



RIC Report 004  
Discussion Document

**Report of the  
Geology, Soils and Archaeology  
Task Force to the  
Resources Inventory Committee**

May 1992

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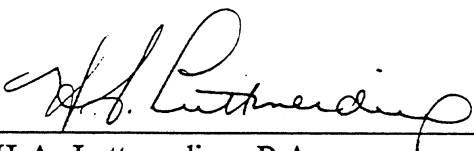
RIC Report 004  
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REPORT OF THE  
GEOLOGY, SOILS AND ARCHAEOLOGY  
TASK FORCE  
  
TO THE  
RESOURCES INVENTORY COMMITTEE

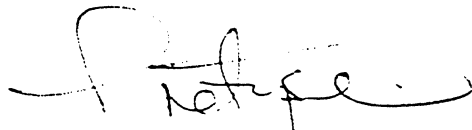
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MAY 1992

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## PREAMBLE

This report is submitted to the Resources Inventory Committee (RIC) by the Geology, Soils and Archaeology Task Force.

The Resources Inventory Committee consists of representatives from various ministries and agencies of the Canadian and the British Columbia governments. First Nations peoples are represented in the Committee. RIC objectives are to develop a common set of standards and procedures for the provincial resources inventories, as recommended by the Forest Resources Commission in its report The Future of Our Forests.

To achieve its objectives, the Resources Inventory Committee has set up several task forces, including the Geology, Soils and Archaeology Task Force. The terms of reference for the Task Force were to review their inventory programs with emphasis on purpose, methods, standards and procedures of data collection and interpretation; to review current status of their data base; comment on its adequacy to meet current and future land management needs. This is the synoptic report of that work.

Funding of the Resources Inventory Committee work, including the preparation of this report, is provided by the Canada-British Columbia Partnership Agreement on Forest Resources Development: FRDA II - a four year (1991-1995) \$200 million program cost-shared equally by the federal and provincial governments.

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## **EXECUTIVE SUMMARY**

*The ability to undertake systematic geological, soil and archaeological inventories is extremely limited in the provincial government. Data are often not available; are not accessible or are not at sufficient detail to meet current needs. Data and map products relating to geology, soils and archaeology are in high demand from a diverse client base. Often, these resource managers make decisions without the aid of knowledge regarding these resources.*

*Earth science data are considered to be the foundation of all resource management and planning decisions. Information supplied by these inventories often dictates the quality of other related data bases and land management decision making models. Archaeological data are necessary as it represents a non-renewable, scientific and culturally significant resource protected by legislation and valued by society.*

*This report provides a number of recommendations that should be initiated in order to provide the basis for sound decisions and problem solving in the context of integrated and sustainable resource use and management. The main recommendations are:*

- 1. Re-establishment of inventory capability in the province and enhancement of programs that are currently on-going. Of particular concern is the current lack of soil inventory capability in the province.*
- 2. Management of inventory programs should be by a multi-ministry coordinating committee with strong commitments to multi-resource inventory and integration; this committee should be responsible for quality control of data.*
- 3. Undertake regional level inventories (approx. scale 1:50,000) for the entire province; larger scale inventories to be undertaken as and when required.*
- 4. Standardize, and make user friendly, all derivative and interpretive maps.*
- 5. Provide the means of training inventory personnel.*
- 6. All inventory maps and data (existing and future) should be made available in a GIS framework that is PC-compatible and in a format that can be used by all government agencies.*
- 7. All data collected that are relevant to a particular inventory theme should be stored in a common data base.*
- 8. All inventories should annually publish an index of map and data coverage, and implement procedures to ensure that other inventory programs are aware of their activities.*
- 9. All maps and data must be timely and easily accessible.*





## **1.0 INTRODUCTION AND PURPOSE OF THE REPORT**

### **1.1 Background**

The report prepared by the Forest Resources Commission entitled " The Future of Our Forests" (April 1991) expressed concern about the overall status of resource inventories and their ability to meet the current needs of planning processes and for problem solving on publicly managed lands. This concern resulted in the formation of the Forest Resources Inventory Committee (FRIC) that was charged with the responsibility of reviewing the status of current resource inventories and providing recommendations for addressing the concerns. During its early stages, FRIC recognized that confining its review to the forest land base was unrealistic and adopted a slight name change to reflect their concern for the entire Province. The committee is now referred to as the Resources Inventory Committee (RIC).

To assist RIC, several Task Forces were established to address the different kinds of resource inventories that have and are being undertaken as well as ones that will be needed in the future. Each of these Task Forces were required to assess specific inventory programs that provide the knowledge necessary to enable sound land management decisions in the context of sustainable development and integrated resource management. The Geology, Soils and Archaeology Task Force is one of these groups.

The objective of RIC is to address two critical issues:

1. What information is vital for effective land management, at what levels of detail and for what purposes?
2. How can this information most effectively be acquired in a manner that minimizes duplication, promotes cooperative data collection, and encourages broad application and long-term relevance?

### **1.2 The Organization of the Geology, Soils and Archaeology Task Force**

The Geology, Soils and Archaeology Task Force (the Task Force), in a manner similar to other Task Forces, is made-up of several Task Groups. These Task Groups are: Bedrock Geology; Surficial Geology; Soils; and Archaeology. Each of these Task Groups was chaired by an individual representing the Ministry and Branch of government currently responsible for the inventory program. Members of the Task Groups were from all levels of government (federal, provincial, and regional), the private sector, and included those agencies or individuals who are users of the inventory information.

Each of the four Task Groups was required, on behalf of the Task Force, to undertake a review of their specific inventory programs with special emphasis on their purpose, methods, standards and procedures of data collection and interpretation. In addition, they were requested to review the current status of their data base and provide comment on its adequacy to meet current and future land management needs, including accessibility, availability and residence of the data.

The four Task Groups prepared individual reports addressing these, and other, objectives. These reports are available as supplementary reports (Annexes 1 to 4). The reader is encouraged to reference these 'stand alone' reports in order to gain a greater appreciation of the points raised by the Task Groups than is accomplished in this synoptic report.

### **1.3      Objectives of the Geology, Soils and Archaeology Task Force**

The immediate tasks of the Task Force and hence the objectives of this report, are the following:

1.      Review the current status of geological, soils and archaeological inventories in British Columbia, including areal coverage, scale (detail), adequacy of attributes collected and standards applied, interpretive products developed, ability of the data bases to meet current needs, and data accessibility and dissemination.
2.      Identify future client needs and products to be generated from geological, soils and archaeological inventories, assess the adequacy of standards and procedures to meet these new requirements, and determine inventory methodology modifications needed to meet these future uses, including linkages with other resource inventories, data storage, analysis and interpretation.

The result of meeting these objectives are contained in this report. Following a presentation and review of the conclusions and recommendations at a combined Task Force - RIC Workshop, it is intended that two additional objectives will be met. They are:

1.      Develop, where appropriate, common standards and procedures with other resource inventories for the collection, storage, analysis, interpretation and reporting of inventory data.
2.      Test these procedures and standards in the field and, after verification, encourage and promote their application, including provision of training and extension, in both government and private data collection programs.

### **1.4      Organization of the Report**

This report is organized specifically to address the two immediate objectives of the Task Force, thereby assisting RIC in carrying out its assigned responsibility. The recommendations and conclusions contained in the report are intended for presentation and debate at the proposed combined Task Force - RIC Workshop. To this end, the report has been designed to be brief, and to the point. Where more detailed background information and rationale are required, reference can be made to the individual Task Group reports contained in the Appendices.

## **2.0 PRESENT STATUS OF THE INVENTORY PROGRAMS**

### **2.1 Introduction**

Information contained in this section of the report deals with the following topics, relative to each of the four inventory programs being addressed:

1. What information is available?
2. Who collected the information and where can it be obtained?
3. What standards and procedures were employed in the collection of the data?
4. What is the approximate cost of the inventory program in terms of annual expenditure or on a cost per unit area basis?; note that this information is very limited and values provided are highly variable and difficult to substantiate.

Table 1 presents a synopsis of this information for each of the inventory programs. Areal coverage of the inventory programs are shown on Figures 1 to 5. When referring to Figure 1, it is important to note that it is not always possible to show levels of mapping detail (scale) or age of the information (some very old information is considered obsolete).

