CANADA LAND USE MONITORING PROGRAM

TOTAL LAND USE CHANGE IN URBAN CENTRED REGIONS

VICTORIA

1966-1976

REPORT NO. 13

Environment Canada | Environnement Canada

Lands Directorate | Direction générale des terres

Canada

Canada land use monitoring program: Victoria 1966-1976.

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M. ANNE KERR

February, 1983

Lands Directorate
Environment Canada

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FOREWORD

The objective of the Urban Centred Region component of the Land Use Monitoring Program is to provide a national perspective of land use change for the rural-urban fringe areas of Canada. All urban centred regions with populations of over 25 000 are included in this project. Beginning in 1981, the land use information is collected for each individual urban centred region on the basis of five year cycles coincident with census years.

This report focusses on land use change in one urban centred region. The publication of such a series of reports by the Lands Directorate will provide information on land use change to users as quickly as possible. Once data for a particular cycle year are available for all urban centred regions, a national perspective report containing comparative information on land use change in urban centred regions across Canada will be published.

R.J. McCormack
Director General
Lands Directorate

ABSTRACT

This report analyzes land use changes in the Victoria, British Columbia urban-centred region (UCR) for the period 1966 to 1976. The study area, located on the southeastern tip of Vancouver Island, covers approximately 86,000 hectares within the National Topographic System 1:50,000 map sheets 92 B/5, 6, 11 and 12. Land use maps for 1966, 1972 and 1976 as well as information from the Canada Land Inventory, all at a scale of 1:50,000, formed part of the data base used in the analysis. Data were stored, processed and manipulated by the Canada Land Data System of Lands Directorate, Environment Canada.

The report focusses on rural to urban land use changes, on changes between various rural land uses, and on the relationship of these changes to the land capability for agriculture and outdoor recreation. Following a brief discussion on land use planning considerations, the report concludes with a summary of the principal findings of the study. The major land use change was an 80% increase in the amount of built-up land in the Victoria UCR between 1966 and 1976. Major declines were in unimproved pasture and rangeland, and improved agricultural land uses.

RÉSUMÉ

Ce rapport analyse les changements d'utilisation des terres dans la région urbaine (RU) de Victoria, Colombie Britannique, pour la période de 1966 à 1976. Située à l'intérieur des cartes au 1:50,000 du Système national de référence cartographique 92 B/5, 6, 11 et 12, la région d'étude est localisée dans la partie sud-est de l'Ile de Vancouver et couvre environ 86,000 hectares. Des cartes de l'utilisation des terres pour 1966, 1972 et 1976 et des données provenant de l'Inventaire des terres du Canada, toutes à l'échelle de 1:50,000, forment la base de données pour l'analyse. Les données ont été traitées par le Système de données sur les terres du Canada de la Direction générale des terres, Environnement Canada.

Ce rapport étudie les changements d'utilisation des terres rurales à des utilisations urbaines, les différents changements d'utilisation des terres rurales et la relation entre les changements et le potentiel des terres pour l'agriculture et les activités récréatives. Faisant suite au bref examen de le planification de l'utilisation des terres, le rapport présente, en conclusion, un résumé de ces principales découvertes. Les principaux changements d'utilisation des terres sont: une augmentation de 80% dans la superficie des surfaces bâties dans la région urbaine de Victoria entre 1966 et 1976. Les diminutions majeures ont été enregistrées dans les classes d'utilisation: pâturages et friches herbacées et terres agricoles amendées.

ACKNOWLEDGEMENTS

I wish to acknowledge with thanks all those who helped in the preparation of this report. Staff of the Canada Land Data System Division of the Lands Directorate processed the land use maps and generated the computer print-outs. David Gierman provided valuable assistance in advising on new selections and map generation and, along with Ken Redpath, Doug Lacate and Wayne Bond, offered constructive comments on the draft report. Jaan Tamm prepared the report cover and location map, and Julia Anderson and Danica Forcan typed the manuscript.

Cover photo by D.S. Lacate

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1. INTRODUCTION

The Victoria urban-centred region (UCR) is situated on the southeastern end of Vancouver Island on the west coast of British Columbia. Two important centres within the UCR are the City of Victoria, the capital of British Columbia, and Esquimalt, an important naval base and ship building and repair yard. Away from the built-up areas, agriculture remains a prime activity. As well as being the provincial administrative centre, the Victoria UCR with its mild climate and attractive surroundings has become an increasingly popular tourist and retirement area.

Most of the population of the Victoria urban-centred region reside within the Victoria Census Metropolitan Area (CMA). Population statistics for the CMA show steady increases from 173,455 people in 1966, to 195,800 in 1971, to 218,250 in 1976. The net ten-year gain - a substantial 25.8% - has resulted in rapid urbanization of rural land. In particular, agricultural areas of the Saanich Peninsula, which have some of the best soil and climatic conditions for farming in B.C., have come under pressure from the growth of Victoria and outlying towns such as Brentwood and Sidney (Wood, 1979:166). Saanich Inlet, Haro Strait and Juan de Fuca Strait, and the expanse of hills and ridges that extend along the east coast of Vancouver Island, physically confine the area in which development, both agricultural and urban, can spread in the Victoria urban-centred region. (See Map 1).

This report is concerned with changes in land use outside the urban core, in the Victoria urban-centred region. The discussion is supported by tabular and mapped land use data for 1966, 1972, and 1976.

Victoria is one of the centres included in the Urban-Centred Region component of the Canada Land Use Monitoring Program. A national perspective report on total land use change will be published in the future, giving comparative data for all urban-centred regions in Canada over 25,000 population.

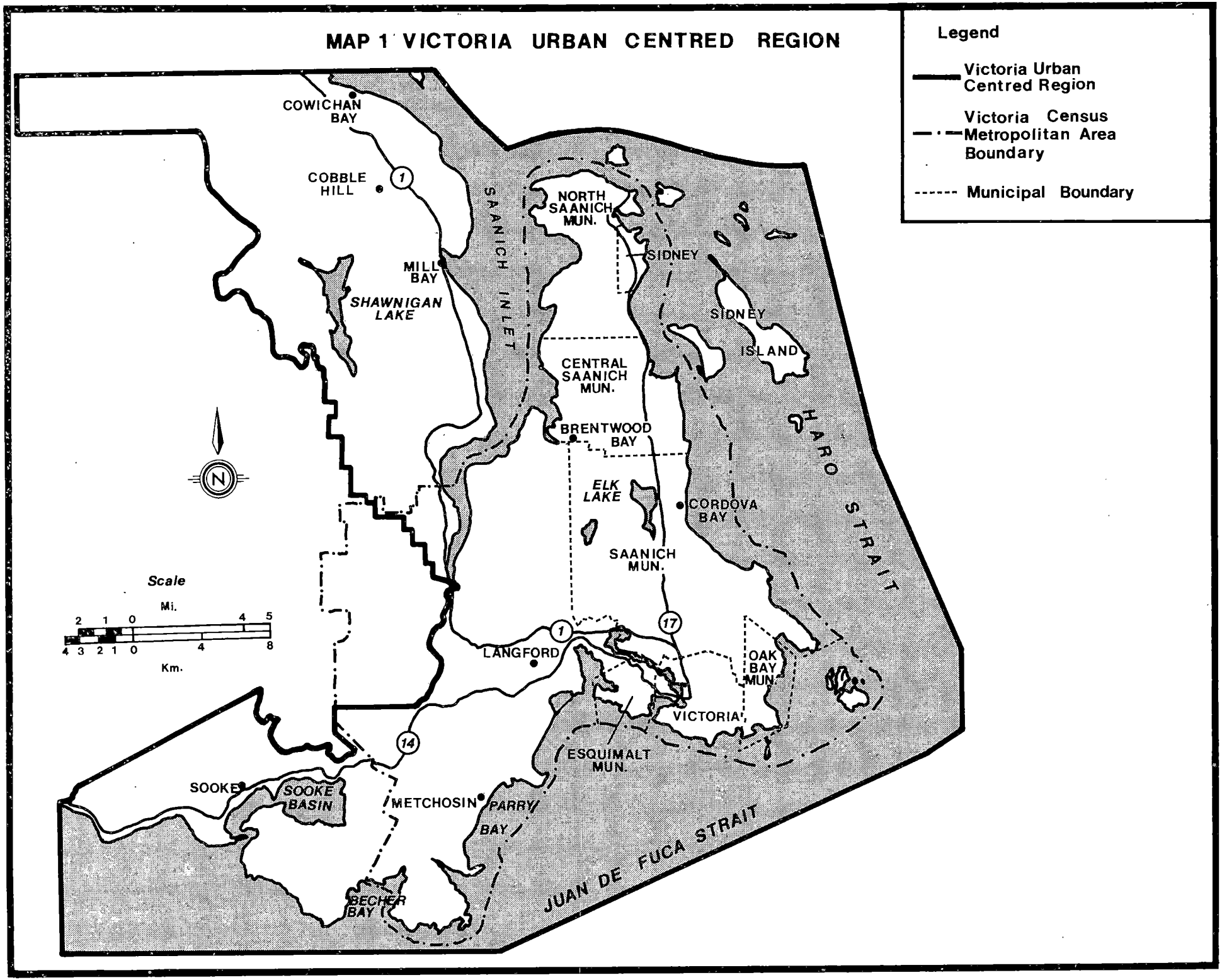
2. DATA BASE

The Victoria urban-centred region lies within National Topographic Series maps 92 B/5, 6, 11, and 12 (1:50,000 scale). It encompasses an area of 86,076 hectares (ha).

The five data bases used in the study were: Land Use 1966, 1972 and 1976, Canada Land Inventory (CLI) soil capability for agriculture plus primary and secondary limitations, and CLI capability for recreation as well as recreation feature subclasses.

Agricultural and recreation capability maps were prepared as part of the original CLI program. Capabilities were based on physical parameters and therefore have not changed significantly since the original survey. Land use in the study area, however, has undergone substantial changes since the original land use maps were produced in 1966. The land use was remapped in 1972, and this information was subsequently updated to 1976 through interpretation of 1:50,000 scale aerial photographs.

All the map data bases were processed through the data input and reproduction subsystems of Canada Geographic Information System (CGIS), of Lands Directorate, Environment Canada and placed in computer storage. This data base then was made accessible by an interactive computer terminal (TEKTRONIX 4014 and 4027). Map data available for analysis were grouped into the following variables:


MAP 1 VICTORIA URBAN CENTRED REGION
Legend
Victoria Urban Centred Region
Victoria Census Metropolitan Area Boundary
Municipal Boundary
COWICHAN BAY
COBBLE HILL
MILL BAY
SHAWNIGAN LAKE
SAANICH INLET
NORTH SAANICH MUN.
SIDNEY
SIDNEY ISLAND
CENTRAL SAANICH MUN.
BRENTWOOD BAY
ELK LAKE
CORDOVA BAY
SAANICH MUN.
HARO STRAIT
Scale
Mi.
Km.
LANGFORD
OAK BAY MUN.
VICTORIA
ESQUIMALT MUN.
SOOKE
SOOKE BASIN
METCHOSIN
PARRY BAY
BECHER BAY
JUAN DE FUCA STRAIT
1
14
17

Present Land Use 1966
Present Land Use 1972
Present Land Use 1976
Agriculture Capability
Recreation Capability
Recreation Primary Feature subclass
Shoreline

A number of values or classes are possible within each variable. Although it is possible to add other themes, mapped data such as land capability for forestry that would be useful in British Columbia, are not yet available.

