

# GIS and the visualization of First Nations resource management

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People's uses of, responses to, and bonds with their environment differ from one person to the next, although at times it is possible to make some generalizations based on a clustering of individual's knowledge and experiences. In this way, we can talk about group knowledge and experience, perhaps reflecting distinctive cultural experiences. Various methods have been used to develop an understanding of environmental knowledge, including questionnaires, formal or informal interviews, and document analysis, as well as observing and making inferences from patterns of use. Obtaining information about environmental knowledge becomes complex when people of different culture and contrasting heritage are involved.

The purpose of this research was to explore the role of new and emerging technologies, such as GIS resource mapping and three-dimensional visualization, in forest and land management processes involving First Nations. The research is based on two considerations. First, the recent court decisions upholding the inherent right and title of First Nations to natural resources (e.g., *R. v Sparrow* and *R. v Delgamuukw*) have placed First Nations at the forefront of resource management issues in British Columbia. Throughout British Columbia, First Nations groups are becoming increasingly involved in the use of GIS and visualization technology in both land claims and the management of resources. In the words of the Gitksan Strategic Watershed Analysis Team: "We identify the resources we need, and we create a common language built of maps and jargon, data and dialect that fuses the best of ancient wisdoms and modern technology." The second consideration involves the severe deficiency of the conventional tools (i.e., two-dimensional planimetric maps) employed by forest planners to consult with indigenous groups and communicate landscape management proposals. Aboriginal perceptions of the land and environment are highly integrated, but in the process of placing environmental values in standard cartographic format, much of value may be lost. Apart from the difficulties of adequately depicting thematic information, an added difficulty may be that of understanding symbolism such as contour lines. Ability to read and understand cartographic devices such as contour lines and mentally reconstruct topography from them is taken for granted by those who frequently use conventional maps. In reality, relatively few people can look at a conventional map and mentally reconstruct the landscape that it represents. However, indigenous peoples must have a clear picture of how land management proposals (e.g., timber harvesting, watershed restoration), depicted on conventional maps, would appear in the real world.

Emerging techniques involving computer-based visual information systems such as user-friendly GIS resource mapping and three-dimensional visualization, offer new ways to interact with landscape information and, perhaps, to measure more deeply rooted indigenous environmental perceptions.

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CITATION —

Lewis, J. 2000. GIS and the visualization of First Nations resource management. *In* Proceedings, From science to management and back: a science forum for southern interior ecosystems of British Columbia. C. Hollstedt, K. Sutherland, and T. Innes (editors). Southern Interior Forest Extension and Research Partnership, Kamloops, B.C., pp. 63–4.

However, little is known about how useful or acceptable these innovative tools are for different cultural groups, or whether they can help communicate land-use information and perceptions of land-use management. This research initiative:

- examines this evolving cross-disciplinary area;
- assesses the potential utility of integrated GIS and three-dimensional visualization technology as a resource management tool; and
- analyzes the utility of this technology on a watershed-based resource management project led by the Cheam First Nation of the Pilalt tribal group.

A component of this research examines current techniques for calibrating and integrating watershed management data and restoration prescriptions into the GIS/visualization model to develop a range of alternative watershed management visualizations. The visualizations will be presented to members of the Cheam First Nation and used as a basis for mapping traditional ecological knowledge, and for eliciting their reactions to the management scenarios and visual medium.

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