ASPECT

Definition: `as – pekt / 1. a position facing a particular direction
2. appearance to the eye & mind.

THE DEGIFS NEWSLETTER

IN THIS ISSUE….

Page

Letter to the Editor……..……2

DEGIFS Reviews JPB Bridge Design Guidelines……..…..3

A Wonderful Announcement…….……5

Utilizing Qualitative Hydro-Geomorphological Risk Analysis……5

Web-Savy Volunteer(s) Needed……..…10

Conference Announcement……10

Who We Are ……..11

Aspect Submission Information……..11

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The Editorial – Cheers to Bruce!

Bruce Thomson, our esteemed colleague and chief editor of this DEGIFS rag, has chosen early retirement from the Ministry of Water, Land and Air Protection (i.e. the Ministry of Really Silly Walks, as per Bruce). Bruce has worked as our not so civil servant in provincial government (MWLAP and MOF) for 30 years. According to colleagues at MWLAP and counter parts at MOF, his enthusiasm and sense of humour will be very much missed. Through the years Bruce has exhibited a fantastic depth of knowledge and understanding of geomorphological processes in British Columbia. Bruce is packing up the office rock collection to pursue other exciting ventures, first of which will be a trip to a favorite destination…Mexico. As Bruce sits back, enjoying a cold cervesa, I hope he reflects on his wonderful career with a smile on his face.

Cheers Bruce and all the best!

Now we couldn't let Bruce relax just yet, so he has submitted the following Editorial…

This particular Editor is in the process of undergoing a lifestyle renewal and consequently has been remiss with respect to the creation of an editorial. It is one of the quirks of human nature that as one matures (like a fine wine or a single malt) a certain number of brain cells seem to basically go off on a spontaneous holiday (not the result of fine wine or single malt, although this has been known to occur). It would appear that in this instance, a number of neurons and synapses within the cerebral cortex decided to do their own thing and serve notice to mainframe that they wished to "down tools" and re evaluate their function. As a consequence of this act, mainframe temporarily "put the feet up" until brain cell function evaluation was addressed (of course, function evaluation is never really completed, it is just addressed). Consequently, a hiatus of thought processes resulted. With function evaluation "successfully" addressed, at least temporarily, mainframe has been "rebooted" and electronic activity resumed. However, resumption of activity does not necessarily equate to patterns of logical thought processes, not that all human beings are endowed with such, some just happen to have more of it in a temporal sense than others. So, the result has been the above, which may have nothing to do with logical thought, but it has accomplished the filling of a space entitled Editorial. Enjoy the articles in the rest of this issue, they are far more logical.

DIVISION OF ENGINEERS AND GEOSCIENTISTS IN THE FOREST SECTOR
Volume 9, No. 1 **MAY 2004**

The EXECUTIVE UPDATE, which is normally included in Aspect was not available at the time of publication. DEGIFS executive are currently resolving several important issues and an update will be provided in the next issue of Aspect.

LETTER TO THE EDITOR

Calvin VanBuskirk, P.Eng.,P.Geo., DEGIFS Chair

Subject: Minimum Fees, Mentorship, Continued Professional Development and Quality of Work

Over the past several years, I have listened to a number of discussions and read a number of articles about substandard practices. Most of the articles and discussions involve the practice of geotechnical engineering and geoscience (specifically in the forest sector) and the practice of structural engineering. The Association has spent a considerable amount of time and energy dealing with these issues by preparing standards of practice and developing the recent "Structural Engineer of Record" designation. By reviewing this information in conjunction with my personal experience in the field of Professional Engineering and Geoscience I strongly believe that APEGBC, DEGIFS, and other organizations within APEGBC are actively trying to address symptoms of a larger, fundamental problem of how APEGBC operates with respect to regulating the practice of Professional Engineering and Geoscience.

The problem, as I see it, is a fundamental lack of MENTORING and continuing professional development outside of mentoring**.** In my opinion, this lack of mentoring stems from:

1. A lack of appropriate regulation and direction from APEGBC regarding mentoring and mentorship planning; and
2. The lack of a minimum fee structure for Professional Services that would enable adequate funding for both mentoring and continued professional development.