3. METHODOLOGY

The five map coverages were digitized separately, then overlayed to form a common data base ready for analysis. Output was produced by batch processing, producing tabular hard copy data. Through an on-line interactive graphic system terminal in Lands Directorate, Environment Canada in Ottawa, additional or modified data were requested which was more suitable for graphic manipulation, from the standard CGIS data format. Map output was produced by deciding what data selections were required and then having maps plotted on a drum plotter (Map 3) and on a colour tektronix terminal with a hard copier attached. Results of the analysis are presented in tabular and map form. To aid presentation of information, some classes of the original data were grouped together. The major groupings and corresponding original map source symbols are as follows:

LAND USE

Group Name	Land Use Classes	Symbol
Built-up	Urban built-up areas	B, X[1]
Urban associated uses	Quarries, sand and gravel pits	E
	Outdoor recreation	O
Improved Agriculture	Horticulture, poultry and fur farms	H
	Cropland, improved pasture and forage crops	A, P
	Orchards, vineyards	G
Unimproved pasture and rangeland	Unimproved pasture, rangeland and idle grassland	K
Natural cover	Productive woodland	T
	Unproductive woodland	U
	Swamps, marshes, bogs	M
	Bare sand and rock	S, L
Water	Water	Z

1. B is urban built-up areas, or acreage dwelling (e.g. rural subdivisions) in which the overall character is not agricultural production nor productive woodland. B also includes land being used by the Department of National Defence (DND). X is transportation facilities such as major highways and airports.

SOIL CAPABILITY FOR AGRICULTURE

Group Name	Capability Class
Prime agriculture land	Class 1
	Class 2
	Class 3
Low capability for agriculture	Class 4
	Class 5
	Class 6
No capability for agriculture	Class 7
Unclassified	Class 8
Organic Soils	Class 0

LAND CAPABILITY FOR OUTDOOR RECREATION

Group Name	Capability Class
High capability land for outdoor recreation	Class 1
	Class 2
	Class 3
Moderate capability	Class 4
Low capability for outdoor recreation	Class 5
	Class 6
No capability for outdoor recreation	Class 7
Unclassified	Class 8

Accuracy of tabular and map data in the report is related to the reliability of the source of information used: the land use and land capability maps. Each of the three land use inventories was conducted by different organizations. Variations in data may result from varying degrees of understanding of class definitions, interpretation expertise and local knowledge of the area by the interpreter in each inventory.. Although aerial photo interpretation was employed in each inventory, much more extensive field work was carried out in the 1966 cycle, while for the 1972 inventory, very small scale (1:120,000) aerial photos were the primary data source. Some variations in data reliability may be attributed to these differences.

Errors, such as mislocation of land use units or over generalization of unit boundaries, may also occur in transferring land use units from air photos to a stable map base. Most serious are those errors made in complex, intensive use areas. However in these areas there are generally more landmarks (e.g. roads, etc.) to guide the transferring process. More common are errors in less developed areas with fewer control points. These tend to be less critical since less change is taking place. However, a land use change overlay procedure was introduced to minimize such problems.[2]

The 1:50,000 scale of mapping used in this study, limits the minimum land use unit size to a corresponding ground area of 2.5 hectares. Thus, land uses which occupy small areas (e.g. orchards, beaches) may be under-represented. Given the scale of the mapping, the most appropriate use of the information contained herein would be at the regional level.

2. A land use change overlay is a map which outlines only those areas that have changed use; it is not a total land use map.

Both the 1966 and 1972 surveys were conducted as 'one time only' efforts with little consideration given to their potential use for sequential land use change monitoring. This has presented some difficulties in comparing inventories. The new Canada Land Use Monitoring Program (CLUMP) has been designed to provide land use change information and should, therefore, minimize difficulties in comparing land use changes for 1981 and subsequent monitoring years.

4. LAND USE AND LAND CAPABILITY

4.1 Land Use In 1966,1972 and 1976

Table 1 gives the composition of land use in the Victoria study area for 1966, 1972 and 1976.

The most dominant land use class in all three periods was natural cover, and more specifically productive woodland. In 1976, natural cover accounted for 59.6% of the study area. Other major uses in descending order were: urban and urban-associated uses 28.5%, improved agriculture 7.7% and unimproved pasture and rangeland 4.2%

Table 1 shows that the built-up portion of the study area has increased steadily from 12.7% in 1966, to 17.4% in 1972, to 22.8% in 1976. The net gain of land in urban uses between 1966 and 1976 was 80.5%.

During this same ten-year period, improved agricultral uses decreased slightly in proportion to the total study area from 9.7% to 7.7%. Unimproved pasture and rangeland also declined from 6.2% to 4.2%, while natural covers dropped from 67.7% of the study area in 1966 to 59.6% in 1976. Looking at each rural use individually over the ten-year period, the declines are more dramatic. The actual amount of land in unimproved pasture and rangeland, and improved agriculture decreased by 32% and 20% respectively. The actual amount of natural cover uses declined by 12%.

These statistics indicate that the built-up area, reflecting increasing urbanization, has increased steadily at the expense of most other land uses. However, it cannot be assumed that decreases in the amount of one land use is the direct result of gains by another land use simply on the basis on an apparent arithmetic difference in areas. Change of land from one use to another can be complex as will be demonstrated in the discussion on Land Use Dynamics in Section 5.

4.2 Agricultural Capability

Soil capability for agriculture is presented in Table 2. Twenty-six percent of the study area has been classified under the Canada Land Inventory (CLI) as prime agricultural land (Classes 1, 2 and 3). By far the largest of these is Class 3 land; Class 1

TABLE 1. PRESENT LAND USE 1966, 1972, 1976

Land Use Class	1966 Area(hectares)	1966 % Study Area		1972 Area(hectares)	1972 % Study Area		1976 Area(hectares)	1976 % Study Area	
Built-up	10 892	12.7		14 987	17.4		19 656	22.8	
Quarries, sand and gravel pits	225	0.3	16.4	229	0.3	21.0	306	0.4	28.5
Outdoor recreation	2 911	3.4		2 810	3.3		4 524	5.3	
Horticulture, poultry and fur farms	928	1.1		739	0.9		633	0.7	
Cropland, improved pasture and forage crops	7 342	8.5	9.7	6 437	7.5	8.5	5 973	6.9	7.7
Orchards and vineyards	122	0.1		82	0.1		67	0.1	
Unimproved pasture and rangeland	5 333	6.2	6.2	4 412	5.1	5.1	3 625	4.2	4.2
Productive woodland	54 977	63.9		51 718	60.1		46 445	54.0	
Non-productive woodland	3 212	3.7		4 433	5.1		4 548	5.3	
Swamp, marsh or bog	82	0.1	67.7	123	0.1	65.4	186	0.2	59.6
Sand flats, dunes and beaches	36	0.0		36	0.0		36	0.0	
Rock and other unvegetated surfaces	16	0.0		70	0.1		77	0.1	
Water	0	0.0		0	0.0		0	0.0	
TOTAL AREA	86 076 ha	100%		86 076 ha	100%		86 076 ha	100%	

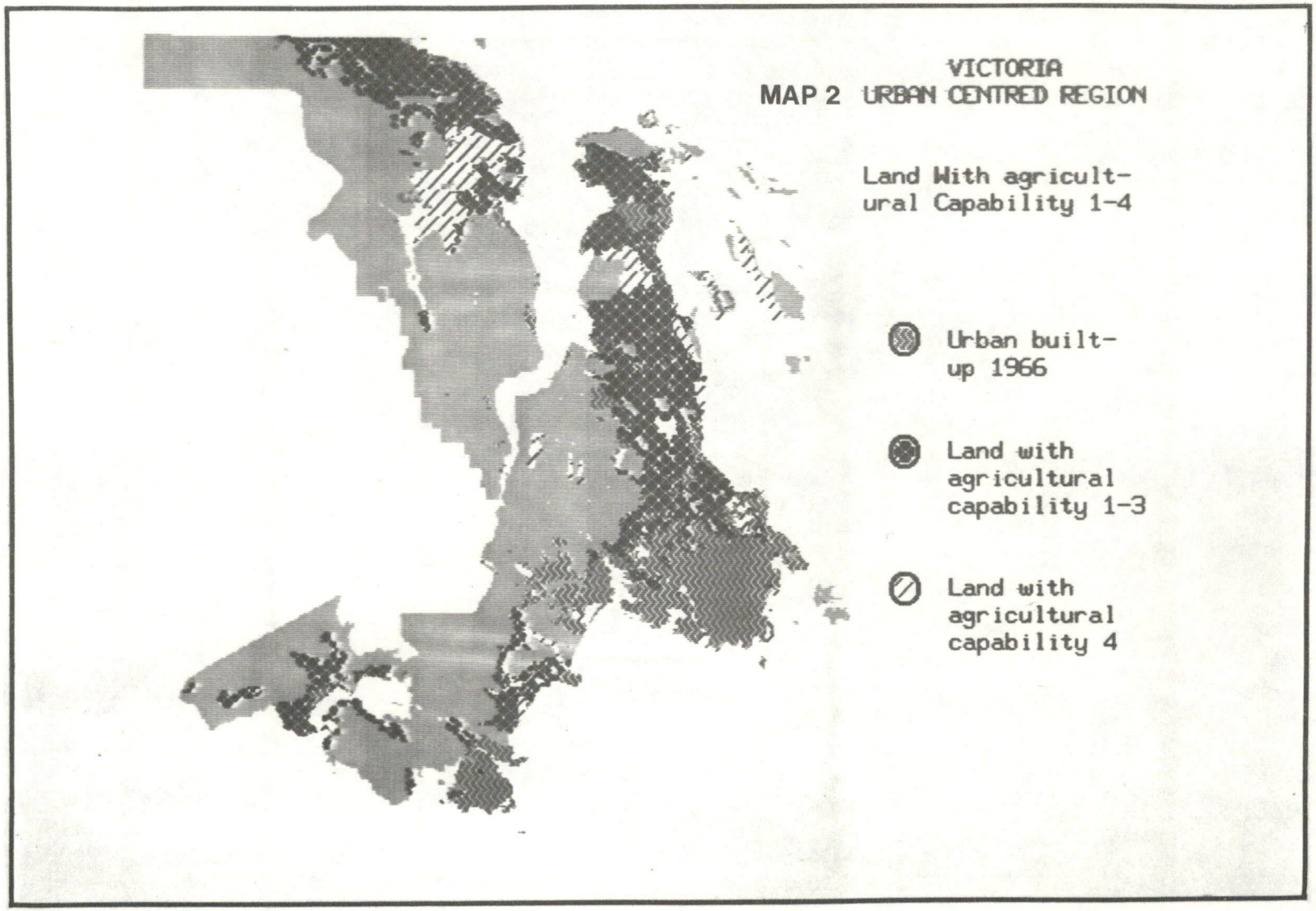

VICTORIA
MAP 2 URBAN CENTRED REGION
Land With agricultural Capability 1-4
Urban built-up 1966
Land with agricultural capability 1-3
Land with agricultural capability 4

TABLE 2. SOIL CAPABILITY FOR AGRICULTURE

Class	Area (hectares)	% Study Area	
1	38	0	
2	4 749	5.5	26.1
3	17 732	20.6	
4	6 521	7.6	
5	15 284	17.8	28.0
6	2 280	2.6	
7	38 376	44.6	44.6
Organic Soils	1 082	1.3	1.3
Unclassified area	14	0	
TOTAL AREA	86 076 ha	100%	

TABLE 3. LAND CAPABILITY FOR OUTDOOR RECREATION

Class	Area (hectares)	% Study Area	
1	108	0.1	
2	498	0.6	68.1
3	5 898	6.9	
4	52 100	60.5	
5	14 150	16.4	20.4
6	3 413	4.0	
Unclassified area	9 909	11.5	11.5
TOTAL AREA	86 076 ha	100%	

occupies less than 1% of the study area.