The following sections provide point form summaries regarding the current status and relevant issues of the four resource inventory programs. Not included in this discussions, but considered relevant to land management needs are geochemical maps, geophysical maps and stream chemistry data.

### **2.2. Inventory Coverage (see Figure 1 to 5)**

#### **BEDROCK GEOLOGY**

- Geological Survey of Canada and B.C. Geological Survey maps cover 90% of the province at 1:250,000 scale although several of these maps are considered obsolete; 9% of the province covered at 1:50,000 scale; very limited coverage at larger scales.
- Very little of the mapped data is in digital form; most is available as published or open-file paper maps.

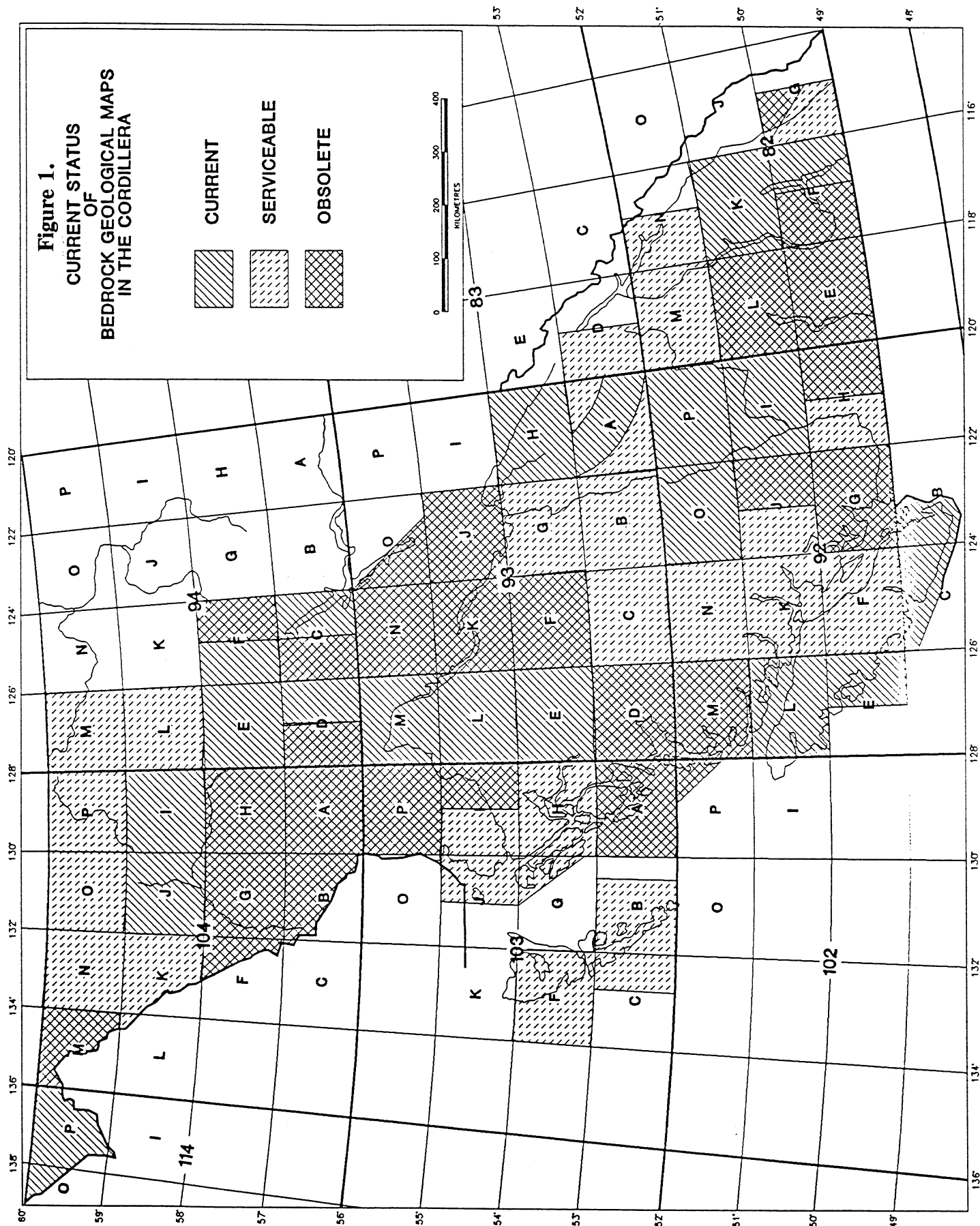
#### **SURFICIAL GEOLOGY**

- Approximately 70% of the province is mapped at various scales (mostly from 1:50,000 to 1:250,000); the bulk of this mapping is from older soils/landform products and not necessarily completely compatible with the current Terrain Classification System.
- Very little of the mapped information is in digital form; most maps, with the exception of some Geological Survey of Canada products are in unpublished manuscript form (paper prints).