In recent years APEGBC has actually made the mentorship issue worse by organizing a mentorship program for EIT's and GIT's employed by companies that do not have professional staff that can provide mentorship. The mentorship program assembled by APEGBC provides an avenue for an EIT or GIT to work for industry or a multidisciplinary company with a "side order" of mentoring from a volunteer that reviews the trainee's work 2 or 3 times a year. In my opinion, an EIT of GIT should not work in relative isolation and should have daily or at the very least, weekly access to professionals from the same discipline for guidance. Companies that do not have senior professionals on staff to provide guidance (on both professional practice and technical issues) should not be hiring EIT's, GIT's and junior professionals. APEGBC could easily limit the potential for this to occur by stating that work experience gained under these conditions does not qualify as part of the 4 years required for professional registration. Furthermore, APEGBC should have companies that hire EIT's, GIT's and junior professionals submit mentorship and professional development plans/programs to APEGBC for approval. This would help to set up a "plan and prove" approach to mentorship and professional development rather than the relatively ad hoc approach currently in use.

I feel APEGBC has slipped far behind other professional and technical organizations in appropriate monitoring of mentorship and continued professional development of our members. We have to remember that substandard work done by P.Eng.'s and P.Geo's devalues all of our services and has the potential to impact Life and Limb. How would anyone feel going in for medical surgery and finding out the surgeon worked as an intern for 4 years and had his work reviewed on a volunteer basis twice a year during that time? Along a similar line, how would one feel having their house electrical wiring done by an individual that did his electrician apprenticeship with a plumber?

The present voluntary mentorship program provided by APEGBC just provides justification for industry and multidisciplinary consulting and contracting companies to hire cheap "professionals" (EIT's, GIT's and junior professionals) rather than hiring fully qualified professionals or consulting firms (some of which do provide time and money for mentoring and professional development).

By establishing in-house mentorship requirements and standards for mentorship we would go a long way to improving the standard of practice throughout the profession. A minimum fee schedule would help the

firms that do provide for mentorship and professional development. For example, firms and individuals that rely on low fees to acquire contracts would lose much of their financial advantage over the firms and individuals that have higher rates to accommodate mentorship and continued professional development (CPD) costs. This would lead clients (government and private) to put more weight on the quality of the service being provided rather than the cost when hiring a consultant or employee.

By increasing the demand for quality work, the firms and individuals that produce such work would have the workload and funding required to provide mentorship and CPD for EIT's, GIT's and professionals.

I believe minimum fees (as established by most other professional groups) are a fundamental requirement for good mentorship and CPD; and these are fundamental requirements for establishing and maintaining an acceptable standard of practice.

I have discussed my own mentorship experience with many other professionals and have found similar stories. Individuals get hired with great expectations as to what the new employer is going to provide with respect to mentorship and experience only to be "thrown to the wolves" with little guidance and expectations of 90% plus chargeability and severe reprimands for write-offs.

I believe the association and the profession have let down many young professionals. Fundamental changes need to be made or we can expect to spend a lot more time addressing symptoms like those faced by the structural engineers in the last 14 years and the recent issues with terrain stability field assessments which have also made their way to the media.

Poor quality work will continue until mentorship and continued professional development become cornerstones of our association, and this will not happen without the adoption of minimum fee schedules. This problem will not go away simply by treating the symptoms.

DEGIFS REVIEWS JPB BRIDGE DESIGN GUIDELINES

Calvin VanBuskirk, P.Eng.,P.Geo., DEGIFS Chair

The following is an excerpt from a letter sent to the Joint Practices Board on behalf of DEGIFS.

The Division of Engineers and Geoscientists in the Forest Sector (DEGIFS) solicited DEGIFS/APEGBC members to review the draft "*Guidelines for Professional Services in the Forest Sector Bridge Design*" document released by the JPB in October 2003. Upon receipt of these reviews DEGIFS formed a subcommittee of bridge practitioners. The terms of reference for the subcommittee was as follows:

> *… review the JPB Bridge Design Guidelines document and all comments received by DEGIFS from bridge design practitioners. Objective is to provide DEGIFS/APEGBC with a recommendation on the appropriateness of the proposed approach of the JPB document for forest road bridge design professional practice guidelines. In addition, the Bridge Guidelines Subcommittee will make recommendations to DEGIFS with the suggested changes, areas requiring modification or alternative approaches.*

The DEGIFS Executive appointed subcommittee consisted of:

- Don Williams, P.Eng.
- Tim Dunne, P.Eng., RPF
- Gino Fournier, P.Eng., RPF
- Martin Jobke, P.Eng.
- Gary McClelland, P.Eng.
- Doug Nicol, P.Eng.
- Dave Grant, P.Eng.
- Brian Chow, P.Eng.

