Thinking more about safety when doing everyday tasks outside of work.

### 2.3 STEPS FOR CREATING A HASP – RECOGNIZING, ASSESSING AND CONTROLLING HAZARDS

A new HASP should be developed for each new project, and the HASP should be updated if there are big changes to the project work. It is best for all team members to help with creating the plan. The team can meet as a group to think about the project, its tasks and hazards, and how to come up with solutions to safety concerns or problems (also called “brainstorming”). To develop a HASP, follow these six steps:

1. **List the Project Tasks:** Start with the overall goal, and then break the project down into smaller tasks that are needed to finish the project. Remember:
  - *Think about the way you will travel between home base and the field site(s). Travel-related tasks can often be some of the most hazardous.*
  - *How many tasks the project work needs to be broken into is up to the team, and will depend on how big or complicated the project is.*
  - *Tasks that are not completed in the field may also be included. For example, team meetings, prior to site work, planning or project management, and reporting after the fieldwork is done. These tasks are generally very low risk, however, and so the team may choose not to include them.*
2. **Identify Hazards for Tasks:** Think about each task one-by-one and think about what hazards the team may face when carrying out that task.
  - *See Appendices A and B in the [Additional Resources and Links](#) for downloadable lists of possible hazards and possible ways to control those hazards. Not all hazards are listed here. Additional hazards may exist – don't forget to consider hazards other than the ones that have been suggested.*
  - *Think about hazards related to the tools, equipment or supplies that will be used in the field, including how these are used and what could happen if something went wrong with the equipment or supplies. Think about the supplies/equipment that might be necessary for survival (e.g., vehicles, fuel supplies, firearms, shelter, food, etc.). Are these items likely to break, fail, go bad or be lost?*
  - *Tips to follow during your “brainstorming session” can be found here: [Brainstorming Techniques - Wikipedia](#).*
3. **Identify Consequence(s) of Exposure:** Think about what could go wrong (the “consequences”) if you are exposed to a hazard. Focus on what is mostly likely to go wrong as well as the most serious possible consequences of exposure.



- *Hazards may affect workers or the project in more than one way. There may be many consequences of exposure to the hazard – list each of them. For example, the most likely consequence of an uncontrolled fire might be a minor burn, but this might also cause the field site to burn down, and/or loss of life or the need for rescue.*
4. **Reduce the Risk:** Starting with the riskiest activities, decide as a group if there is a safer way to complete the task, following these two key steps:
- 1) **Identify Existing Controls:** Are there any safety measures or practices already in place that would help protect the team member(s) from getting injured, becoming ill or suffering other types of harm (e.g., mental distress) while performing the task? For example, using boots that have anti-slip soles, or extra equipment or supplies that are already being packed for the trip.
  - 2) **Consider Additional Controls:** Finally, decide as a group if any changes can or should be made to the current project plan to better protect the team member, if while performing the task, they get exposed to the hazard. When considering adding controls to improve safety, think about the following:
    - *Higher risk hazards will likely require more controls than lower risk hazards.*
    - *Controls may include changes to how or when tasks are completed (e.g., taking a different route to site, do the work at a less hazardous time of year, use safer equipment, etc.).*
    - *Changes may include adding extra safety measures to limit the chances that a team member could be harmed. For example:*
      - *Use or take more reliable or less hazardous field equipment or supplies,*
      - *Take extra/backup supplies/equipment,*
      - *Have frequent check-ins with home base,*
      - *Send another team member to help do the task or to watch out for hazards while the task is done,*
      - *Make regular noise to reduce the chance of a surprise animal encounter, etc.*
    - *If risk from the hazard is already low enough (e.g., the chances of harm are low, or the consequences of harm are low), then the group may decide that no changes to the existing plan are needed.*
    - *Consider how often you may be exposed to a hazard (i.e., frequency), and how serious the consequences of exposure to the hazard would be, to decide if extra control is needed:*
      - *The more frequent the exposure to a hazard is, the more likely it is to cause harm, injury, or illness to team members.*
      - *Hazards with more severe consequences usually need more controls.*
    - *If you have limited planning time, start by reviewing tasks with the highest level of risk (consider frequency and severity) first and then work through to the lower risk tasks as time permits.*



- 5. **Assign Responsibility:** Share the plan with the project team and decide who will be make sure each of the safety measures are put into action. This can a single person such as the project manager or fieldwork team leader, or can be assigned to other team members, as appropriate.
  - o *All team members should be familiar with the safety measures and how to put them into action, in case one team member is no longer able to work on the project.*
- 6. **Emergency Preparedness:** Make plans for how the team will respond to foreseeable emergency situations. See [Emergency Preparedness](#).