**Figure 1.**  
CURRENT STATUS  
OF  
BEDROCK GEOLOGICAL MAPS  
IN THE CORDILLERA

**CURRENT**  
**SERVICEABLE**  
**OBSOLETE**

0 100 200 300 400  
KILOMETRES



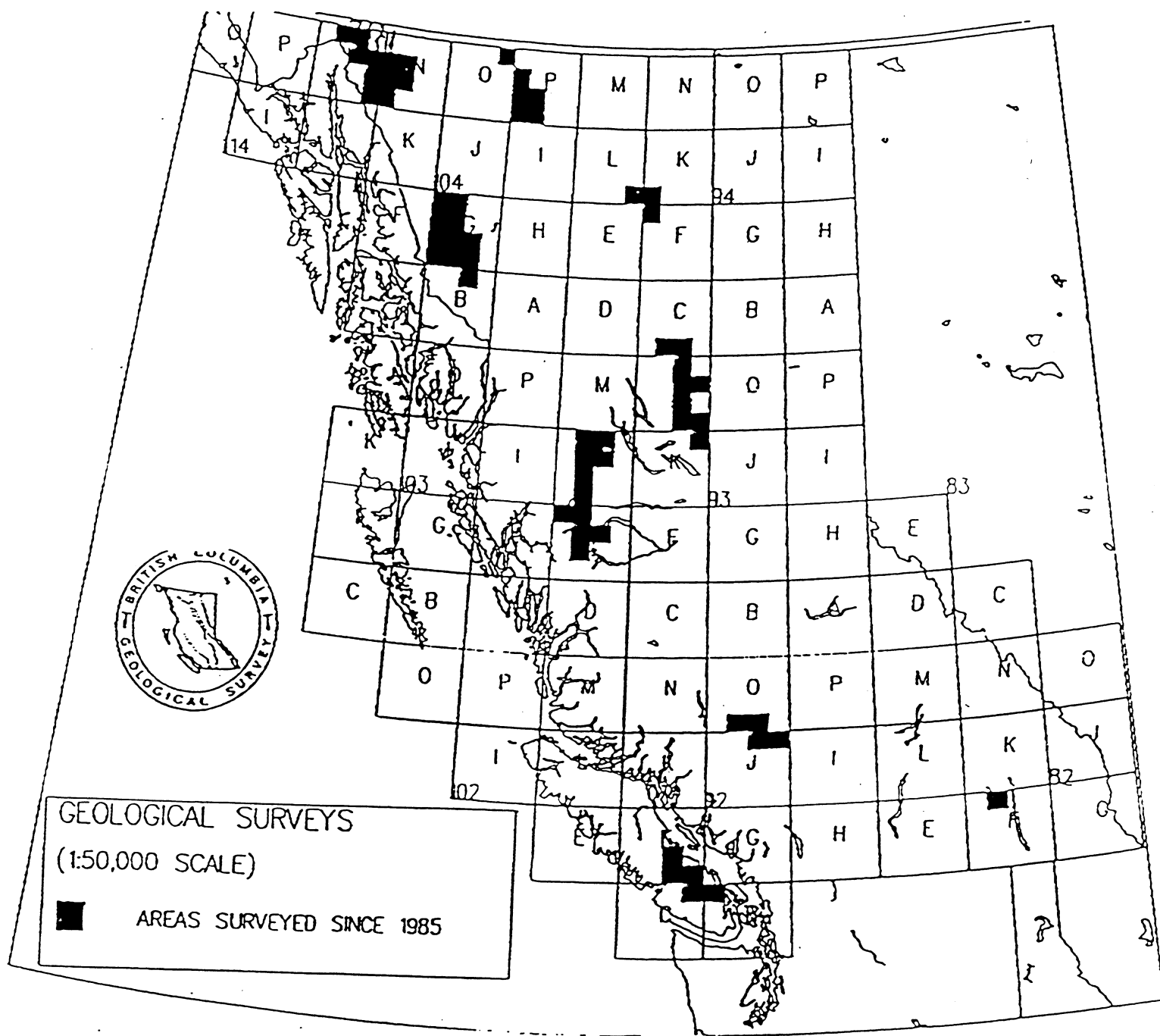
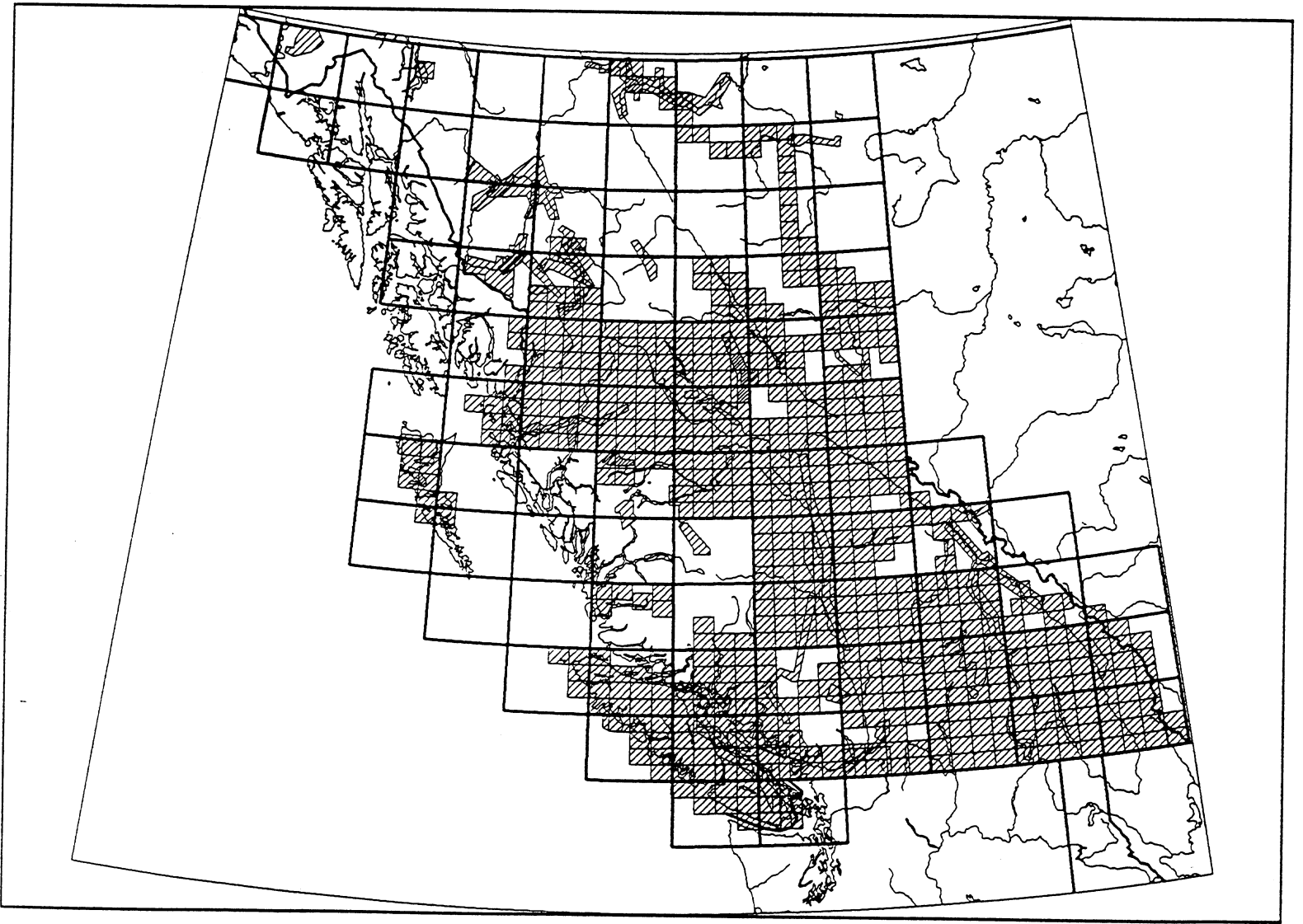


Figure 2. Bedrock Geology Map (B.C. Geological Survey)





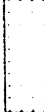
**Figure 3. Surficial Geology Map Coverage (1:50,000 scale)**

# BRITISH COLUMBIA

## INDEX TO SOIL SURVEYS

1990

### REFERENCE

-  Detailed Survey
-  Reconnaissance Survey
-  Exploratory Survey

Publications are available from

MAPS: B.C.

Ministry of Crown Lands

Parliament Buildings

Victoria B.C.

78V: XE

(604) 387-1441

A fee is charged for publications

Index nos. 59, 60, 61 and 63 are also available from

Agriculture Supervisor

Faculty of Extension

University of Alberta

Edmonton Alberta

T6G 2E7

(403) 482-3029

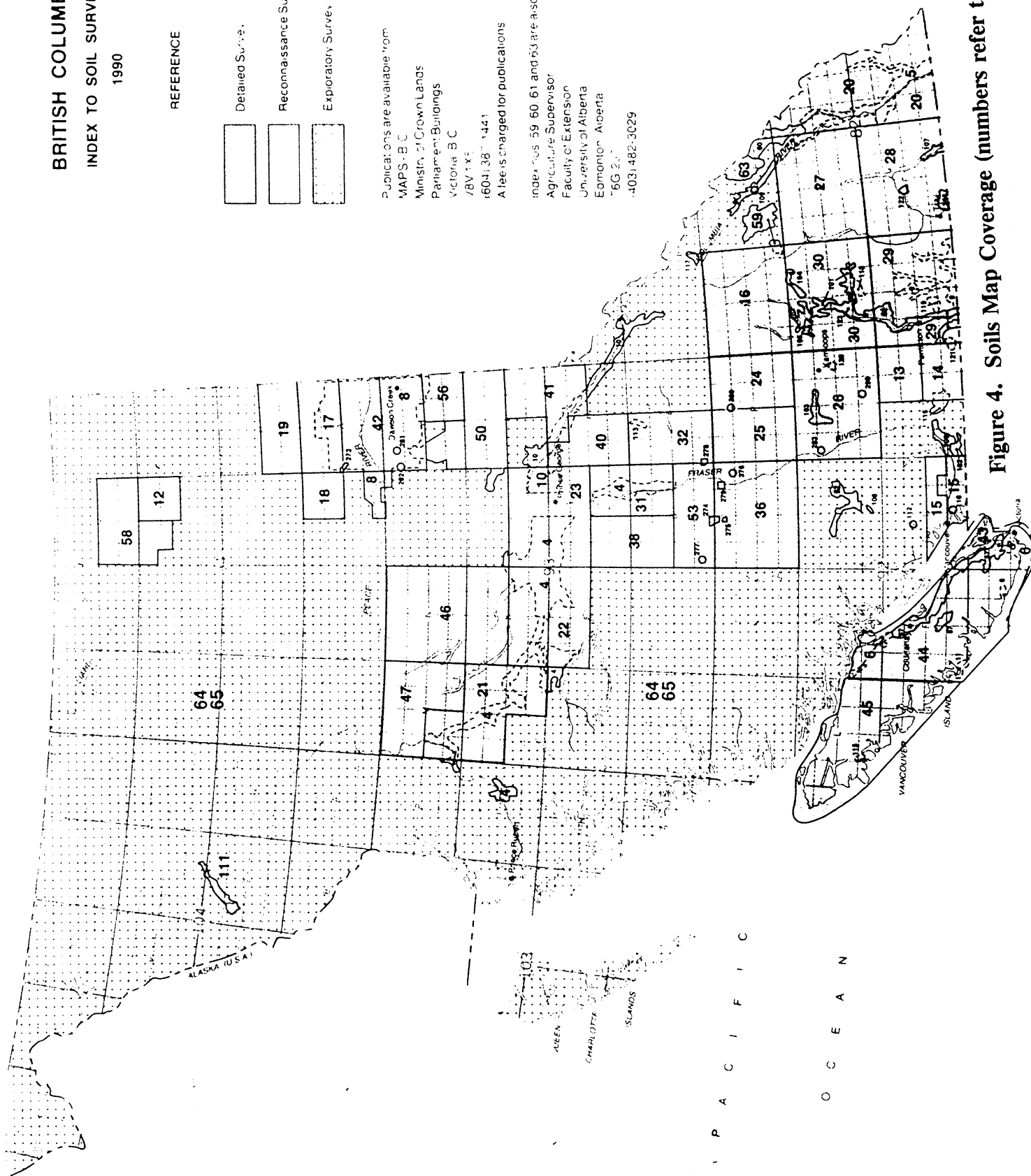


Figure 4. Soils Map Coverage (numbers refer to survey report)