Class 4 land is considered marginal, sustainable arable land for a wide range of crops. The classification, however, does not take into account productivity of crops. In the southern part of British Columbia productivity of most crops increases because of the longer growing season and higher associated heat units. Thus lower capability land such as Class 4 becomes more valuable (Runka, 1973;3). (Map 2 shows CLI 1-4 lands).

Classes 4 and 5 land occupy 28% of the study area, 5.7% of which is Class 4. Land that has no capability for arable cultivation or permanent pasture - Class 7 - occupies the largest proportion (44.6%) of the Victoria study area.

High capability agricultural lands occur mainly on a narrow discontinuous lowland, with numerous rock outcrops, along the east coast of Vancouver Island and the Saanich Peninsula. Most land with low capability for agriculture is situated in the western portion of the Victoria UCR on the low hills and ridges that extend westward into rough mountainous terrain. Primary and secondary limitations to agricultural capability tend to be shallowness of soil to bedrock and adverse topography.

4.3 Land Capability for Outdoor Recreation

Less than 1% of the study area has Class 1 or 2 land with outdoor recreation capability (Table 3). Class 3 areas (6.9%) are located primarily along the sea coast and around lakes. By far the largest proportion (60.5%) of the Victoria study area has Class 4: a natural ability to sustain moderate total annual recreation use based on dispersed activities (e.g. trail riding, hiking). Low capability recreation lands, Class 5 and 6, occur mainly in the rugged uplands in the western portion of the study area.

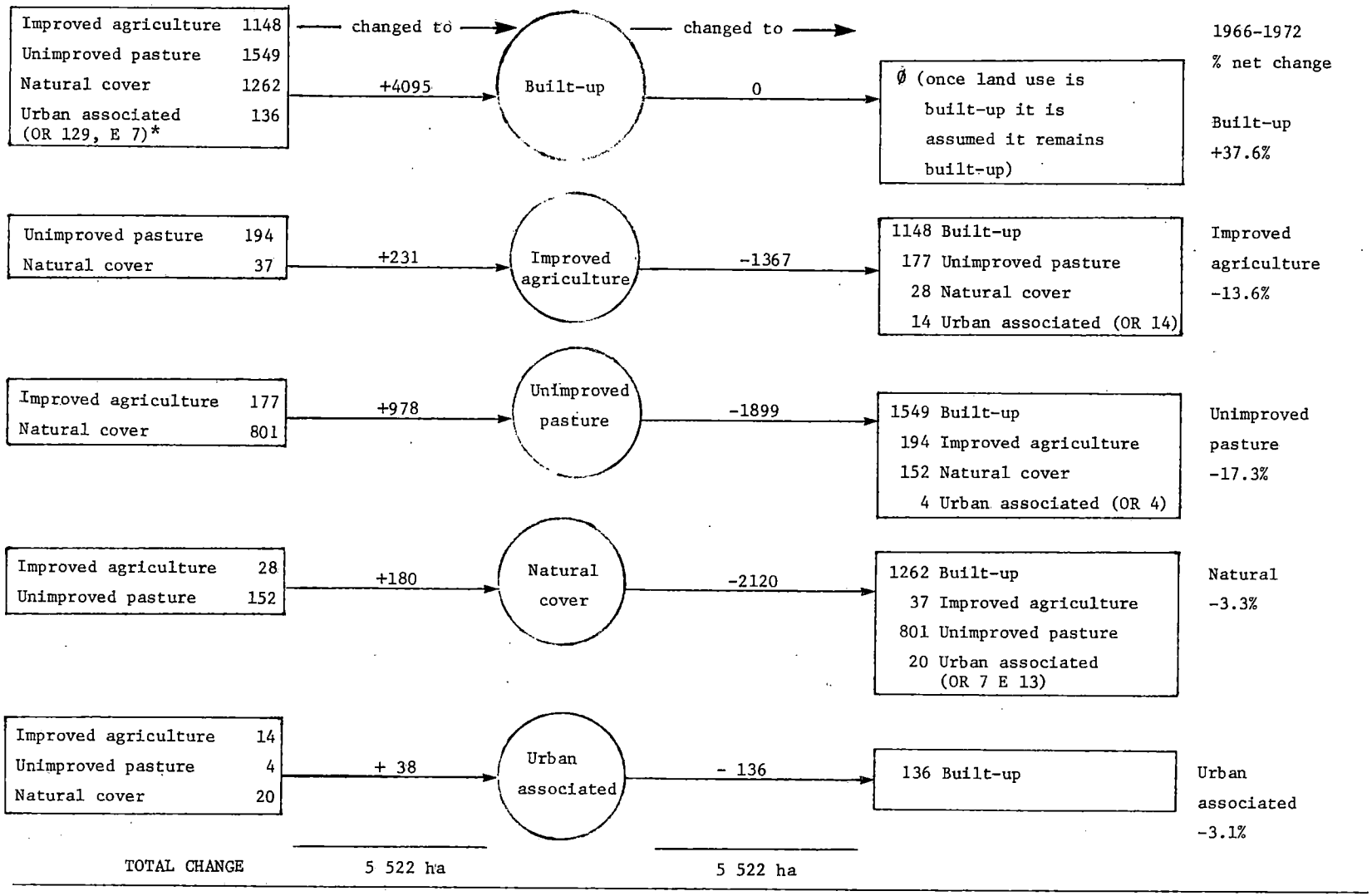
The primary recreation feature: vegetation of a park-land type setting, enhances opportunities for extensive recreation activities. Trail-riding, hiking, camping, huting and nature interpretation opportunities are widespread, particularly in the Saanich Peninsula, Cowichan Valley and Shawnigan Lake-Sooke Hills areas. The second most common recreation feature is landscape viewing. Shoreland capable of supporting family beach activities, may be more widespread than indicated because a substantial portion of the study area (11.5%) including all the coastline in the immediate vicinity of the city of Victoria and the town of Sidney has not been classified.

5. LAND USE DYNAMICS

Land use dynamics is the study of change in land use with time, including analysis of both the quantity and nature of the change. Net gains and losses in each land use category were outlined in Section 4. In this section the dynamics and location of change will be discussed. Figures 1A and 1B give a summary of land use changes in the study area, and serve as a basis for their analysis. For example, in Figure 1A the land use dynamics for improved agriculture (line 2) indicate that between 1966 and 1972 a total of 231 ha, 194 from unimproved pasture and 37 from natural cover, were converted to improved agriculture uses. However, during the same period 1367 ha of improved agriculture were changed to other land uses: 1 148 ha to built-up, 177 ha

FIGURE 1A: LAND USE DYNAMICS BETWEEN 1966 AND 1972

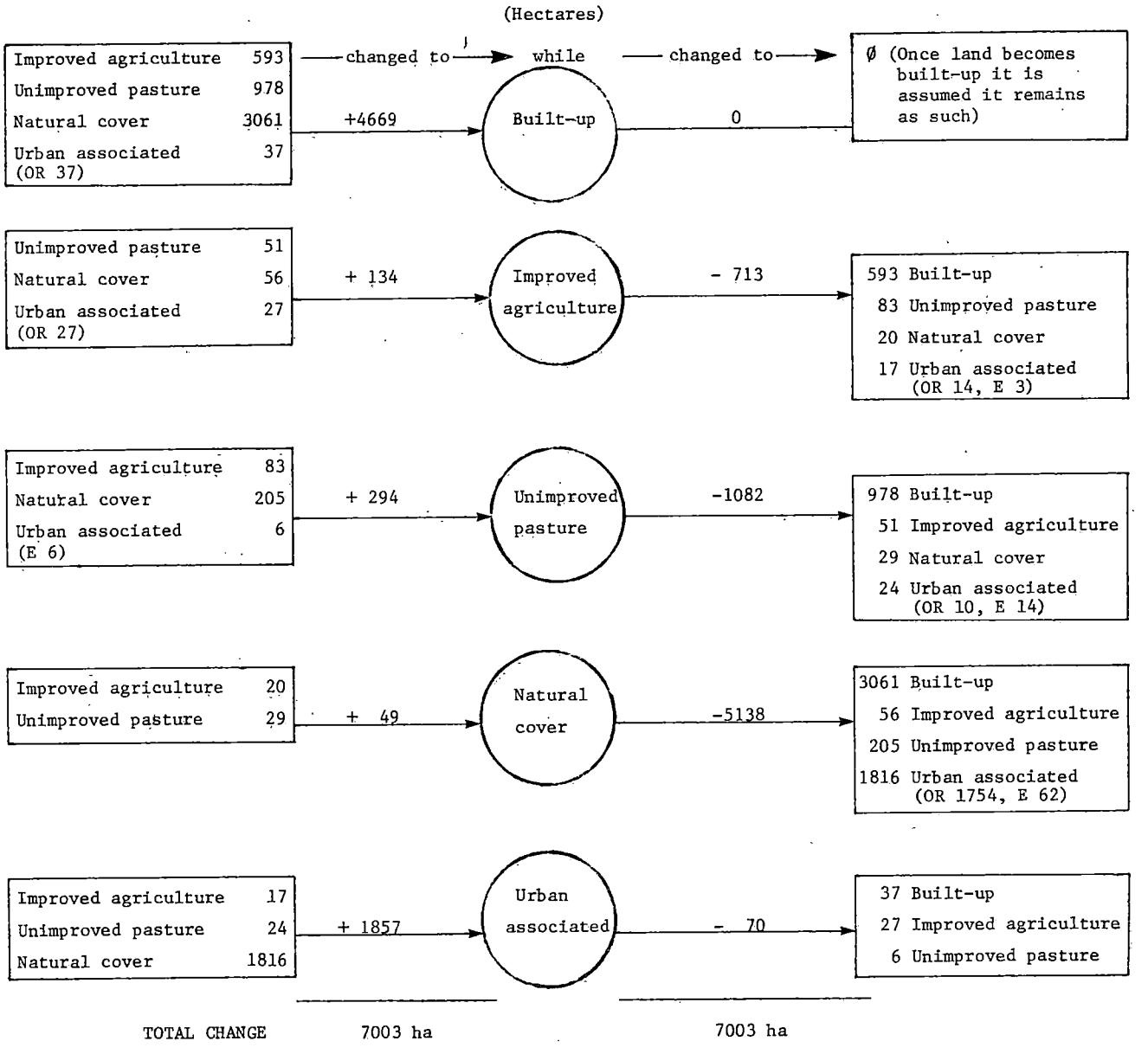
(Hectares)



* OR: Outdoor recreation

E: Quarries, sand and gravel pits

FIGURE 1B: LAND USE DYNAMICS BETWEEN 1972 AND 1976



1972-1976
% net change

Built-up
+ 23.7%

Improved agriculture
- 7.9%

Unimproved pasture
- 17.8%

Natural cover
- 9.0%

Urban associated
+ 37.0%

to unimproved pasture, 28 ha to natural cover and 14 ha to urban-associated uses (in this case outdoor recreation). The net change was a 13.6% loss of improved agriculture. Figures 1A and B are central to understanding the complexity of land use dynamics in the Victoria UCR.

The total area that changed uses between 1966 and 1972 was 5 522 ha or 6.4% of the UCR study area (Figure 1A). This increased to 7 003 ha or 8.1% of the Victoria UCR between 1972 and 1976 (Figure 1B).

5.1 Urbanization

The amount, location and nature of urban encroachment onto high quality resource lands, such as prime farmland, should be a major concern to land managers in British Columbia.

In the Victoria urban-centred region (UCR), Table 1 indicates that the areal extent of urban built-up uses increased from 10 892 ha to 19 656 ha between 1966 and 1976. Just under half of this increase occurred between 1966 and 1972.