### 2.3.1 HELPFUL FORMS AND TABLES

The process outlined in Steps 1-5 above is sometimes called a “job safety analysis” (JSA), “job hazard analysis” (JHA) or “job hazard breakdown”, or when related to travel can be included in a “journey management plan”. Examples of forms and tables that may help with the completion of steps 1-5 can be easily found on the internet by searching for these terms.

Examples of a typical JSA/JHA can be found here: [Job Hazard Analysis - Wilderness Patrol Work](#) or [Job Hazard Analysis - Volunteer Field Work - Desert](#)). Also see the sample JSA template in Excel format provided as Appendix C in the [Additional Resources and Links](#) section (only the first few rows have been filled out as an example).

### 2.3.2 BASIC ELEMENTS OF A HEALTH AND SAFETY PLAN

To be effective, a HASP should include the following elements. Use the following checklist to confirm they are included for your project.

Checkbox	Plan Element
<b>Key Elements</b>	
<input type="checkbox"/>	A brief description of the project, including the fieldwork location(s), team members involved, and the overall objective.
<input type="checkbox"/>	Contact information for key project staff in emergency and non-emergency situations.
<input type="checkbox"/>	A list of the tasks that team members will perform during the project.
<input type="checkbox"/>	A list of the hazards that the project team has identified for each project task.
<input type="checkbox"/>	A brief description of the potential consequences of exposure to those hazards (i.e., how might these cause harm, injury, or illness).
<input type="checkbox"/>	What can be done to limit the risk to team members from these hazards, or in other words, what can be done to limit: <ul style="list-style-type: none"> <li>• The chance of any identified hazards to cause harm, and</li> <li>• The severity of any harm that might occur?</li> </ul>
<input type="checkbox"/>	Who will be responsible for the safety measures used?



<input type="checkbox"/>	Procedures to be followed in an <a href="#">emergency</a> . <i>(These can be prepared as a separate project emergency plan, or included as part of the HASP)</i>
<b>Optional Elements</b>	
<input type="checkbox"/>	Forms, checklists, and other supporting documents to help with the HASP planning/creation process.
<input type="checkbox"/>	References to applicable health and safety legislation or internal health and safety rules or guidelines.
<input type="checkbox"/>	Established procedures for performing frequently completed, very high-risk tasks safely <i>(if the project team feels these are needed to improve safety).</i>
<input type="checkbox"/>	Links to training and educational resources.

### 2.3.3 HEALTH AND SAFETY PLAN FORMAT

- Creating the HASP is the most important step to protect the team from fieldwork hazards (see [Steps For Creating a HASP – Recognizing, Assessing and Controlling Hazards](#)). All team members need to know and understand the overall project plan, and any new safety measures that are to be followed during project activities.
- A HASP can be a typed-up document, handwritten, an email, a table or diagram, or a combination of these. Choose the format that will work best for you and your team to make sure the plan is easily accessible to the team.
- While a strong oral tradition may exist within your community, it is recommended that the HASP is documented in some version noted above, in addition to team discussion. It is recommended that discussions or meetings are recorded where possible, for the following reasons:
  - The team, or new team members who missed the discussion, can listen to what was said a second time, and;
  - As a record that the HASP was completed if needed during an accident investigation.
- Some examples of completed and templated health and safety plans include:
  - [University of Alberta, King Lab Field Activities Plan](#) (filled out)
  - [Simon Fraser University - Field Activities Plan - Modified for COVID-19](#) (blank)
  - [University of Regina – Safety Planning Record](#) (blank)
  - [Ohio State University – Remote Fieldwork Safety Plan](#) (blank)



### 2.3.4 ADDITIONAL TIPS FOR DEVELOPING BETTER HEALTH AND SAFETY PLANS

- Project leads should determine if a HASP will be developed, and if so, they should lead the HASP creation process and take responsibility for making sure the HASP is completed.
- Don't leave the HASP to the last minute. Start working on the HASP well before the scheduled fieldwork, to allow enough time to develop a thorough plan.
- "Brainstorming sessions" are often better if the group is diverse and has different perspectives and backgrounds (e.g., includes a range of ages, experience, project roles, technical ability, etc.).
- The team developing the HASP should understand all aspects of the fieldwork that will be conducted.
- Young and inexperienced workers are more likely to be injured during fieldwork. Therefore, their input and opinions when developing a HASP can be very valuable, but they may need extra encouragement to fully participate.
- Project leads should encourage the team to recognize that everyone's input is valuable, and everyone involved in planning should be encouraged and able to participate equally.
- Better plans can be developed when team members who did not help to develop the HASP are asked to review the completed HASP and provide their input.