**Figure 4A. INDEX TO BRITISH COLUMBIA SOIL INVENTORY**

MAJOR SURVEYS				SOIL SURVEY MANUALS			
Index No.	Map Area	Scale	Year	Index No.	Map Area	Scale	Year
1	Lower Fraser Valley (E)	1:63 360'	1939	44	Southern Vancouver Island (A)	1:100 000'	1985
2	Prince George (E)	1:94 040'	1946	45	Northern Vancouver Island (B)	1:100 000'	1980
3	Okanagan & Similkameen Valleys (E)	1:74 270'	1949	46	Manson River-Fort Fraser (A)	1:100 000'	1982
4	Quesnel, Nechako, François Lake & Buckley-Terrace (E)	1:126 720'	1954	47	Hazelton (A)	1:100 000'	1984
5	Upper Kootenay & Elk River Valleys (A)	1:63 360'	1956	50	Wapiti River-Murray River (A)	1:100 000'	1977
6	Southeast Vancouver Island & Gulf Islands (E)	1:63 360'	1959	52	Okanagan-Similkameen Valleys (A)	1:20 000'	1986
7	Upper Columbia River Valley (A)	1:63 360'	1961	53	Williams Lake-Alexis Creek (A)	1:100 000'	1988
8	Peace River (E)	1:126 720'	1965	56	Deep Basin (C)	1:50 000'	1982
9	Kettle River Valley (A)	1:63 360'	1964	57	Southeast Vancouver Island	1:20 000'	1985
10	Upper Fraser Valley (A)	1:126 720'	1970		Duncan, Nanaimo (A)	1:20 000'	1985
11	Tofino-Ucluellet Lowlands (A)	1:50 000'	1971		Parksville, Qualicum,	1:20 000'	1989
12	Fort Nelson (A)	1:126 720'	1971	58	Fort Simpson Trail (A)	1:100 000'	1982
13	Tulameen (A)	1:126 720'	1974	59	Glacier-Mt. Revelstoke Nat'l Parks (A)	1:50 000'	1984
14	Princeton (A)	1:125 000'	1979	60	Kootenay National Park (A)	1:50 000'	1984
15	Langley-Vancouver	1:25 000'	1980	62	Pemberton Valley (A)	1:20 000'	1980
	Vol. 1 Soil map mosaics			63	Yoho National Park (A)	1:50 000'	1977
	of the Lower Fraser Valley			64	Soil Landscapes of B.C. (A)	1:6 000 000'	1978
	Vol. 2 Soil maps of Sunshine	1:50 000	1980	65	Soil Landscapes of Canada-B.C. (C,D)	1:1 000 000'	1978
	Coast and Coast Mountains						
	Vol. 3 Description of Soils						
	in Vols. 1 and 2						
	Vol. 5 Agricultural management						
	and cropping for soils						
	described in Vol. 3						
	Vol. 6 Detailed technical						
	descriptions of soils in Vol. 3						
16	Seymour Arm (A)	1:100 000'	1980	101	North Okanagan (B)	1:31 680'	1960
17	Rose Prairie-Blueberry River (C)	1:125 000'	1971	102	Chilliwack (B)	1:24 000'	1962
18	Halfway River (C)	1:125 000'	1973	103	Ashcroft-Savona (B)	1:31 680'	1963
19	Nig Creek-Big Arrow Creek (C)	1:125 000'	1975	104	Eagle River Valley (B)	1:31 680'	1964
20	East Kootenay (A)	1:100 000'	1990	105	Shuswap (B)	1:31 680'	1965
21	Smithers-Hazelton (A)	1:125 000'	1974	106	Agassiz (B)	1:24 000'	1967
22	Nechako-François Lake (A)	1:125 000'	1976	107	Creston (B)	1:31 680'	1971
23	Prince George-McLeod Lake (A)	1:100 000'	1989	108	Alta Lake (B)	1:15 840'	1971
24	Bonaparte River-Canim Lake (A)	1:100 000'	1988	109	Town of Golden (B)	1:5 400'	1975
25	Lac La Hache-Clinton (A)	1:125 000'	1980	110	Big Bend, Burnaby (B)	1:20 000'	1977
26	Ascroft (D)	1:100 000'	1980	111	Telegraph Creek (B)	1:50 000'	1978
27	Lardeau (A)	1:100 000'	1980	112	Mill-Woodliffe Creeks (A)	1:15 840'	1988
28	Nelson (A)	1:100 000'	1980	113	Cariboo River Valley (B)	1:50 000'	1979
29	Penticton (C)	1:100 000'	1986	114	Pend-D'Oreille Valley (E)	1:20 000'	1980
30	Vernon (C)	1:100 000'	1986	115	Power River Valley (A)	1:15 000'	1988
31	Quesnel (A)	1:100 000'	1982	116	Cascades (B)	1:100 000'	1981
32	Horseshoe (A)	1:100 000'	1987	117	Cummins River Valley (C)	1:50 000'	1981
36	Taseko Lakes (A)	1:100 000'	1988	118	Coldstream Creek Valley (B)	1:50 000'	1980
38	Nazko (A)	1:100 000'	1985	119	Vaseaux Creek Valley (B)	1:50 000'	1980
40	Barkerville (A)	1:100 000'	1987	120	Separation Lake (C)	1:20 000'	1980
41	Jarvis Creek-Morkill River (A)	1:100 000'	1987	121	Keremeos-Ashnola Creeks (B)	1:20 000'	1981
42	Fort St. John-Dawson Creek (A)	1:100 000'	1986	122	Nelson City Watershed (B)	1:20 000'	1987
43	Gulf Islands	1:20 000'	1987	123	North Okanagan Valley (C)	1:20 000'	1987
	Vol. 1 Salt Spring (A)			273	Halfway Indian Reserve (B)	1:31 680' <sup>2,3</sup>	1973
	Vol. 2 Pender, Mayne, Saturna (A)			274	Anahim Indian Reserve (B)	1:16 896'	1973
	Vol. 3 Galiano, Valdes, Thetis, Kuper (A)			275	Stoney Indian Reserve (B)	1:16 896'	1973
	Vol. 4 Gabriola (A)			276	Alkali Lake Indian Reserve (B)	1:16 896'	1973
	Vol. 5 Sidney, James, Moresby, Portland (D)			277	Redstone Indian Reserve (B)	1:16 896'	1973
				278	Williams Lake Indian Reserve (B)	1:16 896'	1973
				279	Toosey Indian Reserve (B)	1:16 896'	1973
				280	Canim Lake Indian Reserve (B)	1:16 896'	1973
				281	East Moberly Lake Indian Reserve (B)	1:95 040'	1973
				282	West Moberly Lake Indian Reserve (B)	1:95 040'	1973
				283	Fountain Indian Reserve (B)	1:14 080'	1973
				289	Nicola-Marmet Indian Reserve (B)	1:36 206'	1974

**SPECIAL SURVEYS**

- 1 colour  
2 black & white  
3 photomosaic  
4 interim data available

Digital

- Map  
Report  
A bulletin/report  
B interim/working report  
C extended map legend  
D in preparation  
E out of print

CanSIS - Canada Soil Information System

- CAPAMP - Computer Assisted Planning Assessment and Map Production (British Columbia)

Additional information about soil surveys may be obtained from:

Ministry of Environment  
Integrated Resource Management Branch  
777 Broughton Street  
Victoria, B.C. V8V 1X5  
Tel. (604) 356-7736

or

Agriculture Canada  
Land Resource Research Unit  
6660 NW Marine Drive  
Vancouver, B.C. V6T 1X2  
Tel. (604) 224-4355  
FAX (604) 666-4994

