

Debris Flow Hazard Awareness in the Kootenay Region

Debris flows are fast-moving mixtures of water, sediment, boulders and logs that flow down steep mountain creeks. In recent years, debris flows have caused fatalities, near misses and significant property damage in the Kootenays.

This document is intended to help you understand this hazard in the Kootenay Region, identify some indicators that could be cause for concern and learn how to report a potential emergency.



Figure 1. Debris flow material that was deposited on the Kuskanook Creek fan after a rainfall event in August 2004.



Figure 2. Debris flood on Memphis Creek. Note the large volume of floating debris in the lake and the uncharacteristically turbid water.

Get to know your watershed:

- Learn the history of debris flow hazards on or near your property and the areas you visit often, especially near the mouths of creek channels and alluvial fans. Flood hazard mapping is available through your local government and is a good initial reference. For example, the Non-Standard Flooding and Erosion Areas (NSFEA) hazard map can be accessed through the Regional District of Central Kootenay's Property Information Mapping System (<https://maps.rdck.bc.ca/>).
- Be aware of dikes or flood control structures that may be protecting your property from flooding and/or debris flows. Structures that were built many years ago and are not being maintained may no longer be providing the protection it was designed for. A dam upstream of your property may also pose a hazard, depending on its condition and maintenance history. Refer to www.env.gov.bc.ca/wsd/public_safety/index.html to identify the locations of any such structures.
- If you live near or visit areas prone to debris flows, you should become familiar with the terrain between your property and the creek channel and fan apex. During a major flood event, creeks may suddenly change course and flow along a new or abandoned flood channel, and debris flow material may run out onto the fan area. Terrain features to be aware of include: abandoned creek channels; levees; scarred trees; and lobal deposit features.
- If you have concerns about debris flows impacting your property, you may wish to hire a qualified professional to provide additional assistance.

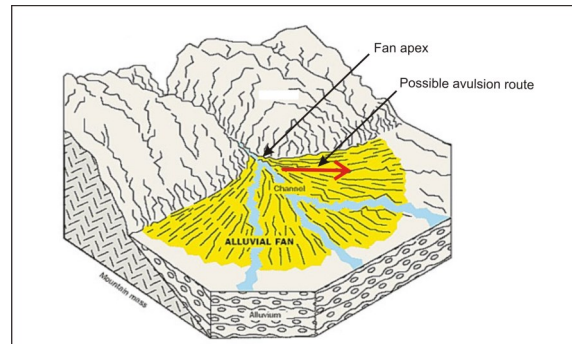


Figure 3. Schematic diagram of an alluvial fan, showing a possible flow route and geological features.

What you should do in an emergency:

- To report a debris flow emergency that is occurring call 911.
- To report observations of these debris indicators, call the 24-hour provincial toll-free number: 1 800 663-3456
- Local governments are responsible for responding to emergencies in their jurisdiction. The provincial government will provide technical expertise and assistance to local governments during emergencies. For more information, visit: <http://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery>

Debris flow hazard indicators:

- By monitoring the creeks near your property or the areas you visit frequently, you can become familiar with typical flow patterns and recognize any unusual events that may indicate a potential debris flow event.
- There are large natural variations in the water levels of creeks in the Kootenays associated with either snow-melt and heavy rainfall. Each creek responds differently, depending on the size and characteristics of its watershed.

However, an unusually rapid increase or decrease in flow may indicate that the creek has been blocked by a landslide upstream or that a debris flow is about to occur. Call the provincial emergency number below to report your observations.

- Creeks in the Kootenays often flow dirty during spring runoff and after a major rainstorm. Dirty or turbid water does not necessarily indicate that a debris flow hazard exists.

However, abnormally dirty water may signal that a landslide or bank failure has occurred upstream. Pulses of sediment in a creek channel may also indicate that something unusual has occurred upstream. Call the provincial emergency number below to report your observations.

- A large volume of debris (logs, sediment, etc.) that accumulates in a creek channel or has recently been transported down the creek and is now floating near the mouth of the creek may indicate that a natural hazard event has occurred in the watershed.

If you observe an unusually large and recent change in the accumulation of debris in a creek channel, call the provincial emergency number at 1 800 663-3456 to report your observations.



Figure 4. Turbid water in Gar Creek the day before the Johnson's Landing landslide on July 12, 2012.

Public Safety Advisory:

Use caution while spending time in a confined creek channel or gully that is prone to debris flows. Fatalities and close calls have occurred when people have been caught up in debris flows while working on their water intake systems.

To summarize, the following factors may indicate an upstream hazard:

- Abnormally dirty water
- Accumulation of large logs or debris in the creek
- Sudden changes in flow
- Pulses in flow (i.e. rapid changes in flow) or pulses of sediment
- Rapid accumulation of sediment or bedload along a flat section of a creek channel

***Not all debris flows are preceded by these indicators.
Following the advice in this document does not ensure your safety.***

To report the potential emergency, call the 24-hour toll-free number: 1 800 663-3456