The subcommittee raised a number of fundamental issues with the draft JPB document and its approach. These issues were discussed with the DEGIFS Executive and were summarized by the Executive as follows:

1. Major culvert structures should be included in guidelines for forest road bridge crossing structures.

2. The proposed JPB Guidelines suggest that a risk (assessment) matrix be used to identify VL and L risk scenarios; scenarios whereby an RPF could design the crossing. However, the document does not adequately define the various hazard levels, consequences, or

elements to consider that could be at risk, to allow practitioners to consistently estimate a reliable risk level for a given crossing.

Alternatively, it is recommended that a decision matrix, utilizing specific quantifiable site factors, be developed. This matrix approach would target professional and non-professional Project Coordinators with varied experience levels to arrive at the same conclusion with respect to which crossings require a P.Eng. or RPF.

3. The division of task responsibilities and the team design approach requires a strong central design role to oversee the entire design, coordinate the various specialists on the design team, and take ultimate responsibility for the bridge design. This central design role requires an individual with comprehensive skills and understanding of all elements of bridge design and, in particular, understanding of how the various factors influence and interact with each other. This fundamental design roll may be beyond the capabilities of some CRP's and as such could result in misinterpretation of results provided by various specialists and greying of the lines of responsibility between the CRP and the QRP. To avoid this potential problem, an alternative, more comprehensive approach is required to ensure: effective lines of communications; defined responsibilities; and professional accountability for bridge design projects (see item 4).

4. The CRP and QRP roles, as suggested by the JPB document, are not seen as sufficiently comprehensive. The subcommittee suggests three roles:
   i) Project Co-ordinator
   ii) Engineer of Record or Forester of Record; and
   iii) Professional Specialist

   It is expected that in this approach, the Project Co-ordinator may be a professional or non-professional. Their role would be in the context of higher-level planning. They would be responsible for engaging an appropriately skilled Engineer or Forester of Record for the bridge project in the greater context of the overall development.

   The Engineer or Forester of Record's role is to follow the full bridge structure project from initial planning through construction and would upon completion of the project sign-off the completed structure as being in conformance with the design. This role is a common one in engineered structures. For simple sites and structures, this individual could be a professional engineer or forester, for moderate to complex sites and/or structures this individual would almost always be a professional engineer.

   The Professional Specialist's would be individuals with higher-level of expertise in a particular specialization such as hydrology and hydraulics, foundations and geotechnical engineering, or structural design. The bridge professional of record would engage these specialists, who would generally be professional engineers, to provide design services and/or recommendations. Again, the bridge professional of record would have to clearly understand the implications of the advice provided by the specialists on the overall project.

5. The subcommittee suggests that the JPB document outline the Project Organization and Responsibility for all bridge projects, keeping in mind the foregoing three roles. The subcommittee recommends that the JPB develop guidelines for professional practice relating to those projects identified as allowing for RPF design (where overlap occurs) and construction supervision (see decision matrix). For moderate to complex bridge projects requiring only P.Eng.'s, it is recommended that this section of a practice guideline be prepared by APEGBC (as with other engineered structures requiring P.Eng.'s such as retaining walls, Engineered Earth Fills, highway and municipal bridges, etc).

6. The guidelines should not be a "how to" manual. It is suggested that those that are practising should be aware of the appropriate steps in bridge design and that a "how to" manual would be inappropriate in this context.

7. Owners of forest road bridges should be made aware of Professional Liability Insurance for forest road bridge designs. To ensure that the owners and the public's interests are accounted for. Item 17 (a) of the ABEGBC bylaws requires:

   Before entering into an agreement to provide professional engineering or professional geoscience services to the public, a member, licensee or certificate holder must notify the client, in writing, whether or not professional liability insurance is held and whether that insurance is applicable to the services in question. The note shall include a provision for an acknowledgement of the advice to be signed by the client.

   It is recommended that the guideline include a recommendation that all professional parties engaged to carryout forest road bridge crossing design notify the client, in writing, whether or not professional liability (E & O) insurance is held and whether that insurance is applicable to the services in question.

8. As another related topic, it is suggested that the JPB consider addressing requirements for routine condition inspections of existing forest road bridge structures in a future discussion paper or guideline. Note that although this is a related topic, we suggest that it be dealt with separately and not be incorporated into a forest road bridge design standard for practice.

