Details for 'Skill Set - Terrain Stability Mapping and Bioterrain Mapping '

This document is a copy of "Skill Set – Terrain Mapping' by Peter Weir, summarizing a paper by the APFBC/APEGBC Joint Practises Board, with minor additions (in blue), providing information about skills required for Bioterrain Mapping. Modifications by Deepa Fillatow, P. Geo., Provincial Bioterrain Specialist, BC Ministry of Environment.

The original article is available at:
http://www.degifs.com/resources.php3?category=browsecategories&item=103.

The APFBC/APEGBC Joint Practices Board reports is available from: Terrain Mapping and Interpretations JPB.pdf

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ABCPF/APEGBC Joint Practice Board
The Association of BC Professional Foresters and APEGBC work together through a Joint Practice Board (JPB) to address issues of mutual concern in the forest industry. This article is the sixth in a series produced by the JPB (also published in Forum, ABCPF's journal) that discusses the roles of professionals in the forest sector and areas of interdisciplinary practice.

The Need for Terrain Mapping

Terrain mapping is used in the evaluation of geologic hazards and risks associated with forest development. A terrain stability hazard map and a soil erosion potential map must be prepared for the part of a forest development plan that is within a community watershed. Terrain stability and soil erosion potential maps are also used in areas other than community watersheds to evaluate landslide and erosion hazards that might affect roads and cutblocks as well as areas adjacent to forestry operations. Bioterrain mapping, a type of terrain mapping, is an integral component of ecosystem mapping used to assess wildlife habitat, calculate forest productivity, identifying sensitive ecosystems and for other land management applications.

This article outlines essential and supplemental skills, as recommended by the JPB, for professionals who undertake terrain mapping and make interpretations based on terrain mapping. Such interpretations include ecosystem mapping, slope stability, surface erosion potential, landslide-induced stream sedimentation and potential for sediment delivery from surface erosion sources. The article is intended to guide those who seek to become a qualified registered professional (QRP) in this area and to assist established professionals in their self-evaluation.

A previous article by the JPB, "Using Teamwork to Maximize Efficiency in Terrain Stability Field Assessments" (published in the December 1999 issue of Innovation and posted at www.apeg.bc.ca; see Archives under Innovation link on the home page), provides more information on the skills required to undertake terrain stability field assessments.

Current Procedures and Requirements

Terrain mapping involves subdividing a landscape into polygons based on a terrain classification system. Whereas the classification defines and describes abstractions of objects based on geomorphological principles and understanding, the mapping separates real areas of land (terrain) that have similar and contrasting ranges of characteristics. As a result, the process of mapping contains a personal component that combines elements of both sciences and the mapping "craft." There is no one "right" way to map an area; rather, there is a range of options that will meet mapping objectives to a greater or lesser extent. Direction is provided in the Forest Practices Code Mapping and Assessing Terrain Stability Guidebook and in Ministry of Environment Manual 10, Terrain Classification System for British Columbia.

The mapping of terrain, slope stability, bioterrain and other interpretations requires a thorough understanding of landscapes and the processes that have shaped and continue to shape them. This encompasses the fundamental elements that determine the landscape: bedrock and surficial geology, geomorphology with an emphasis on glacial processes, and weather and climatic conditions.
In order to understand and predict the behaviour of materials under varying conditions, a thorough understanding of earth materials is required. This includes soil and rock mechanics pertinent to forestry; soil physics (in particular, the factors governing the retention and flow of water in porous media); forest, slope and groundwater hydrology; forest harvesting and road building techniques; and forest ecology and silvics as they relate to soil water regimes.

Since air photos are central to the mapping process, stereoscopic vision and advanced knowledge of, and extensive experience in, air photo interpretation in a variety of environments is essential for terrain mappers.

Imagery with the superimposed mapping is normally a preliminary product from which a cartographic or digital product is derived; therefore, a mapper needs to understand photogrammetry and cartography — in particular, those elements that determine the precision and accuracy of map production. The quality of mapping is also determined by basic field skills (including orienteering) as well as skills in recognizing and describing materials and landforms, which can only be gained from field courses and by mentoring under established professionals.

Recommended Training and Experience

The list below outlines essential and recommended supplemental skills for terrain mapping and its interpretations. In most cases, these skills will be obtained by completing university level courses.

The list of subjects does not outline a prescribed course of study leading to a degree. In most cases, such academic skills must be honed further by attaining field experience as guided by an appropriate mentor. A qualified terrain mapping professional should have background in all of the essential skills and many of the supplemental skills.

Essential skills

Basic geology — Physical geology; Introduction to mineralogy and petrology; Igneous, sedimentary and metamorphic petrology; Stratigraphy, sedimentology and sedimentation; Structural geology; Regional geology of western Canada
Geomorphology
Glacial processes and environments/Quaternary history
Soil/rock mechanics
Soil physics
Weather and climate
Hydrology (land use/forest/slope/groundwater/rivers)
Air photo interpretation (advanced)
Natural hazards/forest geoscience
Cartography and photogrammetry
Field geology and hydrogeology
Oral and written communication

Recommended/supplemental skills

Ecology/forest ecology (essential for bioterrain mapping)
Geographic Information Systems
Statistics (eg, relating to terrain attribute studies)
Land use planning/resource management
Soil and water conservation (erosion and sediment control)
Regional ecosystems
Ecosystem biogeochemistry
Remote sensing

Conclusion

QRPs who practise in the area of terrain mapping should follow the above recommendations regarding appropriate training and experience. However, QRPs must always limit their practice to the area of expertise in which they are fully competent. In unusual and complex situations, specialists in the appropriate field of practice should be engaged.

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PDF File: Terrain Mapping and Interpretations JPB.pdf

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