March Madness

Those of us working in or for government are typically scrambling this time of year to ensure that invoices are in, bills are paid, contracts closed and next years business planning is underway. While the administrative process is sometimes cumbersome it also serves several very legitimate purposes, ultimately protecting public interests.

I would venture that the same is true with some of the management tools produced by government. They are not simply processes to complete, but genuine attempts to protect the resources that we all manage, and on which we rely. With that in mind, this issue takes a look at some of our less well known management systems:

Leading the pack this quarter is the second instalment of the Karst story (a follow up to the winter issue where Carol Ramsey and Paul Griffiths introduced us to karst landscapes). Their focus in this issue is much more on available tools to protect karst terrain, primarily in the forestry context.

In addition, with the heavy snow packs throughout BC, I thought it might be interesting to look at management of snow avalanche terrain, only instead of the usual interior context; we are going to look at avalanches on the coast. Kevin Fogolin provides local snow avalanche information.

In addition Mike Miles provides some brief information about the recent river restoration conference and dates for next year.

Comments on any of the articles, or the newsletter can be sent to me at: richard.guthrie@gov.bc.ca

Past issues of Island Geoscience now include subject lines for ease of searching and are catalogued at the Ministry Library:

http://www.for.gov.bc.ca/hfd/LIBRARY/Island_Geoscience.htm

If you are getting this newsletter and do not want it, please send me an Email at the above address and let me know.

Continued thanks to all the folks who send me feedback, or pass this newsletter on to a friend or colleague.

Rick.

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Winter snowpack on Vancouver Island
Managing Karst in BC’s Coastal Forest
Focus on Karst: Part II

Paul Griffiths and Carol Ramsey

Readers were introduced to soluble bedrock landscapes known as karst in the previous issue (http://www.for.gov.bc.ca/hfd/LIBRARY/IslandGeoscience/Island_Geoscience_2007winter.pdf). The current issue focuses on karst management in BC’s coastal forests and in other places where humans interact with karst lands.

In coastal BC forests, most karst resources are found on Crown land, which means they are managed by government on behalf of the public. The BC Ministry of Forests and Range (MFR) has primary responsibility for administering karst resources in Crown land forests outside of protected areas.

In the late 90’s, the Ministry of Forests adopted an ecosystem-based approach to managing karst resources. This new approach was embodied within the following series of significant government initiatives:

• In 2000, the Ministry of Forests released A Preliminary Discussion of Karst Inventory Systems and Principles (KISP) for British Columbia (Stokes and Griffiths 2000), which proposed a scientific framework for developing a standardized inventory system of BC karst ecosystems. The KISP report led to the development of the Karst Inventory Standards and Vulnerability Assessment Procedures for British Columbia (Resources Information Standards Committee 2003), released in 2001 and updated in 2003, that outlined provincial standards for conducting karst inventories.

• In 2003, the Ministry of Forests also released the Karst Management Handbook for British Columbia (BC Ministry of Forests, 2003), which contains a set of proven best management practices for forestry operations on karst terrain. The release of this document followed four years of discussion with industry, government and karst specialists in BC and abroad.

• In 2004, the Ministry of Forests initiated the development of monitoring and effectiveness evaluation indicators and protocols for karst resources under the FRPA Resource Evaluation Program.

A primary objective of karst management in BC is to protect and conserve karst ecosystems and to ensure that natural, dynamic karst processes remain intact during forestry and other activities. The important potential for karst systems to transport air, water, nutrients, soil, and pollutants into and through underground environments is recognized and this understanding serves as input to developing and implementing karst management strategies.

While recognizing the non-renewable nature of many karst resource features, particularly in caves, good management also demands that damaged features be restored insofar as practicable or possible.

The following key principles are considered for overall karst management in coastal BC:

Figure 1. Karst features exposed by the removal of soil.

Figure 2. A tree buffer around a sinkhole in a logged block. Buffers can offer protection for karst features, however, the size of this one is probably too small to be effective.
• Protect the integrity of karst systems, including individual surface karst features, caves and the broader karst landscape.
• Independence of scale: Micro-relief karst features, such as karren exposures, are managed along with larger scale components such as complex cave systems.
• Not all karst features need to be found or known in order to manage the karst system.
• Subsurface karst resources are to be managed through appropriate forest practices applied on the surface, utilizing a total karst catchment approach.
• Contributing non-karst portions of delineated karst catchment areas should also be considered.