## 3.0 HEALTH AND SAFETY TRAINING

Health and safety training helps reinforce the importance of working safely and prepares the team to conduct fieldwork in a safe manner.

### 3.1 HOW TO CHOOSE SUITABLE TRAINING COURSES

Training is only useful if:

- It is relevant and directly applicable to project work,
- Is needed by team members,
- Has appropriate content, and
- Is presented in a way that makes sense to the trainee.

Training is often more effective when project leads take the time to identify the team member's individual training needs, and not simply assign generic training to everyone.

For the purposes of climate and environmental monitoring projects, focus on gaps in the team's current skills and current knowledge by looking at:

- The skill level required for the project tasks versus the skill level of the current project team.

Many paid and free training resources are available. A list of training resources for a variety of health and safety related topics is provided in the [Additional Resources and Links](#) section. Many organizations, universities and colleges offer training courses, and health and safety consultants can provide customized training, as needed.



### 3.2 ESSENTIAL TRAINING

First aid training is essential training for all projects. Other types of training may be essential for many projects (e.g., predator awareness, wilderness survival skills, training on the use of specific medical supplies, etc.), and this should be evaluated on a project-by-project basis.

#### 3.2.1 FIRST AID TRAINING

- All team members performing project fieldwork should take advanced wilderness first aid training, including training in cardio-pulmonary resuscitation (CPR) (e.g., St. Johns Ambulance Wilderness First Aid Level 3 plus Emergency First Aid CPR-C & AED).
- Team members need to be capable of treating potentially serious wounds, possibly to themselves, with potentially little to no additional support, and to be able to stabilize themselves or another injured party until help can arrive.
- [St. Johns Ambulance](#), the [Canadian Red Cross](#), and other reputable providers deliver a variety of first-aid training courses on a regular basis.

### 3.3 TRAINING METHODS

There are four primary methods by which adult learning can be provided:

Method	Pros	Cons	Other Notes
Instructor-led training	<ul style="list-style-type: none"> <li>• Allows for direct interaction between trainees and the instructor.</li> <li>• Instructors can tailor the training to the specific needs of the trainees, keep the class on track and resolve any questions or misunderstandings of the trainees.</li> </ul>	<ul style="list-style-type: none"> <li>• Less flexible scheduling.</li> <li>• Greater cost vs. other methods (usually).</li> </ul>	
Self-paced learning	<ul style="list-style-type: none"> <li>• Students have flexibility to complete training at their preferred schedule and pace.</li> <li>• Lower costs than other methods (usually).</li> </ul>	<ul style="list-style-type: none"> <li>• Typically results in students learning / retaining information less than other methods.</li> <li>• No way to incorporate hands-on training activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Using quizzes with high passing scores will encourage greater student focus.</li> </ul>



Method	Pros	Cons	Other Notes
Structured on-the-job training	<ul style="list-style-type: none"> <li>Use of multiple learning methods (watching, listening, doing) allows for greater learning / information retention than most other methods.</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to do this type of training well for large student groups.</li> </ul>	<ul style="list-style-type: none"> <li>Could involve an experienced team member partnering with and “job shadowing” a more junior team member.</li> </ul>
Drills/mock exercises	<ul style="list-style-type: none"> <li>Very effective training method.</li> <li>Can identify possible problems/planning mistakes before going into the field.</li> </ul>	<ul style="list-style-type: none"> <li>High cost / time / resource requirements.</li> <li>Usually only suitable for life-threatening situations like emergency rescues.</li> </ul>	<ul style="list-style-type: none"> <li>Discussed further here: <a href="#">Emergency Preparedness</a>.</li> </ul>

**3.3.1 ADULT LEARNING**

Adults learn very differently from children. Adults are independent, goal-driven, have a lifetime of existing experiences and knowledge, need to be treated with respect, and generally need to see how the training fits into their day-to-day work to be fully engaged in training sessions.