The DEGIFS Executive recommends that a joint JPB and DEGIFS bridge practitioner committee be struck to address a guideline for professional practice for forest road bridge design. It is suggested that this joint committee draft up appropriate terms-of-reference for development of forest road bridge crossings guidelines keeping in mind all of the points raised in this letter. It is recommended that the committee consist of equal representation of bridge design practitioners representing Professional Foresters and Professional Engineers. As bridge design is a complex and often interdisciplinary issue, it is recommended that the committee include four bridge practitioners from APEGBC and that these practitioners be appointed by the DEGIFS executive. Prior to proceeding with work on the guideline, the terms-of-reference prepared by the committee should be approved by both DEGIFS and the JPB executive.

A Wonderful Announcement…or two!!.

Deepa and family welcomed Nikhil (ni-keel) Anthony Spaeth Filatow to the world on Wednesday, January 14, 2004. Congratulations Deepa!

Congratulations to our DEGIFS chair, Calvin Van Buskirk and his wife Marianne on the arrival of their daughter Julia on March 4, 2004.

UTILIZING QUALITATIVE HYDRO-GEOMORPHOLOGICAL RISK ANALYSIS TO DEVELOP BEST MANAGEMENT PRACTICES FOR FOREST MANAGEMENT IN BRITISH COLUMBIA'S SOUTHERN INTERIOR WATERSHEDS

A Paper for Discussion Purposes

Kim Green, M.Sc., P.Geo., Apex Geoscience Consultants Ltd.

Improving or maintaining aquatic habitat and water quality is the primary management objective of forest development in B.C.'s southern interior.

Watersheds in B.C.'s southern interior typically provide the main source of consumptive use water for communities and are often key spawning and rearing habitat for numerous fish species that are valued for sports fisheries.

Identifying the primary sensitivities within a watershed allows forest managers to develop and apply best management practices to reduce the likelihood of impacts related to forest development.

Forest development or natural disturbance (wildfire, beetle kill) can impact channel stability, water quality and aquatic habitat (aquatic resources) of a watershed primarily through,

- Increases in flow or duration of peak flows through removal of canopy and increasing delivery time of runoff along road systems,

- Increases in sediment delivery through road and trail related mass wasting and surface erosion, and,
- Reduction in riparian function through roads and blocks situated in or too close to the active riparian area.

A qualitative hydrological risk analysis is a simple and effective tool for forest hydrologists and geomorphologists to focus attention on the key hydrological concerns (limiting factors) within a watershed. The risk analysis is a matrix based analysis that considers channel sensitivity and hydrological hazard.

Channel sensitivity is a measure of the likelihood of observable negative changes (severity of impacts) to aquatic resources given increases in size or duration of peak flows, increases in sediment delivery or disturbances to the riparian function. For example, a 'High' sensitivity to increases in peak flows indicates that there is a high likelihood that a channel would experience observable negative impacts given sustained increases in peak flows or duration of peak flows.

The sensitivity of a channel to the three hydrological factors is independent of existing or proposed development. Channel sensitivity is determined entirely by the geomorphic nature of the watershed and stream channel. Each channel has unique physical characteristics determined by the geology, glacial history, climate, physiography, and elevation - aspect distribution of hillslopes that result in low, moderate or high sensitivities to the different hydrological factors. The fluvial geomorphologist or hydrologist determines channel sensitivity through a combination of field assessment, current and historical air photograph review, and regional hydrometric and climate information (Montgomery and MacDonald, 2002). An understanding of watershed and channel processes and natural variability is the critical first step to the risk analysis.

A hazard is defined as the probability of an event occurring. Hydrological hazard ratings of 'Low', 'Moderate, and 'High' are a qualitative assessment of the probability of an event (i.e. impacts to aquatic resources) occurring given existing and proposed development or disturbance. Hydrological hazard is determined by considering the extent of the development or disturbance or proposed development as well as its location with respect to the stream channels and its elevation – aspect distribution within the watershed.

The risk of impact to aquatic resources is determined by combining the level of channel sensitivity to a hydrologic factor with the hazard rating. The risk rating is generally determined for the main stem channel above the point of interest. The effectiveness of a hydro-geomorphologic risk analysis is limited by the size of the watershed because observable impacts are reduced as watershed area increases (Bunte and MacDonald, 1999). The hydrological risk analysis is probably most effective for watersheds less than 3000 ha.