The location of urban growth is shown on Map 3. In the earlier period, most urban growth took place adjacent to the existing urban core. This occurred in the northern part of Oak Bay municipality, the southeastern and southcentral parts of Saanich municipality, and to the west in the Esquimalt area. Other nodes for urbanization were Happy Valley (west of Metchosin), north and central Saanich along Highway 17, Brentwood Bay and Sidney, northeast Shawnigan Lake, Mill Bay and Cobble Hill.

More unimproved pasture and rangeland was converted to built-up (38%) than any other land use between 1966-72. That urban development tended to occur on unimproved pasture and rangeland is indicated by a comparison of Tables 4 and 6. Of the total amount of land in non-urban uses in 1966 only 7% was in unimproved pasture and rangeland. Yet, by 1972, 38% of this unimproved pasture and rangeland had been urbanized. By comparison, 11.2% of non-urban uses in 1966 was in improved agricultural uses, and of this, 27% was urbanized by 1972. During this same period, natural covers accounted for 31% of the land that became built-up. In total, 4 095 hectares or 4.7% of the Victoria UCR was converted to built-up during this six year period.

Between 1972 and 1976, urban growth continued to expand north from the Victoria urban core on both the east and west side of Elk Lake. Areas in and around urban nodes such as Langford were filled in and a continuous built-up stretch spread from Langford south through Metchosin. Cobble Hill urban area expanded as did that around the north end of Shawnigan Lake and around Sooke. More growth appeared around Brentwood Bay and north along the western side of Saanich Peninsula. Scattered urbanization occurred elsewhere throughout the study area as indicated on Map 3.

Substantially more natural cover was converted to built-up between 1972 and 1976 than in the earlier period: 3 061 ha versus 1 262 ha respectively. Although this constituted 65.5% of the total amount of land urbanized during the second period, it still represented only a small proportion (7%) of the total amount of natural cover in non-urban uses in 1972.

By comparison, unimproved pasture and rangeland (6.2% of non-urban uses in 1972) provided 21% of the land uses that became built-up by 1976 (Table 4).

Improved agricultural uses accounted for only 12.7% of the land that became urbanized - less than half the amount that had been converted in the previous period. The total area converted to urban built-up between 1972 and 1976 was 4 669 ha or 5.4% of the total study area. Very little land changed to a different interim use before being urbanized (Tables 4 and 5). For example, 95.5% of the land in unimproved pasture and rangeland in 1966 was still in that use in 1972, before becoming built-up in 1976. Similarly 97% of improved agricultural land remained in that use through 1972 before being urbanized by 1976. Only 3.4% of unimproved pasture land reverted to woodland before being urbanized, and a similar amount of improved agricultural land went to unimproved uses before becoming built-up in 1976.

Maps 4 and 5 show the location of improved agricultural land and unimproved pasture and rangeland respectively, that was converted to built-up in the two periods under study. It appears that more unimproved pasture and rangeland changed to built-up than improved agriculture in Saanich municipality, Mill Bay and Metchosin-Langford areas, and only slightly more in North Saanich between 1966 and 1976. In Central Saanich more land in improved agricultural uses was converted over the ten-year period.

Another factor of land use dynamics is the physical capability of land for various uses. Lands with agricultural capability classes 1, 2 and 3 are the best lands for agricultural production. They are also easily serviced and therefore attractive for urban development. Conflicts between these two uses occur most frequently and most intensively on high capability agricultural lands.

There are only 38 hectares of Class 1 agricultural capability lands in the study area, none of which has been urbanized.

In 1966 built-up land use occupied 23% of all Classes 2-3 agricultural land in the Victoria UCR. By 1972 this figure had increased to 34.2% (Table 7). Of all the land urbanized between 1966 and 1972, 61.7% (2 528 ha) was prime agricultural land (Classes 2-3). Approximately 42% (1 050 ha) of this Class 2-3 land urbanized had been unimproved pasture and rangeland, and 34% (864 ha) was formerly improved agriculture (Table 8).

The British Columbia government passed the Land Commission Act in 1973 (now the Agricultural Land Commission Act), designating land with CLI agricultural capability classes 1-4, that was not irreversibly developed, as agricultural land reserve (ALR). Sufficient land was excluded from the ALR to allow approximately five years' growth of urban areas, if non-agricultural land was not immediately available for urban expansion (Manning and Eddy, 1978:13).

During the 1972-76 period, there was an overall decline in the amount of Class 2 and 3 agricultural

VICTORIA URBAN CENTRED REGION

LAND CONVERTED TO URBAN BUILTUP 1966 TO 1976

SCALE APPR. 1 . 310 000

LEGEND

STUDY AREA

URBAN BUILTUP 1966

CONVERTED TO URBAN BUILTUP 1966 TO 1972

CONVERTED TO URBAN BUILTUP 1972 TO 1976

WATER

CANADA LAND DATA SYSTEMS DIVISION LANDS DIRECTORATE ENVIRONMENT CANADA

JANUARY 13, 1983

TABLE 4. LAND THAT BECAME BUILT-UP BETWEEN 1966 AND 1972, AND 1972 AND 1976

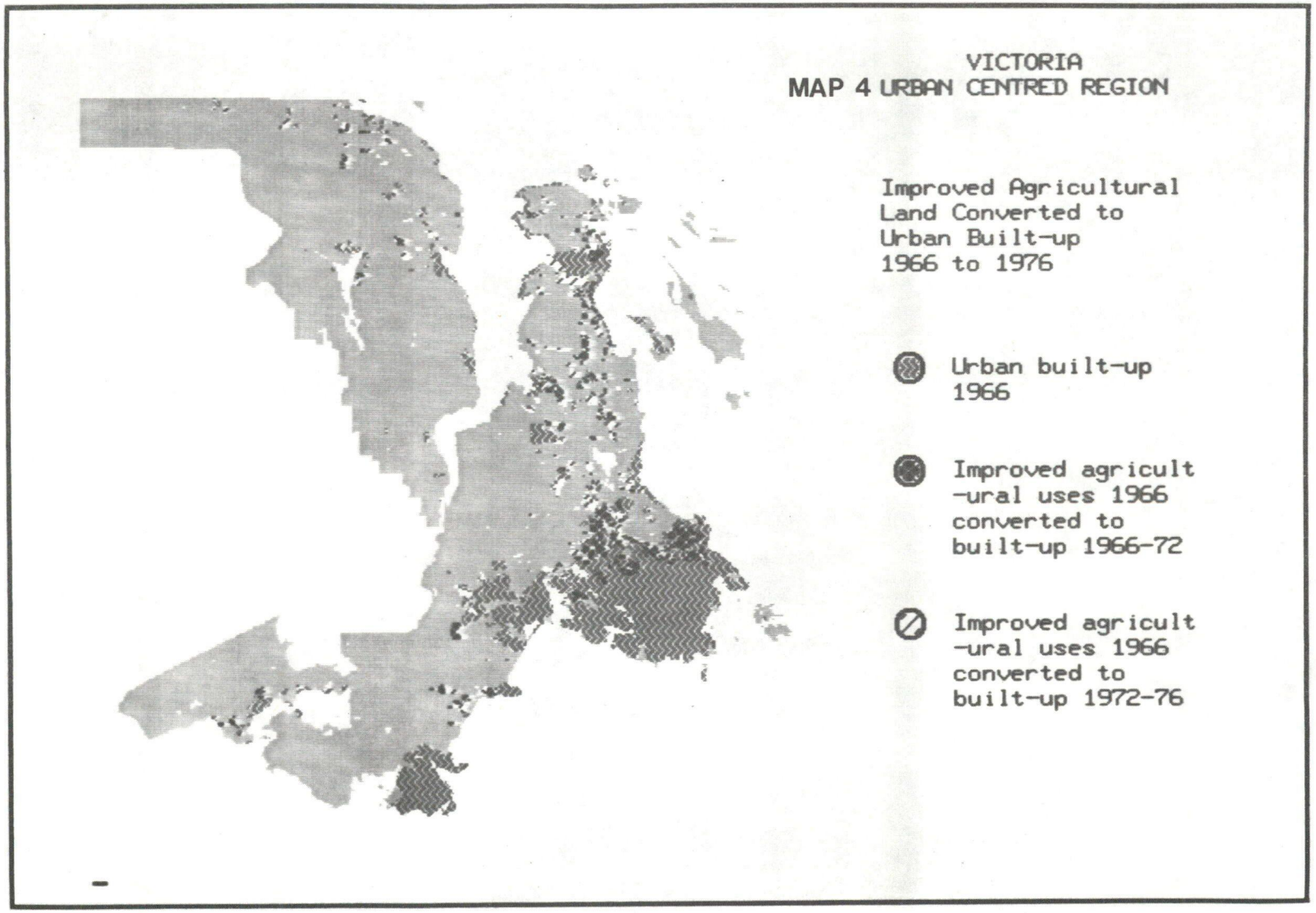
Land Use Class	1966 Use of Land That Became Built-up Between 1966 and 1972				1972 Use of Land That Became Built-up Between 1972 and 1976			
	Area(hectares)	% Selection		% Study Area	Area(hectares)	% Selection		% Study Area
Quarries, sand and gravel pits	7	0.2	3.3	0	0	0	0.8	0
Outdoor recreation	129	3.1		0.2	37	0.8		0
Horticulture, fur and poultry farms	199	4.9		0.2	64	1.4		0.1
Cropland, improved pasture and forage crops	917	22.4	27.1	1.1	514	11.0	12.7	0.6
Orchards and vineyards	32	0.8		0	15	0.3		0
Unimproved pasture and rangeland	1 549	37.8	37.8	1.8	978	21.0	21.0	1.1
Productive woodland	1 238	30.2		1.4	2 925	62.6		3.4
Non-productive woodland	24	0.6		0	135	2.9		0.2
Swamp, marsh or bog	0	0	30.8	0	1	0	65.5	0
Sand flats, dunes and beaches	0	0		0	0	0		0
Rock and other unvegetated surfaces	0	0		0	0	0		0
TOTAL AREA SELECTED	4 095 ha	100%		4.7%	4 669 ha	100%		5.4%