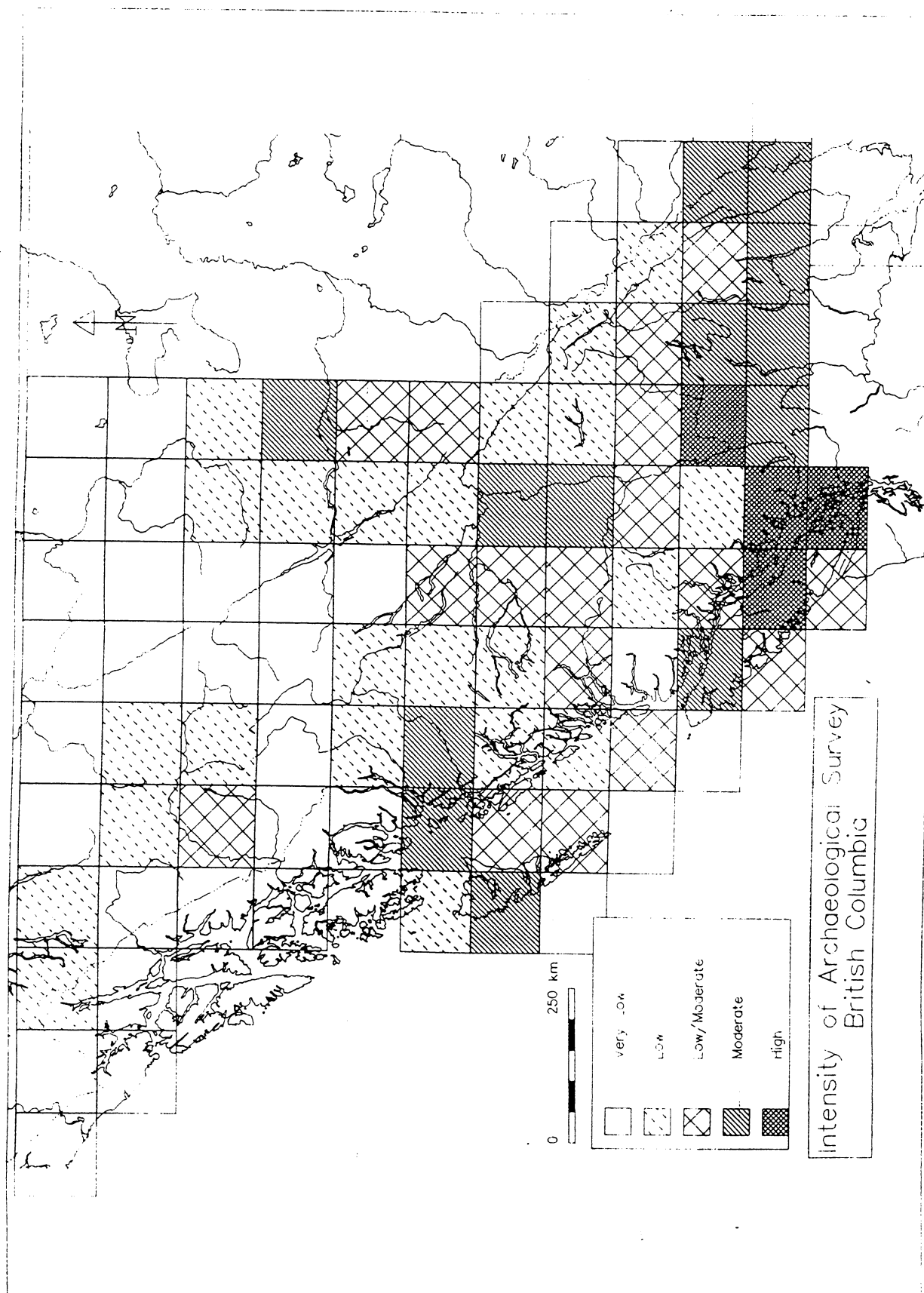


Figure 5. Intensity of Archaeological Survey

Table 1. Current Status of Inventories

Current Inventory Type	Information Available	Where Information Can Be Obtained	Past and Present Producers of Information	Standards and Procedures Employed in Data Collection	Estimated Expenditure or Survey Cost
1. Bedrock Geology	<ul style="list-style-type: none"> <li>• Raw data in files and notebooks.</li> <li>• Field Maps in non-digital format.</li> <li>• Interpretive Geological maps in non-digital format; often includes reports.</li> <li>• Derivative Maps in non-digital format; may include reports.</li> <li>• 90% of B.C. mapped at 1:250,000; 9% mapped at 1:50,000; very limited coverage at large scales.</li> </ul>	<ul style="list-style-type: none"> <li>• B.C. Geological Survey.</li> <li>• Geological Survey of Canada.</li> </ul>	<ul style="list-style-type: none"> <li>• B.C. Geological Survey.</li> <li>• Geological Survey of Canada.</li> <li>• Mineral Exploration Industry.</li> <li>• U.B.C.</li> <li>• U.Vic.</li> <li>• MDRU</li> <li>• MoTH</li> <li>• B.C. Hydro</li> </ul>	<ul style="list-style-type: none"> <li>• G.S.C. Guide to Authors.</li> <li>• B.C.G.S. uses standard field forms.</li> <li>• Style Guide to be published by B.C.G.S.</li> <li>• Standards for Assessment Reports (Mineral Tenure Act)</li> </ul>	<p><b>Current Expenditures:</b> Current costs are approximately \$2 to \$3/ha for 1:50,000 mapping.</p>
2. Surficial Geology	<ul style="list-style-type: none"> <li>• Raw data in files, notebooks and on aerial photography.</li> <li>• Landform Maps combined with Soil Maps.</li> <li>• Surficial Geology and Terrain Maps in non-digital form; often includes reports.</li> <li>• Derivative and Interpretive Maps in non-digital form; may include reports.</li> <li>• Approximately 70% of B.C. mapped at various scales; however, this is mostly part of the earlier soils/landform mapping program and the data is not necessarily compatible with the current Terrain Classification System.</li> </ul>	<ul style="list-style-type: none"> <li>• B.C. Geological Survey</li> <li>• Maps-B.C.</li> <li>• Geological Survey of Canada.</li> <li>• Ministry of Environment, Lands and parks - Integrated Management Branch (limited).</li> </ul>	<ul style="list-style-type: none"> <li>• B.C. Geological Survey</li> <li>• Geological Survey of Canada</li> <li>• Canada and B.C. Land Inventory Program; Ministry of Environment, Lands and Parks</li> <li>• Ministry of Forests</li> <li>• Ministry of Transportation and Highways</li> <li>• Forest and Mining Industry</li> <li>• B.C. Hydro</li> <li>• Consultants</li> </ul>	<ul style="list-style-type: none"> <li>• Terrain Classification System.</li> <li>• G.S.C. Guide to Authors.</li> <li>• Standard field data collection forms.</li> </ul>	<p>Current costs are approximately \$3 to \$7/ha for 1:20,000 mapping and \$0.5 to \$ 2/ha for 1:50,000 mapping.</p>