For this reason, try to choose training:

- That involves trainees in the training, with trainers/instructors guiding the training process along, not simply providing information to trainees. For health and safety topics, this is often achieved through a combination of theory and hands-on activities or practical group learning exercises.
- Where Instructors treat trainees as equals in the learning process, not subordinates to the trainer,
- Where instructors encourage trainees to share their own unique personal experiences and knowledge with others so all may learn.
- That is organized, shows students what the objectives of the training are, how the training activities relate to those objectives, and how achieving those objectives will help them to do their project work better or more safely, and
- That includes a scored test of understanding of course material. This will help the project team lead to understand how well the course material has been understood and if any team members will need additional training on a given topic.

**3.4 TRAINING FREQUENCY, TESTING, AND RECORD KEEPING**

**3.4.1 TRAINING FREQUENCY**

Training should be repeated as often as necessary to make sure team members have a full understanding of the training topics and are able to complete their assigned tasks safely.

The required training frequency will depend on:



- Project-specific needs.
- How well and how long the training content is retained by those receiving the training.
- If there is exposure to hazards where there is a potential for serious harm or death if the training is not properly applied or understood (should typically be provided at least once per year).
- Whether and how often project conditions change (e.g., changes in weather or climate from season-to-season).
- Whether there are young or new workers (those new to the job or job tasks they are expected to perform) on the team (these workers are at greater risk and may need more training).

### 3.4.2 TESTING

Project leads can find out how well team members remember training content using a variety of methods, including:

- Informal conversations between trainees and the project lead or other highly experience team members,
- Formal quizzes, or tests (including those given to test understanding at the end of training), and
- On-the-job observation of team members as they carry out their tasks.

### 3.4.3 RECORDKEEPING

It is recommended that training records are kept as a reminder of when team members last received the training.

## 4.0 EMERGENCY PREPAREDNESS

Climate and environmental monitoring work often happens in remote, rugged and hazardous areas. If something goes wrong, help is often a long distance away and may take a long time to arrive. If an emergency happens during a project, having a response plan in place will save precious time that may be needed to rescue or assist a team member experiencing an emergency.

Since emergency situations are rare, it is best to have written emergency plans (i.e., physical or electronic documents) so they can be accessed and reviewed quickly by team members in case of emergency (e.g., carry a copy with them in the field).

## 4.1 CATEGORIES OF EMERGENCY

Four categories of potential emergency that could affect project teams and that need to be considered when developing [emergency plans](#) are described below.

1. Life-Threatening Medical Emergencies:
  - a) For example: heart attack, animal attack, hypothermia, severe allergic response, vehicle or plane crash, etc.
2. Potentially Life-Threatening Environmental Emergencies:
  - b) For example: fire/forest fire, flood, capsized boat, etc.
3. Conditions Requiring a Rescue (not immediately life-threatening):



- c) (e.g., stranding/failure of shelter or transportation, becoming lost, loss of food or water supplies, loss of medications, etc.)

4. Total Communications Failure between Field Team and Home Base.

## 4.2 EMERGENCY PLANS

It is best to include emergency plans as a section of the health and safety plan (HASP). In either case, the emergency plan for a project is different from a project health and safety plan in two important ways:

1. Emergency plans focus on the highest-risk hazards or conditions, and focus on the most severe possible consequences of exposure to those hazards (i.e., someone’s life could be put in danger right away, or could be put in danger if a rescue is not performed).
2. An emergency plan provides a list of the key information and procedures that are needed to respond to the emergency in a quick and organized way.

### 4.2.1 DEVELOPING AN EMERGENCY PLAN

Developing an emergency plan requires the following two basic steps:

1. Create a list of possible life-threatening hazards on the project and the consequences for each foreseeable type of emergency event that could project team members’ health and safety.
  - a) *You may have already done this while [creating the project HASP](#).*
2. Based on the hazards and consequences, decide what actions would be needed, and in what order those actions need to be taken, to respond to the emergency and remove the project team members from danger.
  - a) *The list of step-by-step actions should be detailed enough to answer the questions below. However, since things often change quickly during an emergency, the plan should allow team members room to think and make choices on how best to respond to the emergency, based on the training they have received.*

Think about the following when developing an emergency plan:

<ul style="list-style-type: none"> <li>• <b>How will communications be handled?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Who are the contact persons in case of an emergency?</li> <li>○ Who will contact whom, when will this be done, and under what circumstances?</li> <li>○ What will be done if communications with the field team are lost?</li> <li>○ How long after loss of communications with the field team will it be considered an emergency?</li> </ul>
<ul style="list-style-type: none"> <li>• <b>What persons/ organizations/ equipment or other resources will be required?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ e.g., internal personnel, equipment, and partner organizations/first responders. that are needed to respond to an emergency effectively.</li> </ul>