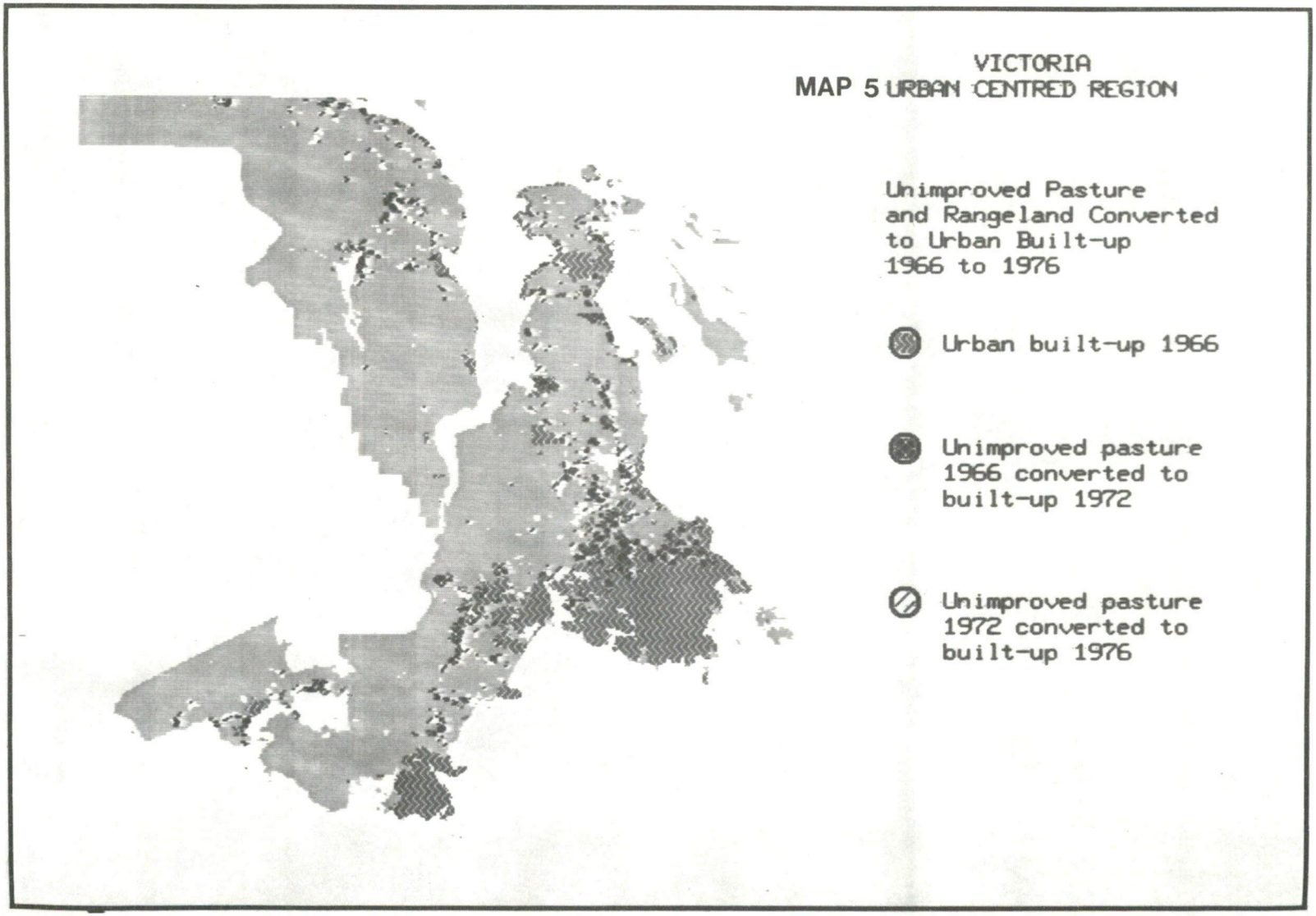
TABLE 5. 1966 USE OF LAND THAT BECAME BUILT-UP BETWEEN 1972 and 1976

	Area(hectares)	% Selection	
Quarries, sand and gravel pits	0	0	0.8
Outdoor recreation	37	0.8	
Horticulture, fur and poultry farms	60	1.3	
Cropland, improved pasture and forage crops	529	11.3	12.9
Orchards and vineyards	15	0.3	
Unimproved pasture, rangeland	972	20.8	20.8
Productive woodland	3 013	64.6	
Non-productive woodland	42	0.9	65.5
Swamp, marsh or bog	1	0	
TOTAL AREA SELECTED	4 669 ha (5.4% of Study Area)	100%	

TABLE 6. NON BUILT-UP LAND USE IN 1966 AND 1972

Land Use Class	1966				1972			
	Area(hectares)	% Selection		% Study Area	Area(hectares)	% Selection		% Study Area
Quarries, sand and gravel pits	225	0.3	4.2	0.3	229	0.3	4.3	0.3
Outdoor recreation	2 911	3.9		3.4	2 810	4.0		3.3
Horticulture, poultry and fur farms	928	1.2		1.1	739	1.0		0.9
Cropland, improved pasture and forage crops	7 342	9.8	11.2	8.5	6 437	9.1	10.2	7.5
Orchards and vineyards	122	0.2		0.1	82	0.1		0.1
Unimproved pasture and rangeland	5 333	7.1	7.1	6.2	4 412	6.2	6.2	5.1
Productive woodland	54 977	73.1		63.9	51 718	72.8		60.1
Non-productive woodland	3 212	4.3		3.7	4 433	6.2		5.1
Swamp, marsh or bog	82	0.1	77.5	0.1	123	0.2	79.3	0.1
Sand flats, dunes and beaches	36	0		0	36	0		0
Rock and other unvegetated surfaces	16	0		0	70	0.1		0.1
TOTAL AREA SELECTED	75 184 ha	100%		87.3%	71 089 ha	100%		82.6%


VICTORIA
MAP 4 URBAN CENTRED REGION
Improved Agricultural Land Converted to Urban Built-up 1966 to 1976
Urban built-up 1966
Improved agricult -ural uses 1966 converted to built-up 1966-72
Improved agricult -ural uses 1966 converted to built-up 1972-76


VICTORIA
MAP 5 URBAN CENTRED REGION
Unimproved Pasture and Rangeland Converted to Urban Built-up 1966 to 1976
Urban built-up 1966
Unimproved pasture 1966 converted to built-up 1972
Unimproved pasture 1972 converted to built-up 1976

capability land that was converted to built-up uses from: 2 528 ha to 2 025 ha, a decline of 19.9%. There was an 18.6% decline in the amount of Class 4 land converted to built-up (Table 7).

Table 8 indicates the previous uses of these high agricultural capability lands. Between 1972 and 1976, the amount of Class 2 and 3 land in improved agricultural uses being converted to built-up decreased by 38.2%. Similarly, conversion to built-up of unimproved pasture and rangeland on Class 2 and 3 land declined by a substantial 45.4%.

In spite of the overall decline of urbanization of Class 2 and 3 land cited above, by 1976 built-up land uses occupied 43.2% of all Class 2 and 3 agricultural capability land in the study area. Some of the land urbanized was formerly in natural cover. Table 8 shows a 400 ha increase in the amount of natural cover with agricultural capability 2 and 3 that was converted to urban uses between 1972 and 1976. Although this was 45% of all Class 2 and 3 land urbanized during this period, it represented only 19.3% of the total amount of land converted to built-up between 1972-76. Map 6 shows the location of agricultural capability 1-3 land converted to built-up between 1966 and 1976.

There was a slight increase in the amount of Class 5 and 6 land that went to urban uses between 1972 and 1976 compared to the earlier period.

By comparison the amount of Class 7 land urbanized rose significantly from 343 ha to 1151 ha, an increase of 236% (Table 7). This conversion took place primarily in the western part of Central Saanich and Saanich municipalities and in the Langford area.

By 1976, the major effects of the ALR legislation appear to have been 1) to reduce the amount of improved agriculture and unimproved pasture and range on Class 2 and 3 land being converted to built-up, and 2) to encourage the use of lower agricultural capability land (Class 5 and 7) for built-up purposes.

Trends in urbanization can be examined by considering annual rates of urbanization. Table 9 shows that, overall, land was converted to urban uses at a much greater rate between 1972 and 1976, than in the earlier period, 1966-1972. Significant variations occurred in the rate of change between individual land uses. Most dramatic was the increase in the conversion of forest land (productive and unproductive) from 211 ha/year to 765 ha/year. In contrast, the rate of urban conversion of improved agriculture land declined in the second period, from 191 ha/year to 148 ha/year. Although the table shows a decrease in the rate of change from outdoor recreation to built-up between 1972-76, this may be due to differences in interpretation between the time periods rather than actual change. With the small scale of aerial photography used, particularly in 1972, it is almost impossible to separate seasonal, recreation dwellings from permanent residences without thorough field checking. In 1972 and 1976, the tendency was to classify all such uses as built-up rather than guess the distinction between recreation cottage and residential uses.

TABLE 7. COMPARISON OF AGRICULTURAL CAPABILITY OF STUDY AREA, BUILT-UP LAND IN 1966, AND LAND THAT BECAME BUILT-UP 1966 - 1976

Agricultural Capability Class	Agricultural Capability				Agricultural capability of land that became built-up between			
	Study Area		1966 Built-up Land		1966 - 1972		1972 - 1976	
	Area (ha)	% Selection	Area (ha)	% Selection	Area (ha)	% Selection	Area (ha)	% Selection
1	38	0	0	0	0	0	0	0
2	4 749	5.5	100	0.9	186	4.5	405	8.7
3	17 732	20.6	5 081	46.7	2 342	57.2	1 620	34.7
4	6 521	7.6	2 099	19.3	591	14.4	481	10.3
5	15 284	17.8	1 321	12.1	526	12.8	935	20.0
6	2 280	2.6	944	8.6	39	1.0	54	1.2
7	38 376	44.6	1 317	12.1	343	8.4	1 151	24.6
Organic	1 082	1.3	26	0.2	68	1.7	23	0.5
Unclassified	14	0	0	0	0	0	0	0
TOTAL AREA SELECTED	86 076 ha	100%	10 888 ha (12.7% of study area)	100%	4 095 ha (4.7% of study area)	100%	4 669 ha (5.4% of study area)	100%

TABLE 8. LAND WITH AGRICULTURAL CAPABILITY CLASSES 2-3 CONVERTED TO BUILT-UP 1966-1976

	Land Converted to Built-up by 1972			Land Converted to Built-up by 1976		
	Area(hectares)	% Selection		Area(hectares)	% Selection	
Outdoor recreation	110	4.4	4.4	0	0	
Horticulture, poultry and fur farms	156	6.2		54	2.7	
Cropland, improved pasture and forage crops	682	27.0	34.2	465	23.0	26.4
Orchards and vineyards	26	1.0		15	0.7	
Unimproved pasture and rangeland	1 050	41.5	41.5	573	28.3	28.3
Productive woodland	503	19.9	19.9	903	44.6	45.3
Non-productive woodland	1	0		15	0.7	
TOTAL AREA SELECTED	2 528 ha (2.9% of Study Area)	100%		2 025 ha (2.3% of Study Area)	100%	

TABLE 9. RATES OF URBANIZATION: LAND THAT BECAME BUILT-UP 1966-1972 AND 1972-1976

	1966-72 (6 years) hectares/year	1972-76 (4 years) hectares/year	Change in the Rate of Change	
All land uses	683	1 167	+71%	+484 ha/yr.
Improved agriculture	191	148	-23%	- 43 ha/yr.
Unimproved pasture and rangeland	258	245	- 5%	- 13 ha/yr.
Forested land (productive and non-productive)	211	765	+263%	+554 ha/yr.
Outdoor recreation	22	9	-59%	- 13 ha/yr.
Quarries, sand and gravel pits	1	0	0%	- 1 ha/yr.
Agricultural capability (Classes 1-3)	421	506	+20%	+ 85 ha/yr.
(Class 4)	99	121	+22%	+ 22 ha/yr.
(Classes 5-7)	151	357	+136%	+206 ha/yr.

The rate at which unimproved pasture and rangeland was urbanized showed a marginal decline. Urbanization of Class 1-3 agricultural capability lands increased by 20% in the second period, while urbanization of Classes 5-7 increased by 136%.

A summary of the urbanization process between 1966 and 1976 follows:

1. The major land use change was the conversion of other land uses to built-up.
2. Unimproved pasture and range was the dominant land use converted to built-up between 1966-1972, and the second most dominant, behind natural covers, in the 1972-1976 period.
3. Of all land urbanized between 1966 and 1972, over half was prime agricultural capability land, of which approximately 40% was in unimproved pasture and rangeland. There was a significant increase in the amount of Class 7 capability land urbanized between 1972 and 1976, accounting for 25% of all land converted to built-up.
4. Very little land changed to a different interim land use before becoming urbanized by 1976.
5. The annual rate of urbanization of land was greater in the 1972-1976 period. Rates of urban conversion declined slightly for improved agriculture and unimproved pasture and range, but increased significantly for natural covers between the two periods.
6. Urban development was concentrated in Saanich municipality adjacent to the Victoria urban core, Langford-Metchosin area, and Cobble Hill northeast of Shawnigan Lake.

5.2 Rural Land Uses

5.2.1 All Rural Land Uses

This section looks at land use dynamics within the rural land use realm. 'Rural'[3] land uses include all land uses except built-up and urban associated uses (quarries, sand and gravel pits; outdoor recreation).