While shaped initially by concerns for protection and conservation of Vancouver Island caves, contemporary karst management focuses on managing all surface and subsurface elements of a karst system. A common misconception is that karst management is mainly about caves. Sometimes, however, managing karst can have little to do with caves if they are not revealed during the field assessments.

The intensity of the management recommended for a particular karst feature can vary according to the relative significance and sensitivity of the feature, as well as the vulnerability of the surrounding karst terrain. Determining the significance of individual karst features and karst terrain vulnerability is carried out as part of the Karst Field Assessment (KFA) undertaken by qualified karst professionals.

Karst features classified as more significant are candidates for retention areas as recommended in the Karst Management Handbook for British Columbia (KMH). For instance, the KMH recommends a minimum two-tree-length retention area to maintain natural microclimatic and habitat conditions for sinkholes large enough to create their own microclimates. Karst features of lesser significance may require other special management measures such as management zones or modified practices. Karst terrains or broad karst landscapes classified with very high vulnerability in a KFA are not normally considered for harvest operations of any kind.

...A primary objective of karst management in BC is to protect and conserve karst ecosystems and to ensure that natural, dynamic karst processes remain intact...

Despite the above mentioned works, there is currently no specific provincial law governing the protection of karst in BC. The Park Act can provide legal protection for karst, but this applies to protected areas only. The Heritage Conservation Act and Wildlife Act have some limited application as well.
The Queen Charlotte Islands Forest District recently (September 2006) addressed karst using a Government Actions Regulation (GAR) order. This GAR order invokes a practice requirement according to which all karst caves, significant surface karst features, and high and very high vulnerability karst terrains must not be "damaged or rendered ineffective" by primary forestry activities. Similar GAR orders are currently in preparation for most other coastal BC forest districts.

Under FRPA, alternative management strategies may be developed and put into practice for specific karst resource features. Managers and operators may in effect choose to implement karst strategies that differ from the recommended best practices outlined in the KMH provided they still meet the management. If the same management objectives (or results) are met, then the alternative strategy will be judged successful.

Finally, privately-owned forested and non-forested lands (i.e., in southeastern Vancouver Island), are managed by a non-legally supported approach.

The careful and sustainable management of karst resources in BC other than in a forestry context (i.e., in association with energy projects, quarrying, agriculture) is also needed.

References


Paul Griffiths and Carol Ramsey are independent consulting karst specialists. They have been actively involved in conducting karst field assessments for both government and industry, principally in coastal BC forests. Carol can be reached at: sciusus46@yahoo.ca. Paul may be contacted by Email: pgriff@island.net.

Snow Avalanches & Forestry on Vancouver Island

Kevin Fogolin

Snow avalanches on Vancouver Island account for distinct ecosystems that provide habitat for a
variety of species. Recently, research conducted at the University of British Columbia has highlighted the need for snow avalanche management by forest land managers (www.geog.ubc.ca/avalanche/index.html).

Though not traditionally considered on the coast, interaction with (and awareness of) avalanche terrain is becoming more commonplace as timber harvesting moves into upper valley drainages at high elevations. Several key issues have been identified that affect the Island’s forest industry as they move into snow avalanche areas.

- **Worker safety:** the identification of avalanche terrain is critical for forest operations that are exposed to snow avalanches during the avalanche season. For example, a logging operation that harvests a cutblock or builds a road directly downhill or adjacent to an avalanche path should be aware that it puts both its equipment and its employees at potential risk. If the conditions are right, the risk exists even for workers that travel on logged roads that cross avalanche hazards.

- **Impacts to natural resources:** Forest harvesting can affect avalanche activity in two key ways. First, removal of forest cover directly adjacent to avalanche terrain can result in an expansion of the avalanche terrain. Second, the removal of forest cover in areas of high snow supply and slopes steeper than 60% can lead to the creation of new avalanche start zones. Both situations can create a variety of problems including worker safety issues, reforestation issues, sedimentation into water courses, and an overall loss of site productivity.

- **Impacts to transportation infrastructures:** Improper planning of road systems in avalanche terrain can result in damage to bridges and roads causing significant monetary loss and environmental damage.

![Figure 1. Cutblock impacted by frequent avalanche activity: northern Vancouver Island.](image1)

These issues can be addressed by resource professionals and land managers by incorporating a snow avalanche assessment into their planning. A snow avalanche assessment identifies snow avalanche terrain or areas that upon removal of forest cover will constitute avalanche terrain. This assessment determines the frequency and magnitude of avalanche events in the identified terrain and recommends appropriate mitigation measures.