<ul style="list-style-type: none"> <li>• <b>Who will conduct search and rescue activities if required?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Share rescue plans with relevant first responder agencies before an emergency happens, so that they will be available and able to help if a rescue is needed.</li> <li>○ Make backup plans if first responders might not always be able to provide help for all types of expected emergencies.</li> </ul>
<ul style="list-style-type: none"> <li>• <b>How will search and rescue activities be coordinated, and who is in charge?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Will this be done by the project team leader? First responders?</li> </ul>
<ul style="list-style-type: none"> <li>• <b>How should team members protect themselves during an environmental emergency (see <a href="#">Appendix D</a>)?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Where should they take shelter?</li> <li>○ How will they decide if it is safe to evacuate the field location by themselves vs. calling for rescue?</li> <li>○ What evacuation steps would they follow?</li> </ul>
<ul style="list-style-type: none"> <li>• <b>What supplies / equipment should team members have with them to handle an emergency until help arrives?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Some possible examples include: <ul style="list-style-type: none"> <li>▪ maps with evacuation routes shown on the map,</li> <li>▪ Automated Electronic Defibrillator (AED),</li> <li>▪ first aid/medical supplies,</li> <li>▪ fire blankets,</li> <li>▪ methods to quickly create a fire or otherwise warm up a hypothermic person,</li> <li>▪ emergency shelters, and</li> <li>▪ ways to signal for help if communications fail (e.g., flares, signal mirrors, strobes), etc.</li> </ul> </li> <li>○ See <a href="#">here</a> for further information.</li> </ul>
<ul style="list-style-type: none"> <li>• <b>What <a href="#">training</a> do team members need to have to respond to an emergency until help arrives?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Some possible examples include: <ul style="list-style-type: none"> <li>▪ First aid training.</li> <li>▪ Wilderness survival training.</li> <li>▪ Training on the use of medical equipment such as AEDs, Epi-pens, etc.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>When or how will it be decided that the emergency is over, and no additional response is needed?</b></li> <li>• <b>Who will make this decision?</b></li> </ul>	<ul style="list-style-type: none"> <li>○ Will this be done by the project team leader? First responders?</li> </ul>

In many cases, creating emergency plans from scratch is not needed.



- Many organizations, such as public universities, publish emergency response plans and procedures for various emergency situations, including for remote fieldwork activities, and these may be freely available on the internet. An example of such a plan is:
  - [University of Alberta, King Lab Field Activities Plan](#) (see Sections 4-6 on pages 2-4, and Sections 12 and 14-16 on pages 6-7).
  - Also refer to the emergency planning sections within the other [HASP example plans](#).
- Add a reference or credit to the original document if using any unchanged sections of it as part of your own emergency planning process. It is also recommended to ask the organization or author who wrote the document for their permission to use any of their work, to avoid any copyright / plagiarism concerns that might exist.

You may want to carry out training drills to practice for an identified emergency. Emergency drills take time to set up but are the best way to practice for the real thing. Drills will often identify areas for improvement. The chance for different or changing project site conditions (e.g., different weather conditions during different seasons, terrain differences at different field sites, etc.) should be considered during a drill scenario to increase the benefit of drills.

Safety measures identified while developing emergency plans may also have value in protecting team members from everyday risks, and the HASP can be revised or updated to include these controls.

### 4.3 FIRST AID/MEDICAL SUPPLIES AND SURVIVAL GEAR

A good wilderness first aid kit is needed for all projects. There is no basic first aid kit that works well for every project, and kits should therefore be customized for the project (see below).

Additional medical supplies and survival gear/supplies may also be needed based on project conditions and the health of the team. Individual project team members should be responsible for carrying enough of their personal medications to last the length of the fieldwork as well as extra days in case of a delay leaving the field. Team members should be encouraged (but are not legally required) to disclose a serious medical condition. When a condition is disclosed, all field team members should be familiar with how to provide emergency medical help to that team member (e.g., administer medication, epi-pens, bronchodilators, etc.) if they are unable to help themselves.

Example first aid and medical supplies and survival gear is listed in the checklist in Appendix D (see [Additional Resources and Links](#)). The checklist also contains links to additional resources for customizing first aid kits for a project.

## 5.0 FIELD RESEARCH SAFETY

The following sections provide additional health and safety information related to fieldwork.

