

SWP Purpose

Working near swift moving water or fording swift water is part of trail crew duties during bridge building. Fording swift moving streams is a common activity for hikers or trail volunteers on the Great Divide Trail especially during spring runoff. This safe work practice (SWP) is intended to help workers in assessing the hazards of swift water – including lack of visible stream bottom creating poor footing, cold water, boulders, strainers, undercut banks, steep slippery banks, bends, ice or snow cover. Proper assessment, planning, picking a location and time for crossing and checking details will help to minimize the risk of swift water incidents.

Scope

This SWP applies to any worker who conducts the following:

- Working within 3 m of swift water (on shore or in swift water during bridge construction)
- Fording of swift water for trail building and maintenance activities

Responsibilities

Responsibilities apply to the Trip Manager/Volunteer Lead, all workers, and the Health and Safety Committee.

It is the responsibility of the **Trip Manager/Volunteer Lead** to

- Be familiar with the hazards of swift water
- Communicate to workers the risks of swift water within the work area or water crossings
- Plan a swift water activity to minimize or potentially eliminate the swift water hazard
- Reinforce to workers that any recommended controls must be applied consistently
- Awareness of workers knowledge in swift water hazards
- Require that this SWP be implemented for all applicable job tasks
- Train workers in a throw rope rescue, planning location of spotters for emergency rescue

It is the responsibility of the **Workers** to

- Be aware of potential hazards that may be encountered while working near swift water or fording swift water
- Be aware of their personal capabilities and comfort level working around swift water and to refuse work based on personal limitations
- Be aware of and comply with requirements communicated in this SWP
- Assess the swift water location and be familiar with physical hazards
- Ensure recommended controls are implemented and used appropriately.
- Immediately report any refusal or discomfort associated with working around swift water to the Crew Lead.

It is the responsibility of the Health Safety Committee to

- Maintain this Safe Work Practice
- Perform periodic audits to assess that these requirements/SWP are being acted upon.
- Reinforce that recommended controls are to be implemented and used appropriately.
- Proper throw rope techniques during Crew Leader Training

Hazards

Hazards relative to working around swift water or fording swift water could include:

- Strainers -logs, brush or obstructions in water that could allow water to pass through but pin or impale a person to the object due to force of water
- Boulders – large rocks below water surface causing standing waves and strong currents, foot entrapment
- Steep and slippery river banks and river bottom
- Undercut banks that could force a person under water due to strong currents
- Waterfalls – severe drop offs
- Cold water – water temperature could lead to shock or eventual hypothermia
- Force of water exerted on person
- Increased weight of wet gear

Controls

Controls may include elimination of work near swift water, selecting time of day or year for minimum water flow or location of crossing to reduce risk, assessing risks and preplanning to minimize risk impact, administrative, and/or PPE.

PPE - Crews working on bridge building near on swift flowing rivers shall wear a CSA approved Kayak whitewater helmet and fall arrest gear to minimize the risks of falling into fast flowing water.

HAZARD Assessment – If site conditions change significantly the team shall regroup to discuss the hazard changes and potential mitigations required.

Working Near Swift Water – this is defined as within swift water or 3 m of it

PLAN > ASSESS > CHECK *see Reference 2 below

PLAN

- Prepare a detailed plan of bridge building tasks
- Consider alternate methods to eliminate tasks requiring swift water entry
- Select time of year for work execution – after July 15 spring runoff water rates reduce significantly

- Select time of day to execute task – early morning potentially lowest flow rate (observe water for a day to confirm min flow times)
- Provide PPE to complete planned task – (hip waders with warm insulation, sturdy closed toe shoes with grip, helmet (Approved paddling helmet), PFD (task dependent))
- Prepare a rescue plan for a scenario where a worker is swept away – include spotter downstream with throw bag
- Plan a method to tie off tools and equipment to prevent loss in swift water
- Plan access to water if entry is required
- Swift water tasks should be planned and adapted to be within the worker's capacity.

ASSESS

- Observe water flow rates during day to select time to complete swift water tasks during minimum water flow rate
- Depth of water in planned work area - **swift water work should be aborted if water higher than knee height**
- Footing – slippery, varying depths, sharp rocks, entrapment
- Water access entry points – slippery or steep – modify for safe entry if required (tied off rope, ladder)
- Upstream and downstream for any debris that could become a strainer, dislodge from upstream to impact downstream work
- Downstream river bottom obstructions: boulders, fences, ice bridges
- Probable path of worker if they are swept away (observe current by throwing in stick)
- Assumptions in pre-plan to confirm that they are consistent with actual swift water conditions or site layout – rework plan to satisfy actual site assessment
- PPE (adequate for planned task -When working in cold temperatures, wear good, insulated clothing – assess it does not increase hazard in swift water work)
- Ensure PPE is in good repair (no leaks in hip waders, no damage if helmet used)
- Clear obstacles/downstream strainers where possible
- Emergency plan, locations for spotters and any unknowns previously not identified that could impact a rescue