Conversion of rural land to built-up and urban associated uses resulted in the reduction of the 1966 rural land area of 72 048 ha by 5.5% between 1966-1972, and by an additional 9% between 1972-76 (Table 10). Changes that occurred among the rural land uses between 1966 and 1976 are given in Table 11. The three general rural land use types (improved agriculture, unimproved pasture and rangeland, and natural cover uses) remained in the same relative proportions to one another throughout the ten-year period. More detailed discussion of each rural land use type follows.

5.2.2 Improved Agricultural Land

Improved agricultural land includes all land used for cash or forage crops and improved pasture; orchards and vineyeards; horticulture, fur and poultry operations. Cropland and improved pasture are the most dominant (over 95%) agricultural land use. Croplands are characterized by forage crops, primarily hay, and highly intensive horticultural crops. The latter occur particularly on the Saanich Peninsula.

The amount of land in improved agricultural uses has been declining since 1966, although this trend slowed in the 1972-76 period. In 1966, 8 392 hectares or 9.7% of the Victoria UCR was in improved agriculture. By 1972, 16.3% of this land had been converted to other uses and by 1976, 24.7% was in uses other than improved agriculture (Table 12). Of this amount, about 21% had gone to built-up uses and approximately 3% had reverted to unimproved pasture and rangeland.

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3 It should be pointed out that in the forest lands in the southwestern part of Saanich peninsula, and in the region south of Shawnigan Lake and west of Saanich Inlet, a designation of "wilderness" would be more appropriate than 'rural'. Part of this area includes the Greater Victoria watershed reserve.

TABLE 10. 1966 RURAL LAND USE AND 1972 AND 1976 USE OF 1966 RURAL LAND

	1966			1972			1976		
Land Use Class	Area(hectares)	% Selection		Area(hectares)	% Selection		Area(hectares)	% Selection	
Built-up				3 959	5.6		8 592	11.9	
Quarries, sand and gravel pits				13	0	5.6	92	0.1	14.5
Outdoor recreation				25	0		1 803	2.5	
Horticulture, poultry and fur farms	928	1.3		739	1.0		619	0.9	
Cropland, improved pasture and forage crops	7 342	10.2	11.7	6 437	8.9	10.0	5 960	8.3	9.3
Orchards and vineyards	122	0.2		82	0.1		67	0.1	
Unimproved pasture and rangeland	5 333	7.4	7.4	4 412	6.2	6.2	3 623	5.0	5.0
Productive woodland	54 977	76.3		51 719	71.9		46 445	64.5	
Non-productive woodland	3 212	4.5		4 433	6.2		3 623	6.3	
Swamp, marsh or bog	82	0.1	80.9	123	0.1	78.2	186	0.3	71.2
Sand flats, dunes and beaches	36	0		36	0		36	0	
Rock and other unvegetated surfaces	16	0		70	0		77	0.1	
TOTAL AREA SELECTED	72 048 ha	100%		72 048 ha	100%		72 048 ha (83.7% of Study Area)	100%	

TABLE 11. 1976 RURAL LAND USE AND 1966 AND 1972 USE OF 1976 RURAL LAND

Land Use Class	1976 Rural Land Use				1966 Use of 1976 Rural Land				1972 Use of 1976 Rural Land			
	Area(hectares)	% Selection		% Study Area	Area(hectares)	% Selection		% Study Area	Area(hectares)	% Selection		% Study Area
Quarries, sand and gravel pits					2	0		0	6	0		0
Outdoor recreation					27	0		0	27	0		0
Horticulture, poultry and fur farms	633	1.0		0.7	666	1.1		0.8	675	1.1		0.8
Cropland, improved pasture and forage crops	5 973	9.7	10.8	6.9	5 870	9.6	10.8	6.8	5 902	9.6	10.8	6.9
Orchards and vineyards	67	0.1		0.1	73	0.1		0.1	66	0.1		0
Unimproved pasture and rangeland	3 625	5.9	5.9	4.2	2 783	4.5	4.5	3.3	3 411	5.6	5.6	4.0
Productive woodland	46 445	75.4		54.0	49 259	80.0		57.2	47 498	77.1		55.2
Non-productive woodland	4 548	7.4		5.3	2 777	4.5		3.2	3 777	6.1		4.4
Swamp, marsh or bog	186	0.3	83.3	0.2	82	0.1	84.7	0.1	122	0.2	83.6	0.1
Sand flats, dunes and beaches	36	0.1		0	36	0.1		0	36	0.1		0
Rock and other unvegetated surfaces	77	0.1		0.1	15	0		0	70	0.1		0.1
TOTAL AREA SELECTED	61 590 ha	100%		71.5%	61 590 ha	100%		71.5%	61 590 ha	100%		71.5%

TABLE 12. USE OF 1966 IMPROVED AGRICULTURAL LAND IN 1972 AND 1976

	1972			1976		
Land Use Class	Area(hectares)	% Selection		Area(hectares)	% Selection	
Built-up	1 148	13.7		1 752	20.9	
Quarries, sand and gravel pits	0	0	13.9	3	0	21.2
Outdoor recreation	14	0.2		28	0.3	
Horticulture, poultry and fur farms	721	8.6		569	6.8	
Cropland, improved pasture and forage crops	6 222	74.1	83.7	5 685	67.7	75.3
Orchards and vineyards	82	1.0		67	0.8	
Unimproved pasture and rangeland	177	2.1	2.1	240	2.9	2.9
Productive woodland	25	0.3		25	0.3	
Non-productive woodland	3	0	0.3	14	0.2	0.6
Swamp, marsh or bog	0	0		9	0.1	
TOTAL AREA SELECTED	8 392 ha (9.7% of Study Area)	100%		8 392 ha	100%	

TABLE 13. 1966 AND 1972 USE OF 1976 IMPROVED AGRICULTURE LAND

	1966			1972		
Land Use Class	Area(hectares)	% Selection		Area(hectares)	% Selection	
Quarries, sand and gravel pits	0	0	0.4	0	0	0.4
Outdoor recreation	27	0.4		27	0.4	
Horticulture, poultry and fur farms	643	9.6		652	9.8	
Cropland, improved pasture and forage crops	5 609	84.1	94.7	5 821	87.2	98.0
Orchards and vineyards	69	1.0		66	1.0	
Unimproved pasture and rangeland	237	3.6	3.6	51	0.8	0.8
Productive woodland	82	1.2	1.3	56	0.8	0.8
Non-productive woodland	6	0.1		0	0	
TOTAL AREA SELECTED	6 673 ha (7.7% of Study Area)	100%		6 673 ha	100%	

TABLE 14. AGRICULTURAL CAPABILITY OF 1966 AND 1976 IMPROVED AGRICULTURAL LAND

Class	1966 Area(hectares)	% Selection		1976 Area(hectares)	% Selection	
1	32	0.4		32	0.5	
2	1 438	17.1	80.5	1 332	20.0	79.4
3	5 283	63.0		3 929	58.9	
4	459	5.5	5.5	241	3.6	3.6
5	522	6.2		514	7.7	
6	10	0.1	6.3	5	0	7.7
7	175	2.1	2.1	161	2.4	2.4
Organic soils	473	5.6	5.6	459	6.9	6.9
TOTAL AREA SELECTED	8 392 ha (9.7% of Study Area)	100%		6 673 ha (7.7% of Study Area)	100%	

TABLE 15. AGRICULTURAL CAPABILITY OF 1966 AND 1976 RURAL LAND USE

Agricultural Capability Class	1966 Area(hectares)	% Selection		% Study Area	1976 Area(hectares)	% Selection		% Study Area
1	38	0		0	38	0.1		0
2	4 596	6.4	23.0	5.3	3 982	6.5	19.7	4.6
3	11 980	16.6		13.9	8 082	13.1		9.4
4	4 173	5.8		4.9	3 107	5.0		3.6
5	13 227	18.5	26.1	15.4	11 657	18.9	25.9	13.6
6	1 315	1.8		1.5	1 222	2.0		1.4
7	35 676	49.5	49.5	41.5	32 560	52.9	52.9	37.8
Organic soil	1 033	1.4	1.4	1.2	932	1.5	1.5	1.1
Unclassified Area	10	0		0	10	0		0
TOTAL AREA SELECTED	72 048 ha	100%		83.7%	61 590 ha	100%		71.5%

5.2.3 Unimproved Pasture and Rangeland

'Unimproved pasture and rangeland' includes natural grassland, rough grazing land, idle or abandoned farmland, and some formerly forested areas being kept in a grassland state for non-agricultural purposes, e.g. electrical transmission corridors.

In 1966 unimproved pasture and rangeland occurred on 5 333 ha or 6.2% of the study area. By 1976, 32% of this land had been converted to other uses. This percentage conversion is greater than in any other land use category in the Victoria UCR, during the same period.

Of the 1 899 ha unimproved pasture and rangeland that were converted to other uses between 1966-1972, 82% went to built-up, 10% went to improved agriculture and 8% went to natural cover (Table 16). Between 1972 and 1976 an additional 1 076 ha of unimproved pasture and rangeland were converted to other uses; 90% went to built-up and 5% went to improved agriculture (Figure 1B). Map 5 shows the distribution of conversion from unimproved pasture and rangeland to built-up uses. The largest areas of conversion were: immediately to the north of the Victoria urban core, in the Metchosin area, Central Saanich and northwest of Shawnigan Lake.

Between 1966 and 1972, 978 ha changed to unimproved pasture and rangeland (Figure 1A). The majority (82%) came from natural cover, with the remainder contributed by improved agriculture. Table 18 indicates that only 294 ha, mostly (70%) from natural cover, were converted to the unimproved land category between 1972 and 1976.

Due to an inappropriate classification of 'K' in 1972, a large portion of land that appears to have came into unimproved pasture and rangeland corresponds to an electrical transmission corridor. This corridor traverses the rough terrain (with low agricultural capability) of the southwestern part of Saanich Peninsula and north along Highway 1, west of Saanich Inlet. Table 18 gives a more accurate distribution of land converted to unimproved pasture and rangeland and its agricultural capability.

In 1966, approximately 2 910 ha of unimproved pasture and rangeland uses occurred on prime agricultural land (Class 1-3). This represented 17.5% of all rural land with agricultural capability 1-3. By 1976, only 1 418 ha were in the unimproved category, representing only 8.5% of all rural land with CLI capability 1-3 in the study area (Tables 15 and 19). A major portion (68%) of the unimproved pasture and rangeland that was converted to built-up in the first period had high class agricultural capability. While the amount of unimproved pasture and rangeland selected for built-up uses declined by 17% between 1966-72 and 1972-76, the amount of prime quality (Classes 2 and 3) unimproved pasture land selected for urban purposes, declined by only 9%. This indicates that the most easily serviced land, close to urban areas, continued to be taken over by urban expansion, (see Map 6) rather than being upgraded to improved agricultural uses.

The dynamics of land classed as unimproved pasture and rangland can be summarized a follows:

1. Overall, the amount of land in the improved pasture and rangeland category declined between 1966 and 1976 and, in relation to its size in the total study area, was the most changeable.

Ninety-five percent of the land in improved agriculture in 1976 was already in that use in 1966, and 98% of improved agricultural land in 1976 was such in 1972 (Table 13). Compared to the total amount of land already in improved agriculture in 1966, only a small amount of land (231 ha or 3%) came into improved agriculture by 1972. Most of this (84%) came from unimproved pasture and rangeland. In contrast, 1 367 ha changed from improved agriculture to other uses, primarily built-up (84%). A further 13% reverted to unimproved pasture and rangeland (Figure 1A). The net result was a 13.6% loss of improved agricultural land for the 1966-72 period.