Table 1 continued

Table 1. Current Status of Inventories					
Current Status Inventory Type	Information Available	Where Information Can Be Obtained	Past and Present Producers of Information	Standards and Procedures Employed in Data Collection	Estimated Expenditure or Survey Cost
3. Soils	<ul style="list-style-type: none"> <li>Raw data in files, notebooks and on aerial photography.</li> <li>Morphological data on field forms and in computer files.</li> <li>Laboratory data on hard-copy and computer files.</li> <li>Soils and Soil/Landform maps in digital and non-digital form; often includes reports.</li> <li>Derivative and Interpretive maps usually in non-digital form; may include reports.</li> <li>Approximately 50% of B.C. mapped at various scales; very small scale coverage of whole province.</li> </ul>	<ul style="list-style-type: none"> <li>Agriculture Canada, B.C. Land Resource Unit.</li> <li>Maps-B.C.</li> <li>Ministry of Environment, Lands and Parks; Integrated Management Branch (limited).</li> </ul>	<ul style="list-style-type: none"> <li>B.C. Soil Survey.</li> <li>Canada/B.C. Land Inventory Program; Ministry of Environment, Lands and Parks.</li> <li>Ministry of Forests.</li> <li>Ministry of Agriculture, Fisheries and Food.</li> <li>B.C. Hydro.</li> <li>Forest and Mining Industry.</li> <li>Consultants.</li> </ul> <p>(No current provincial soil inventory program)</p>	<ul style="list-style-type: none"> <li>National and International soil description and classification methods and procedures.</li> <li>Canadian System of Soil Classification.</li> <li>Describing Ecosystems in the Field.</li> <li>Standard field data collection forms.</li> <li>Standard data entry and verification procedures for computer files.</li> </ul>	<ul style="list-style-type: none"> <li>Costs are conservatively estimated at approximately \$4 to \$8/ha for 1:20,000 mapping and \$1 to \$3/ha for 1:50,000 mapping.</li> </ul> <p>(field costs only)</p>
4. Archaeology	<ul style="list-style-type: none"> <li>17,000 records on file in B.C. Archaeological Site Inventory database.</li> <li>Less than 10% of B.C. has been surveyed for archaeological potential.</li> <li>Current inventory is estimated to contain 15% to 25% of the total sites in the province.</li> <li>Some additional information available from Royal B.C. Museum, and Parks Canada.</li> <li>Approximately 1000 survey and excavation reports in library.</li> </ul>	<ul style="list-style-type: none"> <li>Archaeology Branch, Ministry of Tourism and Ministry Responsible for Culture</li> <li>Royal B.C. Museum</li> <li>Parks Canada</li> <li>Canadian Heritage Information Network (federal); available through Archaeology Branch.</li> </ul>	<ul style="list-style-type: none"> <li>Archaeology Branch, Ministry of Tourism and Ministry Responsible for Culture.</li> <li>Royal B.C. Museum</li> <li>Parks Canada</li> <li>B.C. Hydro</li> <li>Consultants</li> <li>Private collections</li> <li>Academic community</li> </ul>	<ul style="list-style-type: none"> <li>Four main publications outline standards and procedures. All are published by the Archaeology Branch.</li> <li>Resource Management Handbook</li> <li>Impact Assessment Guidelines</li> <li>Site Inventory Form Guide</li> <li>Site Inventory Form</li> </ul>	<ul style="list-style-type: none"> <li>Inventory is mostly by consultants paid by their clients, and the academic community but working under permit to the Archaeology Branch; actual costs are unknown.</li> </ul>

## SOILS

- Approximately 50% of the province is mapped at various scales; these scales range from 1:25,000 and larger in highly selected areas (e.g. lower Fraser Valley, Okanagan, east coast of Vancouver Island) with the remainder at 1:50,000 to 1:125,000; 1:1,000,000 (overview) maps currently in preparation for the entire province. Most maps are accompanied by reports.
- Approximately one-half of the maps are available in published (colour) format; remainder are in unpublished manuscript form (paper prints); a few are on air photo mosaic bases.
- Some maps are digitized in various formats either as line work only or as full digital files linked to attribute lists; field and laboratory data mostly stored on computer files but not readily accessible although some is available in hard copy.

## ARCHAEOLOGY

- B.C. Archaeological Site Inventory database available in hard copy and digital format. Site maps and 1:50,000 location maps available in hard copy only.
- Less than 10% of the province surveyed for archaeological potential.
- Bibliographic listing of all files, surveys and reports available in electronic format and hard copy (publications).

### **2.3 Past and Present Producers of Information**

## BEDROCK GEOLOGY

- Current data gathered, mapped and stored mainly by the Geological Survey of Canada at 1:250,000 and the B.C. Geological Survey Branch at 1:50,000.
- Other originators of data that are publicly available (through EMPR) are the mineral exploration industry, universities, federal and provincial research institutions, crown corporations and the Ministry of Transportation and Highways.
- All mapped data can be obtained from either the B.C. Geological Survey Branch (EMPR) or the Geological Survey of Canada.

## SURFICIAL GEOLOGY

- The majority of historical surficial geological mapping was produced by the federal/provincial soil survey program as part of the Canada/B.C. Land Inventory Program (CLI/BCLI) and the surficial geology program of the previous Resource Analysis Branch (Ministry of Environment).

- The Geological Survey of Canada has also produced surficial geology maps generally at 1:250,000 scale for about one-half of the Province.
- The Geological Survey Branch of the Ministry of Energy, Mines and Petroleum Resources is now the principal provincial agency coordinating surficial geology inventory.
- Some of the published mapped data can be obtained from the Geological Survey Branch (EMPR) or the Geological Survey of Canada; in addition, maps can presently be obtained from Maps-BC and Crown Publications.

### SOILS

- Data gathered, mapped and stored mainly by the Ministry of Environment, Lands and Parks, Integrated Management Branch and the Land Resource Unit of Agriculture Canada. A substantial number of older data and maps were generated by the B.C. Ministry of Agriculture.
- Most mapped data available from Maps-B.C. (Ministry of Crown Lands).
- B.C. Soil Information System (BCSIS) is a computer file that contains extensive soils information (currently archived).
- Those maps and associated data bases that are in digital form (CAPAMP), are not easily accessible.

### ARCHAEOLOGY

- Most information gathered by consultants and academics working under permit to the Archaeology Branch.
- All information available from the Archaeology Branch.

## **2.4 Standards and Procedures Employed**

### BEDROCK GEOLOGY

- All data collected, mapped and interpreted conforms to standards established provincially and federally as well as those legislated for industry.
- Since 1985 all data collected in digital format by Geological Survey Branch (1:50,000).
- All mappers and interpreters are trained professional geologists or are under the direction of a professional who is a member of the B.C. Association of Professional Engineers and Geoscientists.

- Since 1985 data is considered by independent review to be of above average quality.
- Provincial mapping standards are currently being updated.
- Provincial bedrock maps are verified by managers in the Geological Survey Branch and by peer review.

### SURFICIAL GEOLOGY

- All mappers and interpreters are trained professionals or are under the direction of a professional.
- Data produced using the Terrain Classification System is of above average quality, soils/landform maps lack Quaternary information.
- All mapping has conformed to provincial, national, and in some cases, international standards and procedures.
- Standards and procedures are published and are currently being updated.

### SOILS

- All mapping has conformed to provincial and national (and in some cases, international) standards and procedures applicable at the time.
- Standards and procedures are published (e.g. Canadian System of Soil Classification).
- Standard field data collection procedures are contained in "Describing Ecosystems in the Field".
- All current maps and data are verified by survey chief prior to issue and by provincial correlator.
- Mapping and interpretations undertaken by consultants are usually of good quality and often verified by provincial correlator.
- All mappers and interpreters are trained professionals, or are under the direction of a professional.
- Existing data is generally of above average quality and well correlated throughout the province.

## ARCHAEOLOGY

- Standards and procedures that must be followed as part of the permit requirements are published by the Archaeology Branch.
- Standard field data collection forms are used.
- All work is undertaken by trained professionals or under the direction of a trained professional.
- Majority of information in existing data base is of high quality.

### **2.5    Cost of Inventory**

The following information on inventory costs is considered to be an estimate only due to the fact that the inventories have been undertaken over many years and costs are highly variable depending on the location and nature of the inventory.

## BEDROCK GEOLOGY

- Current expenditure for 1:50,000 scale inventory is approximately \$2 to \$3/ha.
- The estimated replacement value of existing 1:50,000 scale bedrock inventory is calculated as:

Area of Province	90 million ha.
Area covered	9% of province = 8.1 million ha.
Average cost	\$2.50/ha.
Replacement Value	\$20.25M.

The cost to replace existing 1:250,000 inventory is uncertain but very high; 95% of the province is covered, but a significant portion of the coverage is obsolete.

## SURFICIAL GEOLOGY

- Costs for 1:50,000 inventory are conservatively approximated at \$0.5 to \$2/ha and for 1:20,000 inventory at \$3 to \$7/ha.



- The estimated replacement value of existing 1:50,000 surficial geology maps is calculated as:

Area of province . . . . .	90 million ha
Area covered . . . . .	70% of province = 63 million ha
Average cost . . . . .	\$1/ha
Replacement value . . . . .	\$63M

## SOILS

- Costs for 1:50,000 inventory are approximated at \$1 to \$3/ha and for 1:20,000 inventory at \$4 to \$8/ha.
- The estimated replacement value of existing 1:50,000 scale soil maps and data bases is calculated as:

Area of province . . . . .	90 million ha
Area covered . . . . .	50% of province = 45 million ha
Average cost . . . . .	\$3/ha
Replacement value . . . . .	\$135M

## ARCHAEOLOGY

- No costs are available since the majority of the inventory is undertaken by consultants working under permit to the Archaeology Branch; costs are usually born by a project proponent.
- The cost to complete the 1:50,000 inventory of the province is estimated at \$15M.