### 5.1 HEALTH AND SAFETY BASICS

#### 5.1.1 RIGHTS AND RESPONSIBILITIES

All workers (including unpaid workers) have three basic rights under Canadian health and safety legislation, commonly referred to as:

- The right to know:



- A worker has the right to know what hazards they may be exposed to during their work, and to get any training, knowledge and supervision needed to protect the worker’s health and safety.
- The right to participate:
  - A worker has the right to report unsafe work or work conditions to their supervisor / employer and to be involved in activities or decisions related to protecting or maintaining their safety (for example, assisting the project team in developing a HASP).
- The right to refuse unsafe work:
  - A worker has the right to refuse to do work they believe to be unsafe, until the employer corrects the unsafe condition or shows it is acceptably safe. The first step in the process is to tell your supervisor or employer about the unsafe condition.

Workers also have responsibilities to follow their employer’s health and safety procedures to protect themselves and their co-workers or team.

### 5.1.2 PERSONAL PROTECTIVE EQUIPMENT AND PROTECTIVE CLOTHING

Personal protective equipment (PPE) is any kind of protective equipment worn by a team member. Standard PPE that may be worn during some project tasks are described in the table below. A helpful infographic showing various types of PPE is available here: [CCOHS - PPE Infographic](#).

Location on Body	Types of PPE to Consider for Project Work
Worn on Head	<ul style="list-style-type: none"> <li>● Hard hat or bump cap for protection against falling objects.</li> <li>● Safety glasses for eye protection.</li> <li>● Ear plugs or ear muffs for hearing protection:               <ul style="list-style-type: none"> <li>○ Hearing protection is needed in any situation where you must shout to be understood by another person 2 metres (6 feet) away.</li> </ul> </li> <li>● Respirators for protection against hazardous substances that can be inhaled.</li> <li>● Face coverings to limit the spread of infectious diseases (e.g., COVID-19 face coverings).</li> <li>● Sun hat, sunglasses/tinted goggles, and sunblock for sun protection.</li> </ul>
Worn on Torso/Arms/Legs	<ul style="list-style-type: none"> <li>● High-visibility clothing or vests to increase visibility in dark or foggy conditions or in thick vegetation, and to prevent being mistaken as an animal by hunters.</li> <li>● Fall arrest harnesses.</li> <li>● Chemical-resistant aprons, coveralls or other clothing when hazardous chemicals could splash on skin.</li> </ul>



Location on Body	Types of PPE to Consider for Project Work
	<ul style="list-style-type: none"> <li>Insulated clothing for cold-weather work to prevent frostbite, chilblains, hypothermia, etc.</li> <li>Waterproof clothing to prevent hypothermia, and protect against exposure to rain, snow, etc.</li> </ul>
Worn on Hands/Feet	<ul style="list-style-type: none"> <li>Abrasion-resistant or knuckle-protecting heavy-duty work gloves.</li> <li>Vibration-dampening gloves (for rapidly vibrating tools such as chainsaws).</li> <li>Chemical-protective gloves (for touching substances that can be hazardous if skin contact occurs). If unsure what gloves are needed, consult a health and safety professional.</li> <li>Rugged boots with ankle support. Consider the need for soles that prevent sharp objects poking through and crush-resistant “safety” toes where sharp objects could go through the sole and/or where heavy objects could fall on the foot. Waterproof boots may be of value in some cases.</li> </ul>

### 5.1.3 LIFTING AND CARRYING

Back injuries due to incorrect lifting and carrying techniques or trying to lift objects that are too heavy are a common injury at all worksites. General steps to help avoid such injuries include:

- Only lift loads you can carry without discomfort or excessive effort.
- Repack supplies into multiple lighter loads rather than struggling to lift one heavy load.
- When lifting, keep your feet shoulder-width apart, bend your legs, and keep a straight back. Hold the weight as close to your body as possible, and do not lift it above shoulder level. Change direction by moving your feet and don't twisting when lifting so that the core of your body (torso) no longer lines up with your feet.
- Get help from one or more additional persons to lift heavier loads, or use levers, pulleys, or other assistance devices or mechanisms.

### 5.1.4 MENTAL HEALTH

Mental health and wellness are important to a team member's overall health and well-being, and can have an impact on project safety. Mental health issues can range from work-related stress to depression, compulsive behaviours, trauma from emotional and physical abuse, or exposure to traumatic situations.

Project leads should create an inclusive, accepting, community-focused work environment in which team members can voice mental health concerns without fear of judgement or retaliation. Make your team knows that there is value placed on team members' mental health. When a team member feels they are heard and recognized in a non-judgemental way, it can be an important step towards recovery.