Between 1972 and 1976, the amount of improved agricultural land gained from natural cover and unimproved agriculture uses approximated the area of improved agriculture land lost to these uses. Again the significant change was to built-up uses, approximately 83%. Overall the net loss of improved agriculture in this period was 8%, a little less than half that of the previous period (Figures 1A & B).

In both periods, the proportion of improved agricultural use occurring on prime quality agricultural land remained relatively constant at approximately 80% (Table 14), but the actual amount declined. In 1966, improved agriculture occupied 30% of all Class 1-3 land in the study area. By 1976, this had declined to 23.5%. Of all the improved agricultural land converted to built-up uses by 1972, 75% was on Class 2-3 lands.

Although the total amount of improved agricultural land that changed to built-up declined by 14.4% between the two periods, improved agricultural land converted to built-up between 1972-76 was almost exclusively (90%) on prime agricultural capability lands (Tables 4 and 8).

Map 6 shows the location of improved agricultural land with agricultural capability 1-3, that was converted to built-up uses 1966-76. Most change was concentrated in Saanich municipality north of the Victoria urban core, in the central part of Saanich Peninsula and around the town of Sidney.

The dynamics of improved agricultural land use are summarized below:

1. The amount of land in improved agricultural uses decreased between 1966 and 1976. The rate of loss declined between 1972-1976.

2. Over 80% of the improved agricultural land that was converted to other uses between 1966-76, went to built-up uses.

3. Approximately 80% of improved agricultural land uses occurred on high quality agricultural land, Classes 1-3. (Less than 1% of the study area is Class 1). This proportion did not change between the two periods.

4. Of all improved agricultural land converted to built-up between 1966 and 1976, 80% was Class 2 and 3 agricultural capability lands.

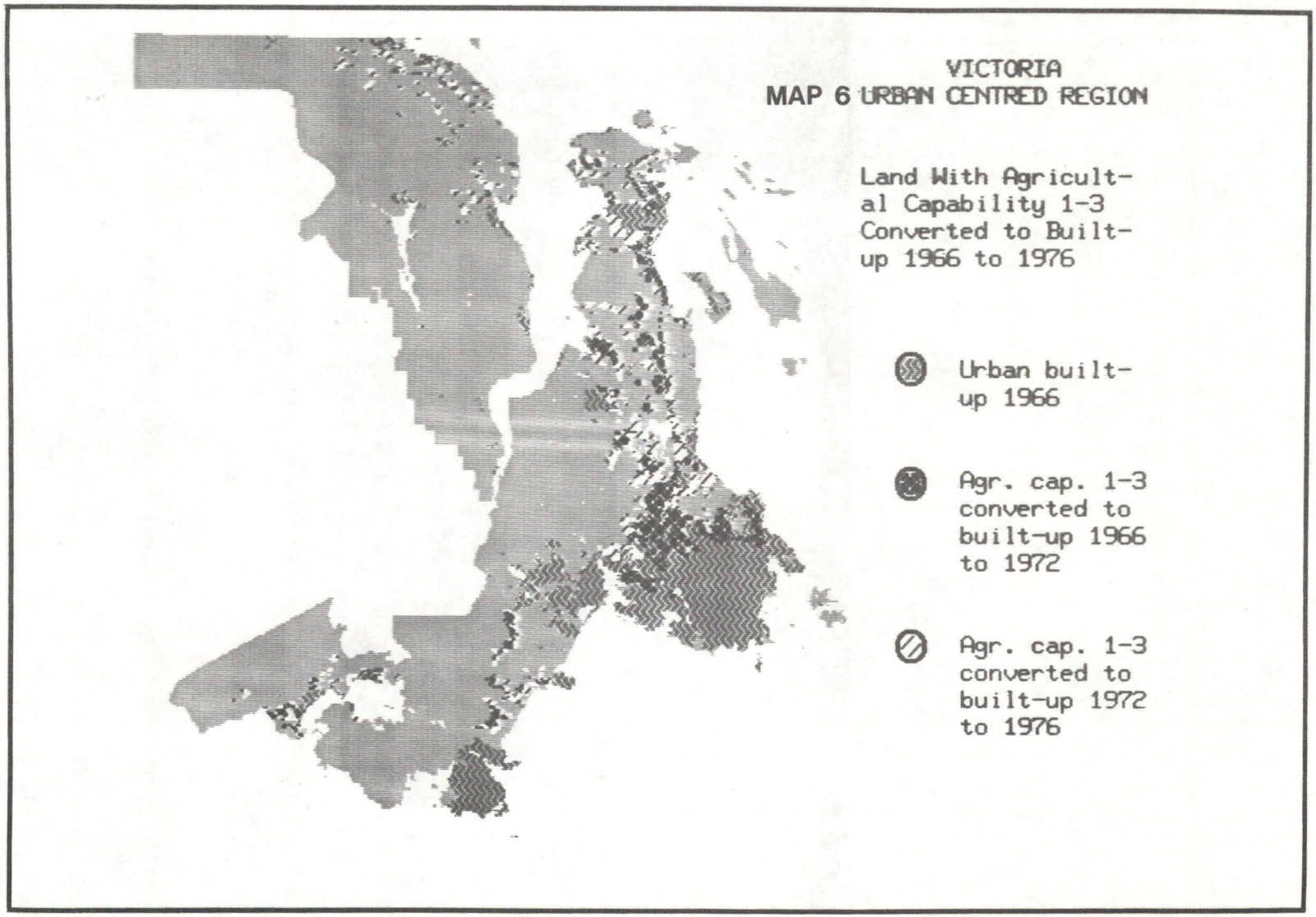
VICTORIA
MAP 6 URBAN CENTRED REGION
Land With Agricultural Capability 1-3 Converted to Built-up 1966 to 1976
Urban built-up 1966
Agr. cap. 1-3 converted to built-up 1966 to 1972
Agr. cap. 1-3 converted to built-up 1972 to 1976

TABLE 16. 1972 AND 1976 USE OF LAND THAT WAS UNIMPROVED PASTURE AND RANGELAND IN 1966

Land Use Class	1972 Area(hectares)	1972 % Selection		1976 Area(hectares)	1976 % Selection	
Built-up	1 549	29.1		2 521	47.3	
Quarries, sand and gravel pits	0	0	29.2	14	0.3	47.9
Outdoor recreation	4	0.1		14	0.3	
Horticulture, poultry and fur farms	16	0.3		25	0.4	
Cropland, improved pasture and forage crops	178	3.3	3.6	213	4.0	4.4
Orchards and vineyards	0	0		0	0	
Unimproved pasture and rangeland	3 434	64.4	64.4	2 407	45.1	45.1
Productive woodland	92	1.7	2.8	82	1.5	2.6
Non-productive woodland	60	1.1		57	1.1	
TOTAL AREA SELECTED	5 333 ha (6.1% of Study Area)	100%		5 333 ha	100%	

TABLE 17. 1966 AND 1972 USE OF 1976 UNIMPROVED PASTURE AND RANGELAND

Land Use Class	1966 Area(hectares)	1966 % Selection		1972 Area(hectares)	1972 % Selection	
Quarries, sand and gravel pits	2	0.1	0.1	6	0.2	0.2
Outdoor recreation	0	0		0	0	
Horticulture, poultry and fur farms	23	0.6		23	0.6	
Cropland, improved pasture and forage crops	213	5.9	6.6	60	1.6	2.2
Orchards and vineyards	4	0.1		0	0	
Unimproved pasture and rangeland	2 407	66.4	66.4	3 331	91.9	91.9
Productive woodland	972	26.8	26.9	205	5.7	5.7
Non-productive woodland	1	0		0	0	
Swamp, marsh or bog	3	0.1		0	0	
TOTAL AREA SELECTED	3 625 ha (4.2% of Study Area)	100%		3 625 ha	100%	

TABLE 18. 1966 AND 1972 USE OF LAND THAT WAS CONVERTED TO UNIMPROVED PASTURE AND RANGELAND BY 1976, AND ITS AGRICULTURAL CAPABILITY

Land Use Class	1966 Area(hectares)	% Selection		% Study Area	1972 Area(hectares)	% Selection		% Study Area
Quarries, sand gravel pits	2	0.7	0.7	0	66	2.1	2.1	0
Horticulture, poultry and fur farms	23	7.8	28.2	0	23	7.8	28.2	0
Cropland, improved pasture and forage crops	60	20.4		0.1	60	20.4		0.1
Productive woodland	209	71.1	71.1	0.2	205	69.7	69.7	0.2
TOTAL AREA SELECTED	294 ha	100%		0.3%	294 ha	100%		0.3%

Agricultural Capability

Class	Area(hectares)	% Selection		% Study Area
2	26	8.8	41.8	0
3	97	33.0		0.1
4	41	14.0	38.5	0
5	72	24.5		0.1
6	0	0		0
7	57	19.4	19.4	0.1
Organic soils	1	0.3	0.3	0
TOTAL AREA SELECTED	294 ha	100%		0.3%

TABLE 19. AGRICULTURAL CAPABILITY OF 1966 AND 1976 UNIMPROVED PASTURE AND RANGELAND

Class	1966				1976			
	Area(hectares)	% Selection		% Study Area	Area(hectares)	% Selection		% Study Area
1	0	0		0	0	0		0
2	583	10.9	54.6	0.7	448	12.3	39.1	0.5
3	2 327	43.7		2.7	970	26.8		1.1
4	601	11.3		0.7	396	10.9		0.5
5	907	17.0	28.9	1.0	690	19.0	30.6	0.8
6	34	0.6			24	0.7		0
7	748	14.0	14.0	0.9	1 010	27.9	27.9	1.2
Organic soils	132	2.5	2.5	0.1	86	2.4	2.4	0.1
Unclassified area	1	0		0	1	0		0
TOTAL AREA SELECTED	5 333 ha	100%		6.1%	3 625 ha	100%		4.2%

2. Between 1966 and 1976, the amount of unimproved pasture and rangeland located on good quality agricultural land (1-3) dropped from 55% to 39%.

3. Over a half of all unimproved pasture and rangeland converted to other uses between 1966 and 1976, was situated on prime agricultural land (Classes 2 and 3). Of this, more than 85% went to built-up uses.

4. The majority of land converted to unimproved pasture and rangeland between 1966 and 1976 came from productive woodland. By 1976 there was a net increase in the amount of unimproved pasture and rangeland uses on Class 7 land.

5.2.4 Natural Cover Classes

'Natural Cover' includes the following land use classes: productive and non-productive woodland; swamp, marsh or bog sand flats, dunes or beaches; rock and other unvegetated surfaces, which are more properly described as cover types. They have been identified during air photo interpretation on the basis of their natural cover rather than their use.

In 1966, natural cover uses occupied approximately 68% of the Victoria UCR, of which 64% was productive woodland. By 1976, natural cover uses had declined to 60% of the total, while the productive woodland component dropped to 54%. Cut-over or non-productive woodland increased slightly by about 3% (Table 1). Of all the natural cover land converted to other uses between 1966 and 1972, 1 262 ha or 60% went to built-up and 801 ha or 38% was converted to unimproved pasture and rangeland (Table 22). Although these conversions to other uses represented only 3.6% change in the total natural cover base, they constituted 38% of the total land use change that occurred in this period (Figure 1A, Tables 20 and 22).

Between 1972 and 1976, 5 138 ha or 9% of land in natural cover was converted to other uses. Of this land converted, 60% went to urban built-up, 34% went to outdoor recreation, and 4% went to unimproved pasture and rangeland (Figure 1B).

Map 7 shows that much of the conversion from natural cover to built-up between 1966 and 1976 was concentrated in the central part of Saanich municipality nd around existing urban areas of Langford, Metchosin, Colwood and Esquimalt. Cobble Hill on the west side of Saanich Inlet was also an area where this conversion was concentrated.