CHECK

- Swift water hazards have not changed from assessment – if changed – back-out and re-assess plan
- Worker executing swift water task is competent and capable of completing task and aware of what to do if swept away
- Emergency plan in place prior to start of work (spotters knowledgeable with throw bag rescue in place, entry access available (if required), PPE in use)

- Task is manageable duration to prevent fatigue, loss of dexterity
- Communicate with worker to ensure they are comfortable, no new unforeseen risks – **STOP – back-out and re-assess or get help if required**
- Do not rush or cut corners.
- Designate a worker to be safety coordinator to clearly communicate to prevent swift water worker from losing stability in current or feeling effects of hypothermia.

FORDING SWIFT WATER

Fording swift water is one of the most risky and variable tasks of hiking. It is critical to minimize or eliminate any unnecessary risk. There are many good references of safe practices for swift water fording that are included as a reference in this document. Controls that eliminate risk can be broken down in an easy to recall saying:

PLAN > PICK > ASSESS > CHECK

PLAN

- Pack essential items (sleeping bag, warm set of clothes, fire starter, electronics) in dry bag
- Pack hiking poles or locate a hiking stick for 3 points of contact river crossings
- Pack closed toed sturdy shoes for river crossings (or use hiking boots)
- Check trail reports and maps to be aware of swift water fords on your route and potential alternate routes
- Plan time of year for hike based on difficulty of river fords and runoff conditions
- Prepare for potential of hypothermia – know the signs and how to treat for it
- Discuss methods of safely fording swift water with hiking group
- Be aware of rescue techniques, emergency plan and discuss with group in advance

PICK

- Minimum water flow rate time of day to ford – usually early morning to cross swift water
- Scout upstream and downstream to select easy access point where water is shallower and slower
- A crossing point that is suitable for the entire hiking group
- A crossing method best for location of crossing (single 3 point, group linked up)
- A back-out plan (wait it out, alternate crossing point, alternate route) if hazard too great for group comfort level

ASSESS

- Water properties – standing waves, uneven bottom, clarity of water, any strainers downstream of crossing point

- Water current – toss a stick in upstream and observe water speed and currents
- Water Depth – avoid cross swift moving water deeper than knees if possible (be ready to back out based on force of water and comfort level)

CHECK

- Personal items are secured safely so that will not cause drag or become snagged if swept away, hands are free, any belts are released, straps loosened for quick exit from pack if required
- Swift water hazards have **NOT** changed from plan or earlier assessment – **re-assess if hazards have changed**
- Face upstream, lean into current, take small slow side steps across ford maintaining two points of contact (one foot, one pole, both feet)
- Keep eyes on far shore – swift water may cause dizziness
- Comfort level – **back-out and re-assess alternate plan if outside personal limits**

See reference attached for safe crossing techniques (single and group crossing), how to assess swift water, optimum crossing points and rescue techniques

Training

Workers who are involved in bridge building tasks near swift water should be made aware of hazards and signs of swift water hazards, be aware of the detailed plan for bridge building and the emergency rescue plan in case of an incident. All workers need to be aware of **back out limits** where work is stopped and re-evaluated due to changes in swift water conditions.

Resources, References, Definitions

1. U.S. National Park Service, Safe River Crossings: <https://www.nps.gov/articles/safe-river-crossings.htm> - see included below.
2. U.S. National Park Service Swiftwater Rescue Manual. Throw bag use – pages 54 – 58, wading rescues, pages 59 and 60 - <http://mra.org/wp-content/uploads/2016/07/nps-swiftwater-rescue-manual-rev09-23-2012-SMALL.pdf> - see pages 54 to 58 included below
3. Pacific Crest Trail Association, lots of text, some worthwhile photos. Suggestion of stationing a bystander ready with a throw rope downstream with knowledge of its use – very wise: <https://www.pcta.org/discover-the-trail/backcountry-basics/water/stream-crossing-safety/>
4. New Zealand Mtn. Safety Council, good diagrams and point format: <https://www.bushwalkingleadership.org.au/resource/river-crossings-techniques/> - see included below.

5. Trail Hiking Australia, worthwhile details on using a pole for crossing: <https://www.trailhiking.com.au/river-crossing-techniques/>

Revision History

<u>Revision</u>	<u>Date</u>	<u>Description of Change</u>	<u>Personnel Involved</u>
REV 0	Mar 2021	New SWP	D Yanchula
Rev 1	Feb 2023	See changes in bold	D Yanchula