Many mental health concerns can lead to inattention or lack of focus on the job if they are hidden from others (e.g., due to fear or stigma) or if required attention and/or treatment is not received. This is a known factor that can contribute to serious accidents or injuries. In some cases, it can also lead to violence to oneself or others.



When planning projects, take steps to limit potential stressful situations for all team members.

[Working alone](#) should be avoided if possible. Feeling isolated from others can lead to poor or deteriorating mental health or cause existing mental health concerns to get worse. If a team member must do fieldwork alone, it is recommended that the project lead takes the time to discuss this issue with their team to find ways to decrease the risk of feeling isolated (e.g., more frequent communication with the remote team member).

Mental health and wellness support services can be made available to team members to deal with the aftermath of physical or mental trauma, including traumatic events like serious injuries, emergencies or fatalities.

Additional mental health resources and support services, including services and resources focused on the specific needs of indigenous communities, can be accessed through the [Centre for Addition and Mental Health \(CAMH\)](#).

### 5.1.5 PHYSICAL HEALTH

Poor physical health and well-being can also impact project safety. Team members should be physically fit and able to perform the tasks they are given, including if they might need to rescue other team members or respond to other types of emergencies.

When a team member has told their team lead about a disability, injury, illness, or other condition that could limit their ability to perform certain tasks in some way, think about ways to accommodate the condition and minimize any possible impacts on project work.

Team members should be strongly encouraged to disclose this information for the safety of all team members (but cannot be forced to do so).

### 5.1.6 LAND VEHICLE SAFETY

Vehicle safety is an important topic, and many resources on safe vehicle operation can be found online. Some basics to consider include:

- Operators/drivers should be licensed as required under provincial/territorial law.
- Operators/drivers should be trained and competent in operating the vehicle.
- Walk around the vehicle and check for any problems with the vehicle every time before departing (do a “circle check”).
- Perform a check of the most important items every time before departing (e.g., adequate fuel supplies, tire pressure correct, clean windows, horn, brakes and lights functional, fluid levels adequate, no warnings or other indicators, windshield wipers functional, towed or carried loads properly secured, all couplings to trailers, in place and secured, etc.).
- Be prepared and have necessary supplies and equipment in the vehicle in case of breakdown (e.g., spare belt for snowmobile, spare spark plug and replacement tool, signal flares, traffic cones/flares, etc.).
- When driving or riding in off-road vehicles, such as snowmobiles, side-by-sides, quad bikes, etc., use of a helmet is strongly recommended, and may be required by law in some provinces/territories.
- Maintain vehicles based on the manufacturer’s recommendations.
- Do not operate vehicles while under the influence of alcohol or drugs.



- Do not operate a vehicle without adequate rest.
- Avoid distractions while driving such as communicating with home base. Consider pulling over to do this to avoid distractions.
- Do not operate vehicles in the dark unless absolutely necessary.

### 5.1.7 BOATING SAFETY

- Operators/drivers should be licensed as required under provincial/territorial law.
- Operators/drivers should be trained and competent in operating the type of boat used.
- Before using the boat, do an inspection of the boat to make sure it is safe to operate and that all necessary safety gear is stowed onboard, and have a crew briefing.
- Check weather conditions/weather advisories before starting a journey in a boat.
- Personal flotation devices (i.e., “lifejackets”) must be worn by the driver and passengers while in the boat.
- Perform a check of the most important items every time before departing (e.g., adequate fuel supplies, horn, motor and lights functional, fluid levels adequate and no warnings or other indicators, carried supplies adequately secured, etc.).
- Be prepared and have necessary supplies and equipment in the boat in case of breakdown (e.g., spare prop for outboard motor, spare spark plug and replacement tool, signal flares, satellite phone, etc.).
- Maintain boat (or check it has been maintained) based on the manufacturer’s recommendations.
- Do not operate boats under the influence of alcohol or drugs.
- Do not operate a boat without adequate rest.
- Do not operate boats at night unless in an emergency.

### 5.1.8 VACCINATIONS

Team members should have up-to-date vaccinations for common diseases they could be exposed to during fieldwork. This includes rabies (animal bites) and tetanus.

## 5.2 FIELD SAFETY BASICS

### 5.2.1 ESTABLISHING AND COMMUNICATING TRAVEL ROUTES TO THE SITE

Getting lost, or losing communications with the outside world, during remote fieldwork is a significant safety risk for team members.