### **3.0 CURRENT USERS OF GEOLOGY, SOILS AND ARCHAEOLOGICAL INVENTORY INFORMATION**

Earth science data and information are essential elements in providing and maintaining (sustainability) basic human needs and economic development opportunities. The other two basic elements are water and climate. Such data are the basic underpinning and framework for all resource planning and management. They strongly influence the quality of other resource inventories and their use. Archaeological data and information contain the only source of evidence for human activity in the province from 10,000 years ago to the last 200. The resource is highly complex, often hidden (buried) and easily destroyed. Archaeological data is valued by both aboriginal and non-aboriginal society as windows on the past. The resource is protected by the Heritage Conservation Act and forms the basis of the provincial governments fiduciary obligations towards the native community. Archaeological site distribution is essential to aboriginal land claims cases. There is increasing pressure from native and non-native groups to improve the management of the resource, which will depend on improving the archaeological inventory.

As a result of this, the four inventory types, with perhaps a greater influence by the geology and soil components, are utilized by a diverse client base for purposes such as land allocation, land management, impact assessment, environmental protection and management, economic development and disaster preparedness.

Figure 6 approximates the degree of use made by various user groups of each of the four inventory types. These user groups were identified in the reports prepared by the individual Task Groups and include not only user groups but also, in some cases, generators of specific inventory data. It is important to note that some of these user groups may use only specific parts of an overall inventory data-set and often need only derivative or interpretive information.

Current trends indicate that much more extensive use of these data-sets will occur in the future, depending in large measure on how the data is presented. An estimate of future use is also presented in Figure 6.

# BEDROCK GEOLOGY

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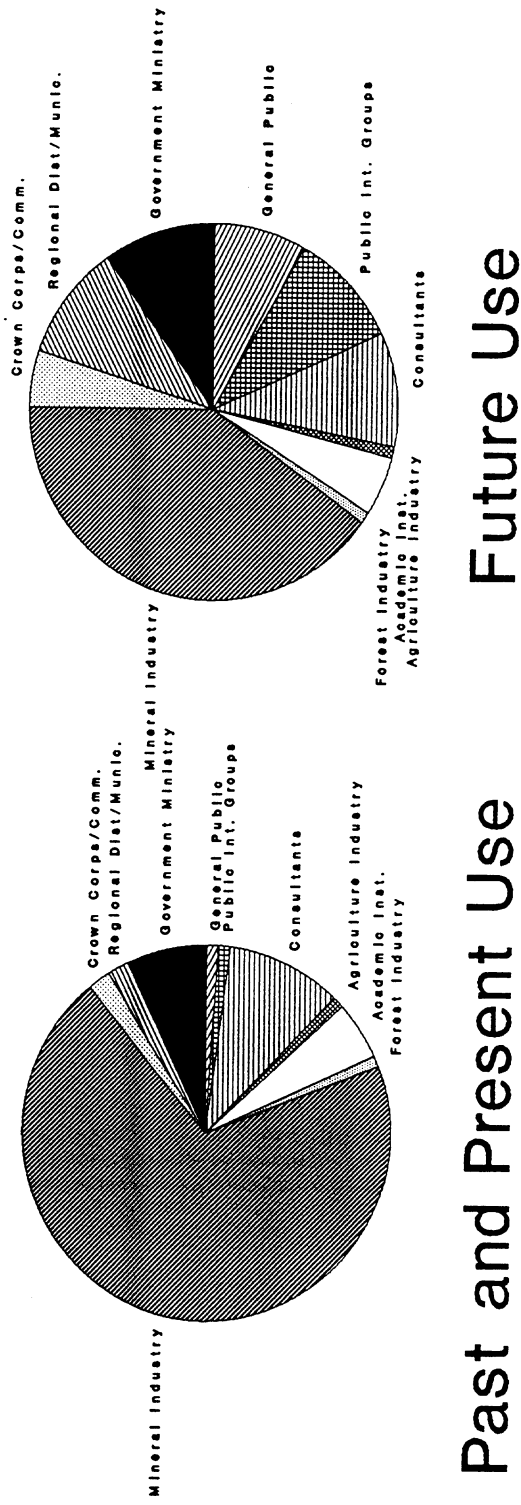


Figure 6. Past and Present Use and Future Use of Inventory Information

# SURFICIAL GEOLOGY

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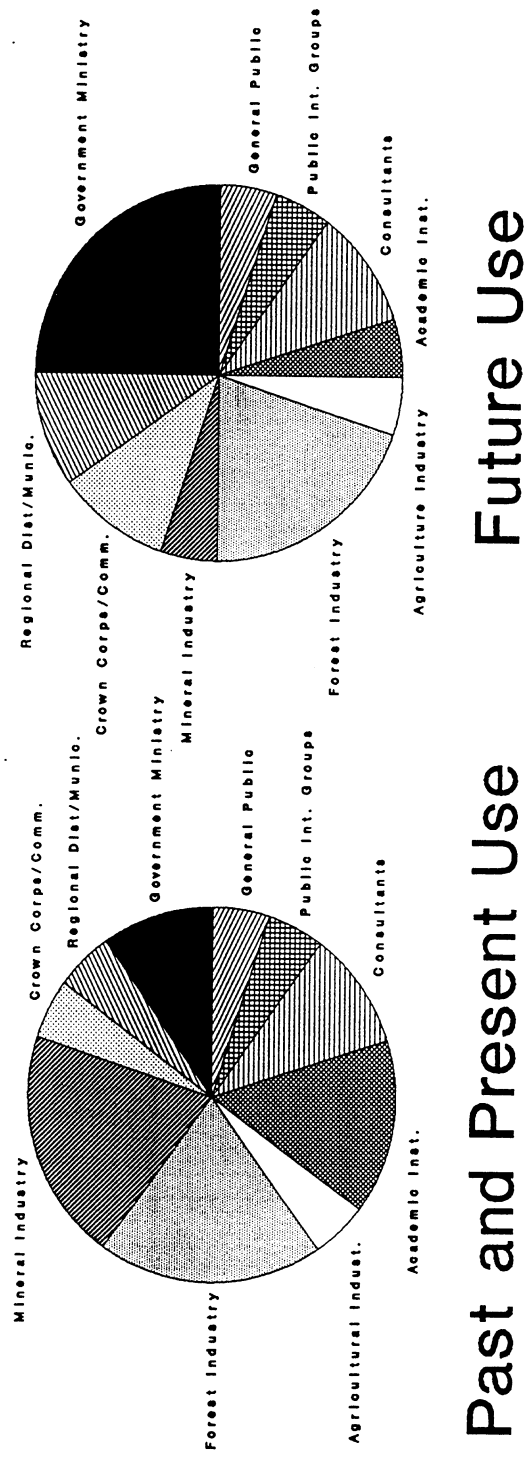
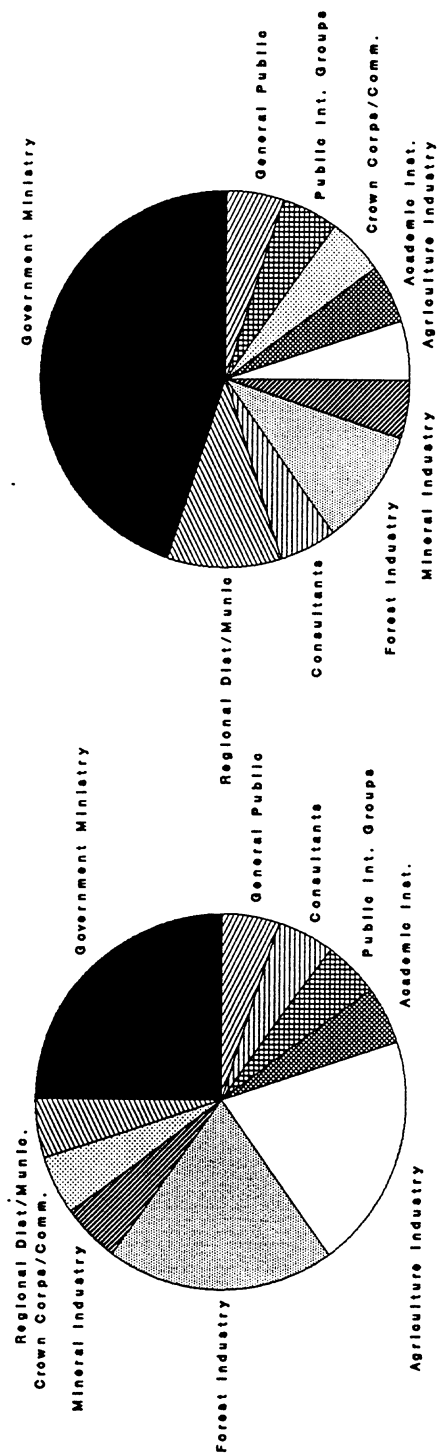


