

## **A ROCK SLIDE - DEBRIS AVALANCHE OF MAY 1999, NOMASH RIVER, VANCOUVER ISLAND**

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The Nomash River is a tributary of the Zeballos River on western Vancouver Island. In the spring of 1999, a rock slide comprising approximately  $0.4 \times 10^6 \text{ m}^3$  of Quatsino limestone collapsed to the valley floor in the headwaters of the Nomash watershed (665,000E, 5,539,000N). The rock slide transformed into a debris avalanche as it hit a slope apron and valley floor deposits of saturated and snow covered debris. It made a right angle bend and continued down valley for nearly 2 km resulting in a total damage area of 39 ha. In the process, it ran up adjacent valley slopes reaching heights of 40 m above the valley floor, and entrained substantial amounts of debris to reach a resting volume of about  $0.7 \times 10^6 \text{ m}^3$ . Residents of the town of Zeballos, a remote coastal town 16 km from the event, found the Zeballos River brown with mud and a plume of mud extending well out into the ocean inlet. A detailed documentation of the landslide is presented herein. At  $13.5^\circ$ , the angle of reach was low for landslides of this type and magnitude. The relative excess travel distance ( $L_r$ ) was 226%. It is proposed that entrainment of saturated debris contributed to  $L_r$ . Velocities back-calculated using the dynamic analysis program (DAN) are estimated as greater than 30 m/s at the toe of the source slope, decreasing gradually throughout its length. Similar recent landslides have occurred nearby at the Conuma and Kaouk rivers. We propose that regional physiographic conditions including elevation, steep terrain sculptured by Pleistocene glaciation, fractured and weathered bedrock and high precipitation combine to make this portion of the island particularly susceptible to long run out landslides. This is of particular concern to existing and potential development or infrastructures within this region.