#### 5.2.1.1 SETTING A ROUTE TO REDUCE HEALTH AND SAFETY RISKS

- When planning for project fieldwork, choose a travel route that minimizes exposure to hazards and high-risk situations (e.g., minimize travel over ice during changes in season, avoid areas with known or expected environmental hazards [\(see Appendices A/B\)](#) or difficult terrain, etc.):



- While this may result in extra cost or travel time, compare that to the time and cost required for a search and rescue.

### **5.2.1.2 COMMUNICATING ROUTE TO OTHERS**

- Always make sure that someone who is able to call for help/rescue knows your most current route of travel before setting out, and when you are expected to get to specific destinations along that route.
- Communicate regularly with that person (a daily check in is recommended at minimum), to confirm your location, especially if your planned route has changed. Setting scheduled times for check -ins is recommended.
- When travelling on water, through difficult terrain, or in bad weather, more regular check-ins are recommended.

### **5.2.1.3 FIELD NAVIGATION METHODS**

- A variety of methods are available for field navigation, including using landmarks, topographical maps and compasses, GPS-enabled devices, navigation by the sun, etc. Teams should select the methods that work best for them.
- Each team member should have at least one backup means of navigation should the primary means fail (e.g., dead batteries or device, lost map, etc.).
- Always check that devices used for navigation are functioning properly before travelling to field sites and that devices are rated to work at the expected project temperatures (e.g., liquid crystal display screens can “freeze” up at low temperature).
- Carry extra batteries for electronic devices in very cold weather as temperatures can affect battery life.

### **5.2.1.4 WHAT TO DO IF YOU ARE LOST**

- Have a plan in place before leaving for a site for what to do and who you will contact in case you become lost.
- Backtracking until reaching a recognized location is a common method when lost, but take extreme care doing so under low visibility or dangerous environmental conditions (see [Appendices A, B](#)), as this can lead to greater risks.
- Make contact with, and stay in contact with, outside help until the situation is resolved.



### 5.2.2 WORKING ALONE OR IN SMALL GROUPS IN REMOTE LOCATIONS

#### 5.2.2.1 WORKING ALONE

- Working alone when doing fieldwork should be avoided if possible. There is a much greater risk of injury or harm for a team member working alone, including increased dangers from animals and other humans.
- If working alone cannot be avoided, consider the use of additional safety measures to reduce the risk.

#### 5.2.2.2 COMMUNICATION STRATEGIES

- Regular communication with the project team at home base is key to staying safe during remote fieldwork. Set and keep up a regular check-in schedule.
- Have a communications plan in place that includes the check-in schedule, what to do if a check-in is missed, and how long to wait until starting rescue procedures.
- Have at least one backup communication method, and check that communications devices are functioning properly before travelling to field sites.
- When working in small groups, think about communication between those team members. Include the following in your communications plan:
  - How the team members will communicate with one another when not together,
  - How often and when the team members are to check-in with each other,
  - What the team should do if a communications window is missed (e.g., when to start rescue procedures), and who will carry out search and rescue activities (i.e., other members of the team who are not missing, or a professional search and rescue team?)

#### 5.2.2.3 PERSONAL SECURITY

- In areas where dangerous wildlife is present, team members may require firearms (and training on safe use of firearms). Use shelters that would protect against a predatory animal attack if possible. It is best to assign one team member to keep a full time watch for wildlife while the rest of the team does the field work.
- If using such shelters is not possible, consider having one team member keep a watch while others are sleeping.
- A team member working alone will be at most risk from other animals or people when sleeping. Where this danger may exist, think about adding additional safety measures for their protection (e.g., secure shelter, perimeter warning systems, etc.).



## **6.0 ADDITIONAL RESOURCES AND LINKS**

Additional resources and links that may assist with the health and safety planning process for climate and environmental monitoring projects are provided below.

- Appendix A – Hazard Checklist
- Appendix B – List of Example Project Hazards and Possible Preventative Measures.
- Appendix C – Example Job Safety Analysis Form (ordered by Task).
- Appendix D – Survival Gear and Medical and First-Aid Supplies Checklist.
- Appendix E – Training Resources Spreadsheet.

Headquartered in the Nation's Capital, CLAW Environmental Services Inc. (CLAW) is an Indigenous-owned consulting firm specializing in the provision of environmental services of particular interest to Indigenous communities. CLAW stands for Clean Land Air and Water. Founded in 2004, CLAW was established for the provision of environmental services to Federal Government Departments and to First Nations, Inuit and Métis communities. As an Indigenous-owned company, CLAW prides itself on working in a meaningful way with communities and clients to achieve a sustainable future.

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