DETERMINING CHANNEL SENSITIVITY

As mentioned above, the hydrologist or fluvial geomorphologist determines channel sensitivity on the basis of field observations and other information. However, observations made on over 50 watersheds in the Kootenay Region of B.C. indicate that there are characteristic attributes that can predispose a watershed to having a low, moderate or high sensitivity to the three hydrological factors. It is important to note that none of the attributes listed here can be considered in isolation. Watershed attributes must be considered and interpreted in a temporal, spatial and cumulative context. This list of attributes included here is not complete and is only provided for discussion purposes.

PEAK FLOWS

Low sensitivity to peak flow increases.

- Stream experiences frequent large, rapid peak flows (banks and valley flat vegetated with alder and willow, bedload bright and mobile, historically active fan, these characteristics are typical of channels draining watersheds with steep alpine headwaters).
- Channel contains coarse textured bedload (not the result of past anthropomorphic disturbance or single anomalous flood event).
- Channel contains numerous boulder cascade or bedrock reaches.
- Channel contains well vegetated, overhanging banks (mature coniferous species with well developed root system) and abundant functioning LWD pieces and jams that effectively provide channel and bank stability.

Moderate sensitivity to peak flow increases.

- Evidence that channel has experienced larger flood events in the past (such as numerous vegetated bank sloughs or levees along channel) with minimal impacts to channel stability.
- Channel has some inherent capacity to withstand higher flows such as overflow channels or an entrenched channel with resilient banks or non-alluvial segments.
- Channel banks and riparian area is vegetated with species that have well developed root systems that provide protection to the banks and forest floor.

High sensitivity to Peak flow increases

- Stream does not normally appear to carry large flood events. Channel bed is dark and vegetated with moss. Banks are overhanging, vegetated to bankfull and show no or little evidence of old scour or overbank deposits.
- Stream has a fine textured bedload that would be susceptible to erosion.
- Channel is confined to partially confined by one or both valley sides and lacks structures that help reduce flow velocity (overflow channels, low gradient marshy reaches, abundant functioning LWD).

SEDIMENT DELIVERY

Low sensitivity to increases in sediment delivery

- Abundant sediment storage opportunities such as frequent pieces of functioning LWD or frequent low gradient sections where channel is unconfined.
- Slow flowing, meandering stream (stream flows through marsh or wetland segments) and lacks the power to transport bedload.
- Channel has a naturally high sediment delivery rate – e.g. bounded by glaciofluvial terraces that routinely fail during high flow events.
- Headwaters are steep snow avalanche and/or debris flow gullies that deliver large volumes of sediment on an annual basis.

Moderate Sensitivity to increases in sediment delivery

- Some storage capacity, such as some long (>100 to 200m) low gradient sections (<15%) that allow sediment to settle out.
- Currently inactive, but relatively numerous natural old slide scars or debris flow channels.

High Sensitivity to increases in Sediment Delivery

- Channel is unable to deal with significant increases in sediment input due to little or no storage capacity (e.g. in-stream storage is full) so that increases in sediment delivery associated with roads is likely to cause channel aggradation.
- Naturally low sediment input rates (e.g. channel is decoupled from valley sides) or,
- Additional sediment input will be detectable at intake due to steep channel (>10%) and relatively small drainage area (<1000 ha) with minimal opportunity for dilution of additional sediment.

RIPARIAN FUNCTION

Low sensitivity to disturbance to Riparian Function

- Channel is not dependent on woody debris to control rate of sediment transport such as a steep colluvial channel or snow avalanche chute
- Low gradient, braided (anastomosing) stream that is situated in a wide valley bottom (glacial source).

Moderate Sensitivity to disturbances to Riparian Function

- Channel requires some woody debris in a number of reaches to provide long term storage, moderate bedload transport rate or aquatic habitat,
- Channel has some tendency to migrate over valley bottom where channel is unentrenched that could be accelerated if valley bottom is disturbed and banks destabilized, or,
- Some reaches are oriented such that the riparian canopy is providing shade and moderating water temperatures.

High Sensitivity to disturbances to Riparian Function

- Channel is entirely dependent on woody debris to control bedload transport rates and maintain bank integrity.
- Channel appears to migrate over flood plain/valley flat on a frequent basis and requires a wide effective riparian area for long term channel stability.

- Channel is dependant on riparian canopy to maintain water temperature and habitat values.

