

Historical Debris Flows, British Columbia North Coast

*Proceedings of the 11th
Vancouver
Geotechnical Society
Symposium - Forestry
Geotechnique and
Resource Engineering*

30 May 1997

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Poster Abstract

Heavy rainfall is the dominant environmental factor contributing to debris flows on the B.C. North Coast. The location of large debris flows are easily identified on forested slopes, using air photographs or from a helicopter, as bare linear tracks or linear strips indicated by vegetation of different age or type. These linear vegetation tracks of varying ages are the stamp or historical record of the rain storm events that have triggered debris flows. In selected study areas, debris flows were identified on air photographs. The identification of failures was repeated for all available photo coverage to determine the year of photography when the failure first appeared. The oldest photography available on the Queen Charlottes was from 1936 - 1937 and near Prince Rupert 1947. A field sampling program was undertaken in the Rennell Sound and Pivot Mountain areas on the Queen Charlotte Islands and in the Prince Rupert area on the mainland coast. Failures greater than 1.0 ha. in size or large enough to extend into the valley bottom were sampled to determine the possible date of the event. Tree sampling was done on slide deposits in the depositional zone or on levees within torrent channels. Ten to fifteen increment core samples were obtained from trees growing on each slide. Cross section disks were obtained from trees showing visible scars. Trees showing vigorous or suppressed growth that were located along the edge of a slide were also cored to look for slowing of or release in growth. A search for events recorded in newspapers, journals technical reports, ship logs, diaries and company documents was also undertaken to find records and written accounts of storms and landslides. The ages of trees sampled on landslide were then compared and linked to known events. A vegetation description of field sampled debris flows made it possible to relate characteristics of tree canopy structure, as viewed from a helicopter, to specific events. Ages determined for large debris flows have revealed that most of the volume transported occurred during a few major events over the past 150 years. The Riley and

Gregory Creek watersheds, in the years 1875, 1891, 1917, 1935, and 1978 transported respectively, 1.6%, 2.9%, 13.3%, 2.1%, 9.6% of the volume (Figure 1). In comparison, Beresford Creek watershed experienced major events, in 1875, 1891, 1917, 1935, respectively transporting 16.5%, 10.8%, 36.2%, 9.5% of the volume (Figure 2). Beresford Creek area interestingly did not experience landslides during the 1978 storm. Four major storms since 1875 moved 73% of the volume transported by landslides in the Beresford Creek watershed. Data collected for Graham Island and the Prince Rupert area indicates that 6 storms over the last 150 years transported 76% of the landslide material: 9.5%, 14%, 30.9%, 6.5%, 6.4%, and 9.1%, respectively for the years 1875, 1891, 1917, 1935, 1957, 1978. This historical documentation of landslide ages suggests that forest management activity on the north coast has yet to experience the "Big Storm" similar to the 1917 event.

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