An excellent overview of snow avalanche management and forested terrain can be found in the Land Management Handbook # 55: Snow Avalanche Management in Forested Terrain (http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh55.pdf).

![Figure 2. Snow avalanches affect both worker safety and infrastructure. In this case a bridge was removed in an avalanche.](image2)
Kevin Fogolin is a registered professional forester and a professional member of the Canadian Avalanche Association. Kevin is the principal of Island Alpine Consulting Limited, which provides services in forestry snow avalanche assessments, snow avalanche hazard mapping, avalanche control, and safety training. Kevin is based out of Campbell River where he lives with his family and their certified avalanche rescue dog. Kevin can be reached at: ialpine@telus.net or 250-923-9362.

Generalized maps that consider snow avalanche potential on Vancouver Island are found as part of the Geomorphology of Vancouver Island research report: MOE RRO2.

Introducing:

Craig Mount is employed as an 'Aquatic Habitat Geomorphologist' with the Ecosystems Information Section of the Ministry of Environment in Victoria. This means that he studies lakes and rivers as they relate to fish habitat. He specializes in using digital technology such as GIS, GPS, depth sounders and surface modeling software to help in the measurement and modelling of these different types of habitat. His main areas of work and research currently includes lake bathymetry measurement and standards, fish passage and culverts, development of the Watershed Evaluation Tool (WET) and finally, the downstream effects of shrinking glacial extent.

Craig holds undergraduate degrees in Outdoor Recreation/Parks Management and Geography from Lakehead University, and a masters degree in Geomorphology from the University of Western Ontario. His work experience began with 5 years of consulting (primarily in the Charlottes and North Coast) during the FRBC followed by four years with the Capital Regional District where he developed one of the first web-based GIS applications in BC (www.NaturalAreasAtlas.ca). He has been with the Provincial Government since 2004.

Craig is married to another MoE geomorphologist; Luanne Chew who works in the River Forecast Centre. They have two young children who are destined to innumerable family vacations to ‘geomorphologically-significant’ destinations.

Craig can be reached at (250) 387-2579 or by e-mail at craig.mount@gov.bc.ca.

River Restoration Northwest

Mike Miles

The River Restoration Northwest symposium was held at the Skamania Lodge in Washington from February 5-8 and attended by close to 400 people. Richard Hebda, Ken Ashley, Rob Millar, Clyde Mitchell and Bob Newbury provided well received Canadian content including presentations on the Salmon 2100 Project, on climate change and Bob Newbury’s fascinating review of habitat riffle and pool design. A number of excellent short course were presented. These included Sediment Transport (Peter Wilcock and Jack Schmidt), STREAM MODULES (spread sheet tools for river evaluation, assessment and monitoring by Andy Ward), Fish Passage Design at Culverts (Ken Kozmo and Pat Powers) and Plant Material Selection, Handling and Care in Stream Restoration Projects( Deb Krammer and Dennis O’Connor).

Many of the original presentations are available online at the Symposium Program.

The 2008 Conference will be held on February 4-7 at Skamania Lodge on the Columbia River east of Portland. The call for papers will be announced in June and abstracts must be submitted before the end of September.

RRNW provides a number of free registrations to students who are willing to assist during the
conference. A number of “Klingeman Scholarships” are also available to subsidize attendance where needed. Working groups have now been established for both student and tribal/first nation members. Private memberships along with Corporate and government sponsors are solicited to help defer the conference costs. (The Canadian firm of Knight Piesold Consulting kindly acted as a sponsor in 2007.) The RRNW web site provides additional details.

Please contact Mike Miles (mikemiles@shaw.ca) or Lisa Christensen (christensenl@dfo_mpo.gc.ca) for additional information or to discuss possible papers. We are interested in receiving papers from a variety of topics such as those dealing with aspects of the BC watershed restoration program or studies on single rivers such as the Nechako.

Next issue:

Landslides and formative events have been delayed another issue while we wait for the parent publication to release the article. Provided it is published by June, it will be included in the next issue. We’ll also have a look at some of the impacts of the storms that occurred over the winter 2006/2007 season.

-RHG

Editor’s note: If you have an article or research paper that you would like to see here next time, please let me know at richard.guthrie@gems6.gov.bc.ca

Auto-hydraulic design in a riffle pool in Chapman Creek on the Sunshine Coast (photograph courtesy of Bob Newbury).

Field work: The remains of the Sarita Lake Forest Rec. Site following a debris flow from the winter storms.