

May 8, 2023

To: Regional District of Central Kootenay (RDCK) and Emergency Management and Climate Readiness (EMCR)

From: Sarah Crookshanks, P.Geo., Ministry of Forests

Re: Talbott Creek debris slide and debris flood

1. Introduction

Late in the afternoon on May 3, 2023 a debris flood event occurred on Talbott Creek. Debris blocked the culvert under Little Slocan South Road, causing debris and water to spill onto the road and erosion through the road prism. The highway maintenance contractor reported an additional pulse of material around 9 pm. The day prior, on May 2, a debris slide occurred around 1550 m in the adjacent unnamed drainage to the east, resulting in a debris flow that impacted several properties on the fan below (see SNT Geotechnical memo to RDCK dated May 7, 2023 for additional details).

On the morning of May 4, I flew over Talbott Creek and performed a ground assessment of the fan, accompanied by Gord Ihlen from the RDCK.

2. Description of the event and channel conditions

A small gully headwall debris slide in the Talbott Creek watershed resulted in a debris flood that travelled 2.5 km down to valley bottom. The initiation point at 1700 m (49° 35' 0" N, 117° 41' 23" W) and slide path are shown on the map in Figure 1. Photos of the debris slide and ridge top conditions are shown in Figures 2 and 3.

The debris slide was triggered by snowmelt runoff. The preceding hot temperatures caused high snowmelt rates likely exacerbated by the loss of canopy due to the 2020 wildfire. The area upslope of the initiation point is completely burned, composed of both moderate and high burn severity. The lack of canopy would also be expected to result in greater snow accumulation, increasing the amount of meltwater. The drainage area above the initiation point is approximately 2.5 ha, extending up to ridgetop at 1850 m.

Many segments of the Talbott Creek channel have been scoured to bedrock (Figure 4), and as such there is little remaining transport volume along those reaches. The channel gradient in the headwater area is ~60%, and 40-50% along the middle portion of the channel. If another event occurs, it is likely to be smaller since there is less material available to be eroded.

3. Fan observations

The channel is highly incised for 150 m upstream of the road and 50 m downstream of the road. A small pulse of sediment and water avulsed out of the channel at a water diversion structure 200 m upstream from the road and ran down a private access road located to the west of the Talbott Creek channel. In the event of a large debris flow on Talbott Creek, the flow could avulse at this location impacting the property at 3279 Little Slocan South Road. The landowner at this location was advised of the ongoing

hazard of another geohazard event on Talbott Creek. I recommended that he avoid spending time in the channel fixing his water intake channel until the snowmelt rates moderated.

The debris flood plugged the culvert under Little Slokan South Road, then spilled onto the road and eroded through the road prism causing nuisance property damage at 3303 Little Slokan South Road. No dwelling or structure was impacted at this location. The water intake structures at the fan apex were also damaged.

4. Residual hazard

There is an ongoing hazard of another snowmelt-induced debris flood or debris flow in Talbott Creek until the snow melts up to ridgetop. The high snowmelt rates over the past week produced large volumes of meltwater that may have undercut channel banks. However, any additional events will likely be smaller given that the remaining transport volume in the channel is less than before.

Talbott Creek is a drainage that is naturally subject to periodic debris flow events. The Talbott Creek post-wildfire risk analysis completed by Sitkum Consulting in 2020 found that the post-wildfire hazard of a debris flow on Talbott Creek had increased from moderate to high. This hazard still exists, and in the coming several years the likelihood of a geohazard event will remain elevated due to the wildfire changes to the canopy and soils in the headwater. While the channel is currently scoured to bedrock in places, debris slides and floods in future years will progressively introduce additional sediment volume into the system.

The ongoing debris flow and flood hazard should be communicated to the residents of the area.