DETERMINING HYDROLOGICAL HAZARD

Hazard ratings for the hydrologic factors are a qualitative assessment of the likelihood of an event occurring given the existing or proposed level of development or existing level of disturbance in the watershed. As mentioned above, the hazard rating considers the extent and distribution of the development or disturbance as well as watershed characteristics including elevation and aspect distribution.

In general a 'Low' likelihood implies that there is a negligible likelihood of an event occurring during the time span of the development or disturbance. A 'Moderate' likelihood indicates that it is possible an impact could occur within the time span of the development or disturbance. A 'High' likelihood indicates that it is probable that an impact could occur within the time span of the development or disturbance.

Specifically, the hazard ratings reflect the probability (or likelihood) of,

- an increase in size or duration of peak flows,
- increases in sediment delivery and/or
- a reduction of riparian function,

given the existing or proposed level of development or the existing level of disturbance from natural events such as forest fire or bug kill. As with channel sensitivity, the attributes considered in assessing hydrological hazards must be considered within a temporal, spatial and cumulative context. The following list of attributes is not complete and is only included for discussion purposes. In addition, the numerical values and percentages used to quantify the ratings 'low', 'moderate' and 'high' are included for general consideration only.

PROBABILITY OF INCREASING PEAK FLOWS

LOW

- Low level of existing/proposed development (e.g. < 15 to 20 percent) or existing disturbance.
- Watershed has distributed area/aspect component and openings are appropriately distributed.
- Forested area of watershed does not contribute to peak flow generation (drainage has significant alpine area and peak flows dominated by alpine snowmelt).
- Watershed has minimal road density and ditches are not concentrating run off.

MODERATE

- Development/disturbance level exceeds 30 percent ECA.
- Watershed has moderate road density and ditches are concentrating and delivering run off to stream system.
- Development or disturbance to forest canopy is limited in distribution and/or focused on 1 or 2 elevation/aspect zones that could influence peak flows.

HIGH

- Level of development or disturbance exceeds 35 percent ECA.
- Watershed has limited area/aspect distribution and disturbances/development is concentrated in one or two areas that likely control peak flows.
- Watershed is forested to the headwaters and has an upper broad basin or plateau where development or disturbance is concentrated.
- Watershed has a high road density and ditchlines are carrying intercepted and concentrated run off to watercourses.

PROBABILITY OF INCREASING SEDIMENT DELIVERY

LOW

- Watershed has a low connectivity (coupling) between hillsides and valley bottom.
- Stable and non-erodible terrain is adjacent to stream channel.
- Watershed has low road density (< 1km/km2) and few stream crossings (<0.25/km2).

MODERATE

- Some degree of coupling between valley sides and stream channel with moderate density of roads/trails on or above unstable or potentially

unstable slopes (Class IV or V) adjacent to channel.
- Moderate road density (1 – 2 km/km2) and number of stream crossing (0.25 to 0.5/km2) on steep slopes with erodible soils.

HIGH
- Channel is directly coupled to valley sides and high road/trails density (>2km/km2) located on or above unstable (IV or V) terrain.
- high road density with numerous stream crossings (>0.5/km2)on moderate to steep slopes with erodible soils.

PROBABILITY OF REDUCING RIPARIAN FUNCTION

LOW
- No development activity or disturbance in riparian zone.
- Appropriately sized riparian buffers in place.
- Few stream crossings by roads or trails.

MODERATE
- 10 to 30 percent of riparian area directly impacted by development or disturbance.
- Undersized riparian buffers along 30 percent or more of channel resulting in a reduction of LWD recruitment or shade function of canopy.
- High density of stream crossings by roads or trails.

HIGH
- Extensive (>30 percent) development/disturbance in riparian area.
- Inappropriately sized riparian buffers along most (>50 %) of channel.
- Channel oriented east-west and development/disturbance has removed a significant amount (> 30 percent) of riparian area on south side of channel.

HYDRO-GEOMORPHOLOGIC RISK ANALYSIS

A qualitative analysis of risk of impacts to aquatic resources (channel stability, water quality and aquatic habitat) for the different hydrological factors is determined by comparing the channel sensitivity rating for a given hydrologic factor against the existing and proposed hazard rating for each factor. The matrix shown in the following table is used to determine risk.

