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27

ECOLOGICAL LAND SURVEY AS BASIS FOR LAND RESOURCE PLANNING AND MANAGEMENT IN CANADA

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ABSTRACT

Relationships of landscape ecology and land use planning and management are discussed. The significance of an ecological data base for national, regional and local planning is considered from a Canadian perspective, relating ecological land classification hierarchy to the various levels of management, and describing developments in survey methodology, remote sensing and computer information systems.

INTRODUCTION

In a global sense, Canada has some unique characteristics. It is one of the largest countries in the world, yet has a small but technically developed population. Its economy is largely based on the commercial use of its renewable and mineral resources. The cold northern climate combined with adverse physiography severely limit the capacity of the land to produce agricultural and forestry products. Only 7 % of Canada's 10 million sq. km of land is suitable for agriculture, and only 25 % of the country is covered by commercially useful forest.

Sound management and sustainable use of the natural resource base is therefore basic to Canada's economic and social well-being. Managing widely distributed resources with relatively few people, and consequently somewhat limited finances, requires a good understanding of all aspects of the resource management process, the decision making involved, and the information technology available. The resource management process can be generalized in several

sequential phases: (i) opportunities (problems) are identified; (ii) resource inventories are carried out to support the process; (iii) policies and plans for the use of the resources are developed; then (iv) the plans are implemented; and finally, (v) operations and their environmental effects are monitored, and controlled. This process of management requires use of social, economic and environmental information for decisions at the various levels and often by numerous agencies. The effective use of our land resources thus depends to a great extent on delivering the right information, in the right format and at the right time to the right decision makers. If one of these criteria is not met valuable information may have little or no impact on the decisions. By understanding the overall information needs and information technology, such situations can be avoided.

INFORMATION NEEDS

In Canada, as in most other countries, specific levels of management and planning can be recognized. Nations develop and implement their economic, social and environmental policies, plans and strategies for the country as a whole. But, as well, these are linked both to more synoptic continental or global levels, and they reflect more specific regional, provincial and local perspectives. The information needs are consequently hierarchical. A national data base is required for national planning; provinces require more specific information, while local management needs a very detailed information base. This information hierarchy is schematically displayed in Table 1, which generalizes the relationship between type of information required at the various levels of decision making.

A similar information-need hierarchy, starting with general information for strategic and conceptual decision making, does not only apply to the planning and management of a country as a whole, but also to the planning of individual projects. In order to relate differing ecological levels to the information gathering processes the Canada Committee on Ecological Land Classification (CCELC) proposed levels of ecological generalization (Table 2). The relationship of these to the planning process and environmental impact assessment is shown in Table 3.

Although this hierarchy of information is essentially a simple concept, many nations, in particular large or developing countries, have difficulties finding the financial resources to obtain adequate and appropriate information. Usually it is information at the higher levels that is inadequate, which results in a lack of policy direction and leads to poorly developed strategies for the use of land. Indeed, misuse and mismanagement can often be attributed to this information void. Consequently the absence of consistent national and regional data bases lead to government interventions