

KARST INVENTORY AND VULNERABILITY ASSESSMENT PROCEDURES IN THE FORESTED KARST LANDSCAPES OF BRITISH COLUMBIA, CANADA. P. A. Griffiths, Cave Management Services, 544 Springbok Road, Campbell River, British Columbia, Canada, V9W 8A2. T.R.Stokes, Terra Firma Geoscience Services, 1480 Sherwood Drive, Nanaimo, British Columbia, Canada, V9T 1G7. B. I'Anson, 2483 Wilcox Terrace, Victoria, British Columbia, V8Z 5R7. Steve Chatwin, British Columbia Ministry of Forests Research Branch, 712 Yates St., Victoria, British Columbia, V8W 1L4.

British Columbia is Canada's westernmost province. Forest development has been the mainstay of British Columbia's economy for the past 200 years. In response to increasing concerns over the impacts of forestry on karst terrain, the British Columbia Ministry of Forests initiated the development of ecosystem-based karst inventory and vulnerability assessment procedures. These standards for karst inventories and vulnerability assessments are designed to be used in conjunction with a set of provincial karst management guidelines that are currently under development.

Standardized procedures have been developed for completing karst inventories at three levels: 1) the reconnaissance-level inventory at 1:250 000 map scale; 2) the planning-level inventory at 1:20 000 or 1:50 000 map scales; and, 3) the karst field assessment at 1:5000 or 1:10 000 map scales. These three levels of inventory provide a filtered approach to evaluating karst terrain, with each progressive level having more detailed requirements for data collection and evaluation.

Reconnaissance-level karst potential maps for the entire province of British Columbia were compiled in 1999. A set of 87 map sheets (1:250 000 scale) identify areas with the potential for karst development. These maps can assist in strategic planning and help guide the requirement for more detailed inventories at the planning or karst field assessment level.

Planning-level karst inventories are used to obtain a general sense of key karst attributes at the landscape-level to assist with forest development planning and identify the need and location of karst field assessments. Six major field tasks are associated with a planning-level inventory: 1) bedrock geological mapping; 2) karst mapping and evaluation for vulnerability potential; 3) identification of significant surface karst and hydrological features; 4) evaluation of the karst catchment; 5) identification of karst flora and fauna, and associated karst habitats; and, 6) identification of geomorphic hazards. This information is used to develop vulnerability potential maps that stratify the karst landscape into polygons of low, moderate, high, or very high vulnerability potential.

Karst field assessments are carried out within and adjacent to areas of proposed forest development to assess the vulnerability of the karst unit. The major karst attributes assessed during a karst field assessment include: 1) karst unit boundaries and geological characteristics; 2) the distribution and intensity of surface epikarst development; 3) the overlying soil thickness/texture; 4) the location, type, density and significance of surface karst features; 5) the roughness of the overall karst surface; 6) karst streams and

hydrology; 7) the potential for caves and other subsurface cavities; and, 8) the occurrence of unique or unusual karst flora/fauna and/or habitat.

Karst vulnerability is determined by utilizing the data collected during a karst field assessment in a four-step procedure to derive ratings of low, moderate, high, or very high vulnerability. The process considers three major criteria: 1) epikarst sensitivity; 2) the density of surface karst features; and, 3) subsurface karst potential. The procedure also allows for the integration of three modifying factors: 1) fine textured, erodible soils; 2) karst roughness; and, 3) unique or unusual karst flora/fauna and/or habitats.

Ratings for karst vulnerability are used to guide forest practices on karst landscapes to help minimize impacts and ensure karst resources are managed in a sustainable manner.