Figure 6. Past and Present Use and Future use of Inventory Information (cont'd)

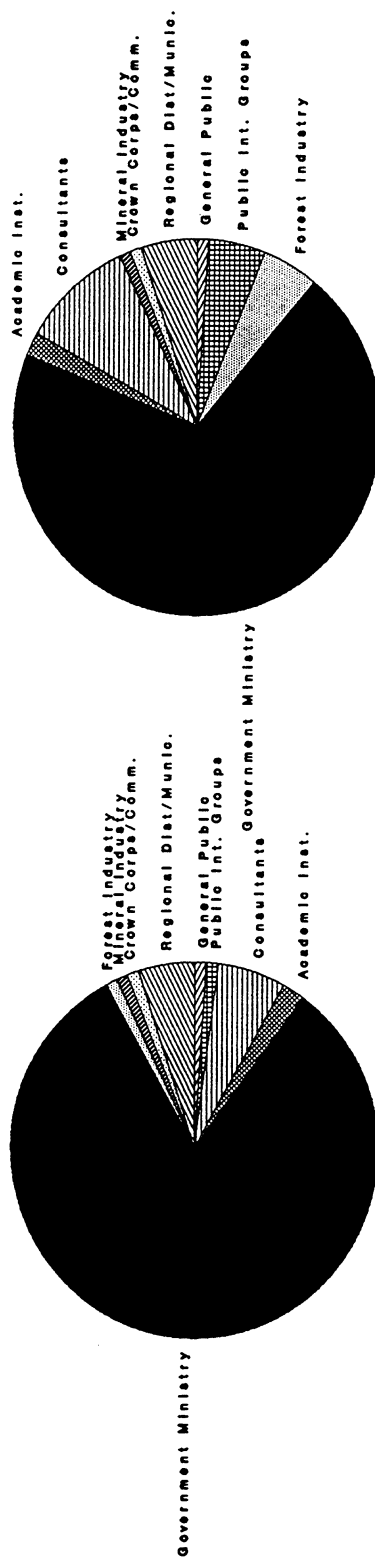
# SOILS



Past and Present Use Future Use

Figure 6. Past and Present Use and Future use of Inventory Information (cont'd)

# ARCHAEOLOGY



Past and Present Use      Future Use

Figure 6. Past and Present Use and Future use of Inventory Information (cont'd)

## **4.0 RECOMMENDATIONS REGARDING INFORMATION REQUIREMENTS FOR EFFECTIVE LAND MANAGEMENT**

The four Task Group reports prepared a series of recommendations regarding the status of their particular inventory, its ability to meet the needs of land management decision making, and changes or modifications that are necessary, and vital, to meet these needs.

While a wide array of recommendations pertinent to a particular inventory type are outlined in the individual Task Group reports, there are a number of common themes among the four groups.

The recommendations pertaining to information that is vital for effective land management are presented as follows (no order of priority implied):

### **RECOMMENDATION 1**

Geology and soils data and information is the underpinning and framework for all resource planning and management. Archaeological data and information is essential for management and protection of this non-renewable resource. Any diminishment in these programs will have a direct and immediate impact on the quality of decision making. At present, due to past funding cutbacks and reassignment of personnel, these inventory programs are incapable of meeting current needs and demands. For example, the province does not currently have the capability of undertaking a soil survey program. These programs must be reinstated or enhanced in order to meet current and future demands.

### **RECOMMENDATION 2**

Each inventory program must have a central agency or authority responsible for the establishment and maintenance of standard procedures, methods, reliability and quality control of products that, at the very least, meet a minimum level of professional quality.

The inventory programs should be managed by a multi-agency coordinating committee with strong commitments to multi-resource inventory and integration.

If standards have been achieved and agreed upon, while it is preferred it is considered not necessary to centralize geology and soils inventory capability within one agency of government so long as strong coordination and correlation with the responsible agency is maintained. However, due to the sensitive nature of archaeological sites, it is necessary to maintain a central repository with controlled access to information.

### **RECOMMENDATION 3**

Geology, soils and archaeological inventory data although basic requirements, are only some of the elements needed for effective land management decision making. These data sets must be integrated with other natural and cultural resource data bases (e.g. climate, vegetation, water, wildlife, etc.) in order to provide the means of achieving sustainable development. Provincial data bases with cross-agency applications should be in easily transportable form to aid data sharing and encourage wider use of the data (see recommendations in chapter 5).

#### **RECOMMENDATION 4**

Given that the needs of land management decision-making cannot always be determined in advance, and that inventories of the type discussed here require substantial lead time to complete, it is necessary to maintain an on-going inventory program aimed at regional (1:250,000 scale) and sub-regional (1:50,000 scale) levels. These inventory programs would mainly provide information for use in policy and regional and sub-regional level planning.

#### **RECOMMENDATION 5**

The capability for larger scale inventory programs (e.g. 1:20,000 and larger) should be available and undertaken where required for detailed land management decision making. These local level or operational scale inventories should be undertaken, where landscape conditions, population pressures or conflicting land uses dictate their needs. Due to the discrete nature of archaeological resource distribution, it is more efficient to undertake inventories with 100% ground coverage in areas of moderate to high potential than produce large scale archaeological sensitivity maps based on predictive modelling.

#### **RECOMMENDATION 6**

The standardization of procedures, methods and products is required for interpretive and derivative maps produced from the basic geological and soils inventory products. User groups are, in most cases, unable to use basic inventory maps and data. They require interpretive and derivative maps that answer their specific questions with an assured level of reliability and quality control. The agency responsible for a particular inventory type should be supported to develop these products.

#### **RECOMMENDATION 7**

There is a very serious shortfall in terms of suitably qualified and experienced personnel to undertake inventory programs. Government agencies, colleges and universities should be encouraged to embark on training programs to ensure the necessary supply of trained personnel.



## **5.0 RECOMMENDATIONS FOR DATA ACQUISITION, SYSTEM DESIGN AND DISTRIBUTION**

Each of the four Task Groups outlined a series of recommendations regarding methods of data collection, data storage and manipulation, and ways to promote the co-operative use of the information. In addition, recommendations were discussed in regard to providing inventory data and map products that user groups are able to apply to their needs.

These recommendations are as follows:

### **RECOMMENDATION 1**

The demands of user groups require that all map (polygon) and attribute data as well as laboratory data be stored and made available in a government-wide compatible GIS framework; all line work and data should be capable of being downloaded onto a PC-compatible computer. Hard copies of maps and reports should be made available to all user groups.

### **RECOMMENDATION 2**

Some computer data files (e.g. soils and surficial geology) are in an archived state. This information should be retrieved and made available. In addition, the capability should exist to incorporate new data.

### **RECOMMENDATION 3**

Several agencies are collecting data of a similar nature (e.g. the Ministry of Transportation and Highways collects bedrock and surficial geological data and the Ministry of Forests collects soils information).

All such information should be collected and stored within standardized format to ensure greater use of the information and avoid duplication. Quality control of the data must be ensured by the agency responsible as coordinated through a multi-ministry communications committee.

### **RECOMMENDATION 4**

All agencies responsible for a particular inventory initiative should be required to annually publish an index of map and data coverage. In addition, these same agencies should be required to annually publish, in advance, their field and mapping programs for the coming year. Each of these products should be made available to all concerned agencies, industry, educational institutions and consultants.

### **RECOMMENDATION 5**

The distribution of provincial maps and data is currently unacceptable. It is recommended that the supply of currently available mapped information and reports, including digital information must be made timely and easily accessible.



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