RISK	Low Hazard	Moderate Hazard	High Hazard
Low Sensitivity	Very Low	Low	Moderate
Moderate Sensitivity	Low	Moderate	High
High Sensitivity	Moderate	High	Very high

The risk analysis procedure used here is adapted from the procedure described in the Road Engineering Guidebook (2002). It is important for all resource users (including water licensees) to note that a watershed can have an inherent level of risk of impact from the hydrological factors even though the likelihood of an event occurring given the existing or proposed development is assessed as low. An inherent level of risk (i.e. moderate risk) for a hydrologic factor is assessed when the channel is considered to be highly sensitive to either peak flow increases, increases in sediment delivery or impacts to the riparian area.

Resource development is not excluded where a moderate or high risk exists. However, resource managers must be willing to adapt management practices to account for the natural sensitivity of the watershed and the potential hazards associated with development.

Results of the hydrological risk analysis can be used to develop recommendations to guide forest development, or, in the case of existing development, direct remedial work. As well, the hydrological risk analysis can be used to identify the most sensitive aspects (variables) of the watershed suitable for monitoring.

Because this is a qualitative risk analysis different professionals are likely to make different interpretations. For this reason it is important that professionals document their observations and interpretations of watershed conditions that have led to the assigned level of risk. This documentation will allow professionals reviewing the document at a later date (or representing different stakeholder groups) to consider the results of the risk analysis within the appropriate context.

DISCUSSION

Forest management in B.C. is moving away from the recipe-style assessments required by the Forest

Practices Code and towards an environment of risk-management and professional reliance under the Forest and Range Practices Act. In this new environment planning and development foresters need to have a comprehensive understanding of the hydro-geomorphologic characteristics and sensitivities of a watershed in order to minimize the risk of forestry related impacts to aquatic values.

The hydro-geomorphologic risk analysis is a simple, cost effective tool for focusing on limiting factors within a watershed and developing practical recommendations to minimize the identified risks.

However, as with any qualitative assessment this risk analysis is subject to personal bias. It is imperative that professionals undertaking this type of analysis have extensive field experience and a comprehensive knowledge of channel and watershed processes.

Literature Cited,

B.C. Ministry of Forests, 2002. Forest Road Engineering Guidebook. For. Prac. Br. B.C. Min. For., Victoria, B.C. Forest Practices Code of British Columbia Guidebook.

Bunte, K. and L. H. MacDonald, 1999. Scale Considerations and the Delectability of Sedimentary Cumulative Watershed Effects. Technical Bulletin No. 766, National Council for Air and Stream Improvement, January 1999.

Montgomery, D. R. and L. H. MacDonald, 2002. Diagnostic Approach to Stream Channel Assessment and Monitoring. In *Journal of the American Water Resources Association, Vol. 38. No. 1, Pgs. 1 – 16.*

Web Savvy Volunteer(s) Needed

The DEGIFS Executive is presently seeking individuals to participate on a DEGIFS Discussion Board Subcommittee. Specifically, we are seeking immediate assistance to upgrade the discussion forum. If you have web site development/discussion board exposure and are interested in assisting, please let us know as soon as possible.

Anyone interested in helping, please contact Heather Blyth (hblyth@shaw.ca)

Conference Announcement

Wildland Urban Interface Fire in the New Era
Western Silvicutural Contractors' Association
2004 British Columbia Wildfire Conference

Whistler Conference Centre, Whistler, B.C.
May 11-13, 2004

The purpose of the conference is to:

- lay the foundations for a broad understanding of our present wildfire predicament;
- present the strategic policies and practices we need to implement to abate the hazard;
- discuss how we must share the responsibility for wildfire in order to mitigate its future effects.

The conference topics range from the ecology, economics and governance of wildfire management to the specifics of the wildland-urban interface, fuels reduction, emergency planning, bio-mass reduction opportunities, public education, parks policy and home insurance.

DEGIFS Colleagues Tim Smith, Don Dobson and Dick Fletcher will be presenting at the conference.

Check out: www.bablackwell.com/conference for more information.

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Do Not Forget!!!

ASPECT SUBMISSIONS:

LAST DATE FOR SUBMISSIONS TO ASPECT	NEWSLETTER RELEASE DATE
JUNE 18, 2004	JULY 9, 2004
SEPT. 3, 2004	SEPT. 24, 2004
NOV. 19, 2004	DEC. 10, 2004

Electronic submissions in **Word format (only)** should be made to Bruce Thomson by the date listed above (no exceptions) (brucethomson@shaw.ca).

Refer to *Guidelines for Submission* on the website http://www.degifs.com/guidelines.doc for submission requirements.

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