

COMPUTER AIDED INTERPRETATION
OF BANFF-JASPER ECOLOGICAL
INVENTORY DATA

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Introduction

The Banff-Jasper ecological land classification project was begun in 1973, with field work beginning in Banff in 1974. The objectives of the project are:

1. to describe the landform, soil, vegetation and wildlife characteristics of Banff and Jasper National Parks in map and report form; and
2. to provide limited data interpretation to Parks Canada for land use planning and management.

The approach and methodology are described by Holland (1976).

Data generated by the Banff-Jasper ecological land classification system are stored in the Canada Soil Information System (CanSIS) of the Land Resource Research Institute, Canada Department of Agriculture, Ottawa. In addition to data storage, CanSIS produces and prints maps and is developing computer software for data manipulation and retrieval.

A pilot project to test the capability of CanSIS to retrieve and manipulate data relevant to management problems was set up by a committee of both researchers (data gathers) and Parks managers (data users). The problem posed was to locate a site for campground development that met certain arbitrary criteria, within the Brazeau mapsheet

Table 1. Campground selection criteria and corresponding data files

Criteria	Data File
1. Subalpine ecoregion	extended legend
2. Morainal landform	extended legend
3. Calcareous parent material	extended legend
4. Well drained	extended legend
5. Silt loam to sandy loam texture	extended legend
6. Coarse fragments <20%	extended legend
7. Lodgepole pine/buffaloberry/showy aster vegetation type	extended legend
8. No summer elk use	extended legend
9. No summer bear use	extended legend
10. Soil pH 7.4 to 8.4	soil detail
11. Slope $\leq 5\%$	cartographic symbols
12. <50% lithic soils	cartographic symbols

in Jasper National Park. Most of the criteria used and their data files are listed in Table 1. In addition, several other criteria were specified which required software development that went beyond retrievals from the legend and symbol files. These included the ability to:

1. window, or discern resource information for an area specified by its geographic coordinates;
2. discern minimal areas, e.g. disregard areas less than 45 ha;
3. eliminate sites with conflicting use, e.g. eliminate sites with adjacent polygons used by elk or bear during the summer;
4. prepare a table showing the values of the criteria for each Ecosite within the pilot project area;
5. update legend and symbol files.

Discussion

Three data files were used by CanSIS to locate an appropriate site:

1. the map legend extended to include wildlife attributes and ratings for each Ecosite;
2. the detail soil data file containing soil descriptive and analytical data from detailed sample sites;
3. the Ecosite symbols used on the CanSIS-digitized maps.

The results were forwarded as three packages. The first was the computerized extended legend with values for each variable and an asterisk indicating values meeting the criteria (Table 2). The second

Table 2. An excerpt from the computerized extended legend showing criteria for four Ecosites

Ecosite	Baker Creek 1	Bow Valley 1	Bryant 2	Fairview 1
Ecoregion	*Subalpine	*Subalpine	*Subalpine	*Subalpine
Mode of depos.	*till	glaciofluvial	*till	colluvium
Calcareousness	*calcareous	*calcareous	*calcareous	non-calcareous
Genetic material	*morainal	glaciofluvial	*morainal	colluvial
Surf. exp. 1A	*ridged	*terraced	*inclined	apron
Surf. exp. 1B	inclined	hummocky	blank	inclined
Surf. exp. 1C	hummocky	blank	blank	fan
Surf. exp. 1D	blank	blank	blank	blank
Drainage class 1A	*well	*rapid	*well	mod-well
Drainage class 1B	blank	well	mod-well	rapid
Drainage class 2A	poorly	blank	blank	blank
Drainage class 2B	blank	blank	blank	blank
Coarse fragments %	*0-10	*0-10	*0-10	35-90
Texture numerator	*SiL	*SiL-SL	*SiL	SL-LS
Texture denominator	*L-SiL	SL-LS	*L-SiL	---
Vegetation types	pine/buffaloberry (C18-C19); shrubby meadow (S1), birch fen (S3)	subxeric pine (C3) pine/buffaloberry (C18-C19)	spruce fir (C13-C30)	avalanche complex
Elk) winter	low	low	*blank	*blank
Elk) summer	low	low	*blank	*blank
Bear) winter	present	*blank	*blank	*blank
Bear) summer	*blank	*blank	*blank	*blank
Meets all criteria	---	---	---	---
Line no.	0010	0016	0022	0045

* Indicates field met specified criteria

package, from the detail soil data file, contained a summary report for each sampled profile and pH values for each soil horizon. Package three was a coding document for a 1:50,000 derived map. Polygons with suitable slope were coded 's' and the rest were blank.

Using the criteria specified initially, there were no Ecosites suitable for a campsite in the pilot area. However, by using the DREAM (Direct Relational Access Method) sorting program and a remote terminal, a user can change criteria and make alternative Ecosite selections.

The pilot project has not yet fully realized the following capabilities:

1. to window areas;
2. to identify polygons of specified minimal area;
3. to determine adjacent polygon characteristics;
4. to make the programs more flexible to user needs;
5. to develop an alternative means of identifying Ecosites with suitable slopes. The current method is cumbersome in that Ecosites of suitable slope are visually identified on the map and then manually coded 's' for subsequent computer retrieval. This method affords no advantage over a visual scan of the map;
6. to check that the Ecosite identified from the legend occurs on the map in question;
7. to provide a means of updating information in legend and symbol files.

The pilot project, however, has been successful in identifying user needs and providing the basic framework on which can be developed a natural resource management tool with applications beyond national parks.

Additional future developments to enhance the utility of the system include: CanSIS' ability to produce single factor or thematic maps, Parks Canada's plan to put remote computer terminals in the parks so that management personnel can quickly retrieve information, and CanSIS' continuing development of software capabilities. Although incorporation of ecosystem modeling and other sophisticated data manipulation and retrieval techniques is probably a few years away, Parks Canada has recognized the potential of these approaches and in future park resource inventories, these techniques will likely be used.

In summary, the Brazeau map sheet pilot project has provided a vehicle by which Parks Canada managers, project researchers and CanSIS have been able to develop preliminary data management tools to manipulate and retrieve resource inventory data.

Reference

Holland, W.D. 1976. Biophysical land classification of Banff and Jasper National Parks. Proc. 1st. Meeting Can. Comm. on Ecological (Biophysical) Land Class. May 25-28, 1976, Petawawa, Ont.

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