

Geomorphology

Matt Sakals, PGeo

Research Geomorphologist, NIFR, Smithers

Matt began with the Forest Service in 2000, as the Assistant Research Hydrologist in the Prince Rupert Forest Region. Then working closely with Dave Wilford, Matt studied alluvial and colluvial fans around the province. In the fall of 2003, Matt left the Forest Service and entered graduate school at UBC to study the characteristics of unstable slopes. In 2007, Matt rejoined the Forest Service and won a succession position under Jim Schwab. During the past two years, Jim has been mentoring Matt and a substantial amount of time has been devoted to knowledge transfer. This is to allow Matt to take over from Jim in research, consulting and extension activities. When Jim moves on to new challenges, Matt will remain as the Research Geomorphologist in the Regional Service Centre.



Research Activities

Characterization of Unstable Hillslopes

Matt Sakals is finishing his PhD thesis in Forest Resources Management at UBC examining the processes following shallow landslides on coastal hillslopes and the recovery of the landscape from these events. The research will determine the recovery rates for natural landslides that will assist in the characterization of unstable and potentially hazardous slopes.

Small Stream Morphology Project

The small stream morphology project has examined harvesting impacts and recovery of creeks and riparian areas for 15 years after heavy disturbance from forestry activities. Study sites include Donna Creek in the Mackenzie Forest District, and two creeks in the Bulkley Forest District. In 2008, researchers prepared the first report on findings regarding the impacts of forestry practices around creeks. MFR districts have helped fund this research.

Todagin Creek Landslide

In October 2006, a massive natural landslide occurred in Todagin Creek, near Iskut. Matt and Jim, along with Marten Geertsema and Vanessa Eggington have been conducting research including fieldwork to reveal the history and processes at work in this exceptionally geomorphically-active valley.

Characterization of Instability in the Hazelton Mountains

Over the centuries, the Hazelton Mountains have had an unusually high rate of landslides, many occurring within the last 4000 years. Matt and Jim, along with Marten Geertsema, Vanessa Eggington and others have examined the region's history of landslides and climate to uncover linkages between climate change and landslide frequency. This learning from the past sheds light on what may result from future changes in climate. This work includes various

investigations of individual landslide events of recent, historic, and prehistoric times. Collaboration with the Geological Survey of Canada is furthering this research.

Managing Forested Watersheds for Hydrogeomorphic Risks on Fans

Matt and Dave Wilford are continuing research on fan landforms and the hydrogeomorphic processes that influence them. Many fans are home to significant values, including residences and highways not to mention forest sites and fish habitat. These features can be damaged or lost due to forest operations in the upstream watershed, even though the forestry activities are taking place many kilometres away. A new Land Management Handbook is on its way that addresses the issue of forest management in watersheds upstream of fans.

Consultation Activities

Together, Matt and Jim have undertaken various consulting projects including:

- Assisted BCTS staff in the field with assessments for terrain, watersheds and roads. They have advised on methods, concepts and forest practices.
- Provided expertise to C&E for investigations involving terrain assessments and road construction, and made recommendations for rehabilitating sites.
- Reviewed and made recommendations to MFR district staff on Morice Road design to stabilize an area repeatedly subjected to landslides.
- Advised Gitanyow Fisheries Authority on road deactivation strategies to protect fish habitat.
- Provided geotechnical advice on mining roads constructed under permit from MFR.
- Conducted and reported on watershed assessments for BCTS, including providing recommendations for road development.
- Other agencies, including Workers' Compensation Board of BC and Ministry of Transportation and Infrastructure, have asked for assistance to investigate catastrophic landslides. In northwest BC, staff typically respond to such emergencies about once a year.

Extension Activities

Land Management Handbook 18 Training – Management of Landslide Prone Terrain

Matt and Jim have restructured and updated the LMH 18 Training course for a new round of delivery in the NIFR. Courses have been offered, but none have been conducted as yet. Please contact Matt Sakals if you are interested.

Alluvial Fans 2007

Matt, Dave Wiford and Jim were part of the team hosting Alluvial Fans 2007, an international conference dedicated to alluvial fans. A 4-day pre-conference trip from Vancouver to Banff organized by the team kicked off the 5-day conference. Further international research collaborations are resulting from this meeting.

Forestry on Fans and Managing Forested Watersheds for Hydrogeomorphic Risks on Fans

Matt continues to be involved with the research and extension program related to hydrogeomorphic processes on fan landforms. Together, Matt and Dave Wilford have continued to deliver workshops around the province on managing fans and their watersheds.

Recent Publications

Submitted

Sakals ME, Wiford DJ, Wellwood DW, MacDougall SA, Submitted. Active fans and grizzly bears: reducing risks for wilderness campers. *Geomorphology*.

Wilford, DJ, **Sakals ME**, Grainger WW, Millard TH, Giles TR, Submitted. Managing Forested Watersheds for Hydrogeomorphic Risks on Fans. *Land Management Handbook*, BC Ministry of Forests.

2009

Geertsema M, Schwab JW, Blais-Stevens A, **Sakals ME**, 2009. Landslides and linear infrastructure in west-central British Columbia. *Natural Hazards*. 48:59-72.

2008

Sakals ME, Schwab JW, Geertsema M, 2008. Todayin rock avalanche. Joint Annual Meeting of the Canadian Geophysical Union and the Canadian Geomorphology Research Group. May 11-14, Banff, Alberta.

Sakals ME, Schwab JW, Innes JL, 2008. Material recharge in the headbasins of shallow landslides. Joint Annual Meeting of the Canadian Geophysical Union and the Canadian Geomorphology Research Group. May 11-14, Banff, Alberta.

2007

Sakals ME, Wilford, DJ, Wellwood DW, 2007. Alluvial Fans and Grizzly Bears: Reducing Risks for Wilderness Campers. *Alluvial Fans 2007*. June, Banff, Alberta.