Completed by:

S. Crookshanks
May 9, 2023



Original signed and sealed

Sarah Crookshanks, P. Geo.
Ministry of Forests
Permit to practice #1003022

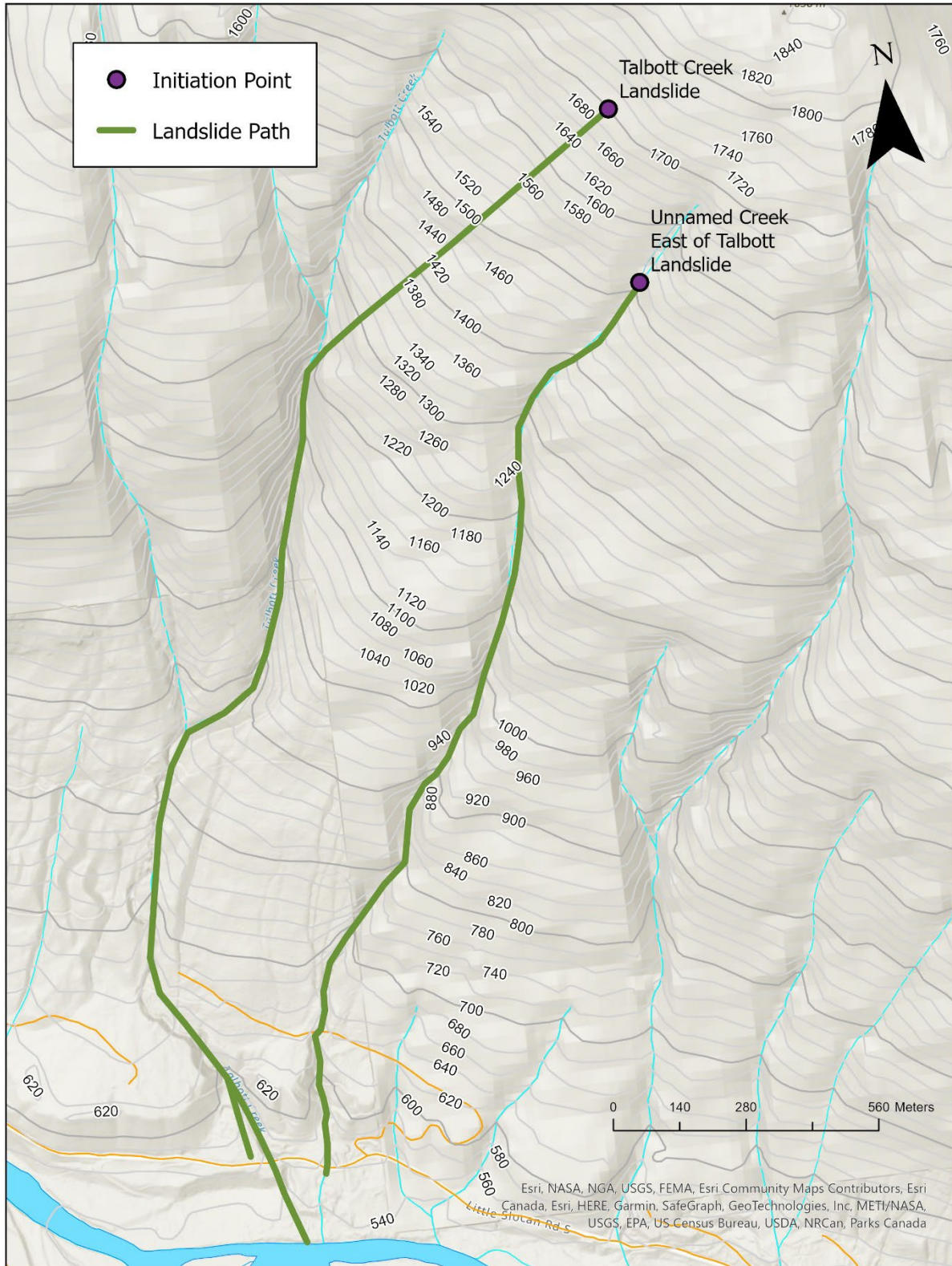


Figure 1. Overview map of the landslide initiation and paths a.



Figure 2. Headwall debris slide in the Talbott Creek watershed.



Figure 3. Oblique view looking west of the Talbott Creek debris slide.



Figure 4. Debris flood path down Talbott Creek.



Figure 5. Talbott Creek at Little Slovan South Road.



Figure 6. Talbott Creek upstream of the Little Slocan South Road.



Figure 7. Talbott Creek at its fan apex with a small avulsion down a private road west of the channel.



Figure 8. The runout of the small avulsion on Talbott Creek showing mud deposition along a private access road at 3279 Little Slovan South Road.