Within the natural cover category, the amount of productive woodland that was converted to built-up uses more than doubled between the two time periods: from 1 238 ha to 2 925 ha. It constituted 63% of all land that became built-up between 1972 and 1976 (Table 4).

Thirty-three and a half percent of natural cover converted to other uses between 1966 and 1972 was Class 7 agricultural capability (Table 23). In the second period, 53% of land converted to other uses was Class 7. Of the total amount of productive forest converted to built-up by 1972, 40% was Class 1-3 land, while in the 1972-76 period this declined to 30% (Tables 4 and 8). By inference, there was a greater tendency in the 1972-76 period to direct urban expansion to land less suitable for agriculture.

Very small amounts of improved agriculture and unimproved pasture and rangeland reverted to natural cover in both time periods (Table 21). Of these, 55% (104 ha) were prime agricultural capability lands.

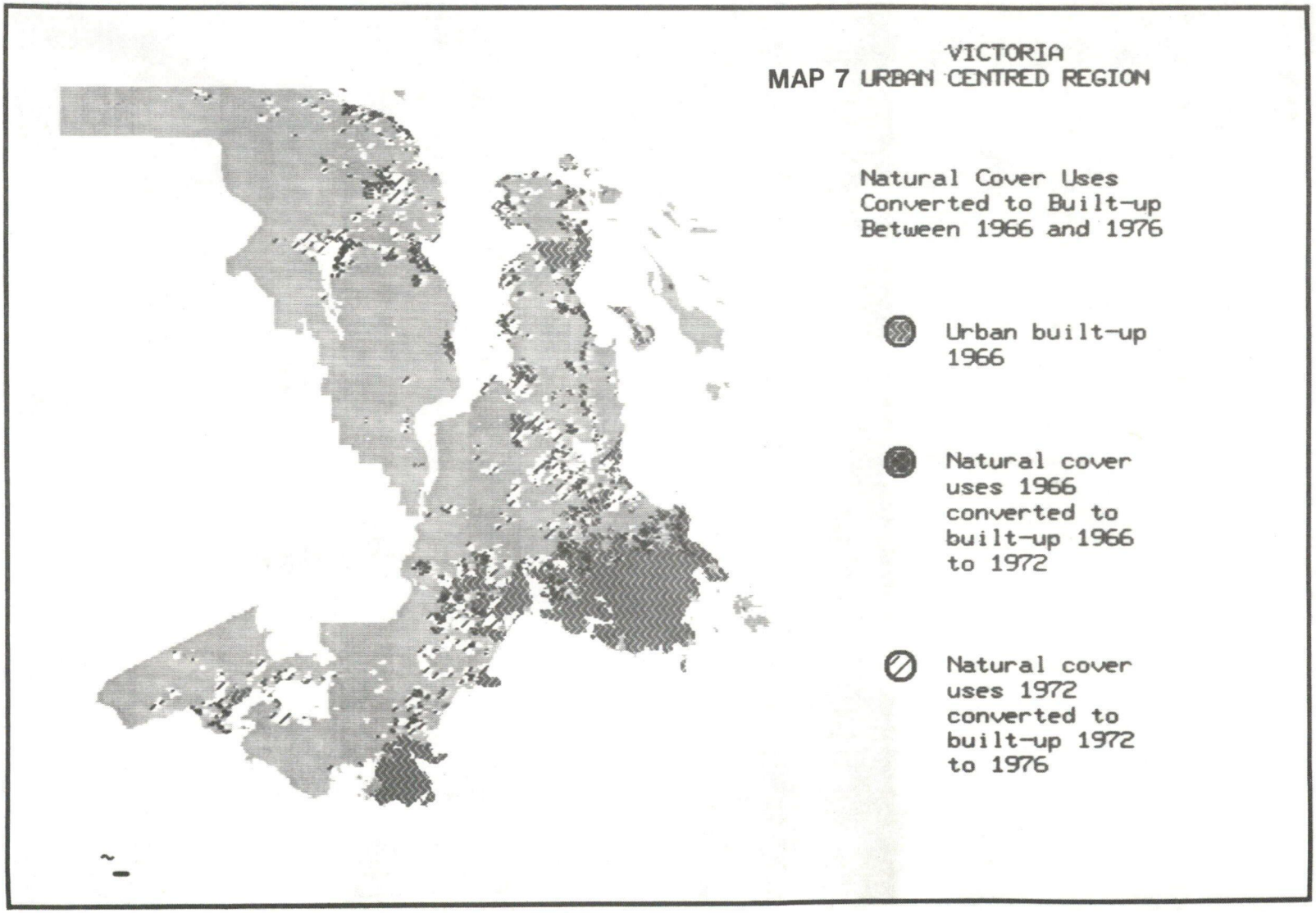
VICTORIA
MAP 7 URBAN CENTRED REGION
Natural Cover Uses
Converted to Built-up
Between 1966 and 1976
Urban built-up
1966
Natural cover
uses 1966
converted to
built-up 1966
to 1972
Natural cover
uses 1972
converted to
built-up 1972
to 1976

TABLE 20. 1972 AND 1976 USE OF LANDS THAT WERE IN NATURAL COVER IN 1966

Land Use Class	1972 Area(hectares)	1972 % Selection		1976 Area(hectares)	1976 % Selection	
Built-up	1 262	2.2		4 318	7.2	
Quarries, sand gravel pits	13	0	2.2	75	0.1	8.5
Outdoor recreation	7	0		1 761	3.0	
Horticulture, poultry and fur farms	1	0		25	0	
Cropland, improved pasture and forage crops	36	0.1	0.1	63	0.1	0.1
Unimproved pasture and rangeland	801	1.4	1.4	976	1.7	1.7
Productive woodland	51 602	88.5		46 338	79.5	
Non-productive woodland	4 371	7.5		4 477	7.7	
Swamp, marsh or bog	123	0.2	96.3	176	0.3	87.7
Sand flats, dunes and beaches	36	0		36	0.1	
Rock and other unvegetated surfaces	70	0.1		77	0.1	
TOTAL AREA SELECTED	58 322 ha (67.7% of Study Area)	100%		58 322 ha	100%	

TABLE 21. 1966 AND 1972 USE OF LAND IN NATURAL COVER USES IN 1976

Land Use Class	1966 Area(hectares)	1966 % Selection		1972 Area(hectares)	1972 % Selection	
Cropland, improved pasture and forage crops	48	0.1	0.1	20	0.0	0
Unimproved pasture and rangeland	139	0.3	0.3	29	0.1	0.1
Productive woodland	48 205	94.0		47 238	92.1	
Non-productive woodland	2 770	5.4		3 777	7.4	
Swamp, marsh or bog	79	0.2	99.6	122	0.2	99.9
Sand flats, dunes and beaches	36	0		36	0.1	
Rock and other unvegetated surfaces	15	0		70	0.1	
TOTAL AREA SELECTED	51 292 ha (59.5% of Study Area)	100%		51 292 ha	100%	

TABLE 22. LAND IN NATURAL COVER THAT WAS CONVERTED TO OTHER USES 1966-1976

	Land in Natural Cover 1966 converted to other uses between 1966 and 1972			Land in Natural Cover 1966 and 1972 converted to other uses by 1976		
Land Use Class	Area(hectares)	% Selection		Area(hectares)	% Selection	
Built-up	1 262	59.5		3 020	59.3	
Quarries, sand and gravel pits	13	0.6	60.4	66	1.3	94.9
Outdoor recreation	7	0.3		1 750	34.3	
Horticulture, poultry and fur farms	1	0	1.8	25	0.5	1.1
Cropland, improved and forage crops	37	1.8		31	0.6	
Unimproved pasture and rangeland	801	37.8	37.8	205	4.0	4.0
TOTAL SELECTED AREA	2 121 ha (2.4% of Study Area)	100%		5 097 ha (5.9% of Study Area)	100%	

TABLE 23. COMPARISON OF AGRICULTURAL CAPABILITY OF NATURAL COVER AND THAT WHICH WAS CONVERTED TO OTHER USES

Agricultural Capability Class	Agricultural Capability of Natural Cover				Agricultural Capability of Natural Cover Converted to Other Uses			
	1966		1976		1966-72		1966 and 1972-1976	
	Area(hectares)	% Selection	Area(hectares)	% Selection	Area(hectares)	% Selection	Area(hectares)	% Selection
1	5	0	5	0	0	0	0	0
2	2 574	4.5	2 201	4.3	128	6.0	248	4.9
3	4 370	7.5	3 183	6.2	514	24.2	774	15.2
4	3 113	5.3	2 469	4.8	260	12.3	386	7.6
5	11 798	20.2	10 454	20.4	455	21.4	919	18.0
6	1 271	2.2	1 194	2.3	31	1.5	46	0.9
7	34 754	59.6	31 390	61.2	710	33.5	2 696	52.9
Organic Soil	429	0.7	387	0.8	23	1.1	28	0.5
Unclassified	9	0	9	0	0	0	0	0
TOTAL AREA SELECTED	58 323 ha (67.7% of study area)	100%	51 292 ha (59.5% of study area)	100%	2 121 ha (2.4% of study area)	100%	5 097 ha (5.9% of study area)	100%

In total, changes in the natural cover regime accounted for 73% of all land use change that occurred in the study area between 1972 and 1976.

The following is a summary of the dynamics of land in natural cover uses:

1. Most (60%) of the land in natural cover that was converted to other uses between 1966 and 1976 went to built-up uses.

2. Thirty-four percent of the total amount of productive woodland converted to built-up uses between 1966 and 1976, was on Class 1-3 agricultural capability lands.

3. Only 13% of the total natural cover base was converted to other uses between 1966 and 1976, although changes in natural cover accounted for 58% of all land use change that took place during this time.

5.3 Outdoor Recreation

In the Victoria UCR, access to shoreland, both coastal and inland provides a variety of recreation opportunities. These opportunities are used most intensively adjacent to urbanized areas by both residents and visitors. In this study, lands classified as having outdoor recreation uses included golf courses, marina shore facilities, cottages, beaches, and parks. These lands comprised 3.4% of the study area in 1966, 3.3% in 1972, and 5.3% in 1976 (Table 1).[4]

Of all outdoor recreation lands in 1966, 21.7% were classed as high capability for recreation (Classes 1-3). The majority (64%) had moderate recreation capability, and 12% were unclassified (Table 24).

Between 1966 and 1972, 129 ha of outdoor recreation land were urbanized, while only 28 ha were converted to outdoor recreation (Tables 4 and 25). However in the 1972-76 period, a significant amount of land was converted to outdoor recreation uses. Of the 1 778 ha changed, 98% came from natural covers. Map 8 shows the location of the latter, which resulted primarily from the creation of a number of regional parks.[5] Ninety-five percent of the lands converted had a moderate capability for recreation (Class 4) with primary features of vegetation with recreational value and landscape view (Table 24).

In the second period, 64 ha of outdoor recreation lands were converted to other uses: 37 ha to built-up and 27 ha to improved agriculture (see Figure 1B).

In 1976, 15% of lands classed as outdoor recreation occurred on high capability recreation land (Classes 1-3), representing a relative decline of 6% from 1966. Land classed as outdoor recreation, with recreation capability Class 4, increased by 13% in the same time period (Table 24). Vegetation with recreational value continued to be the most dominant recreation feature, while landscape viewing rose from fourth rank in 1966 to second rank in 1976, and the opposite took place for shoreland recreation lodging. This change reflects the location of the new 'inland' parks created between 1972 and 1976 (see Map 8).

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4. As noted earlier, it is not always possible to identify on air photos the change from seasonal cottage to permanent residence. Thus, the decline between 1966-1972 may be due to interpretation differences rather than actual change.

5. From north to south these parks were: Horth Hill, Durrance Lake, Mill Hill, and (the largest) East Sooke.

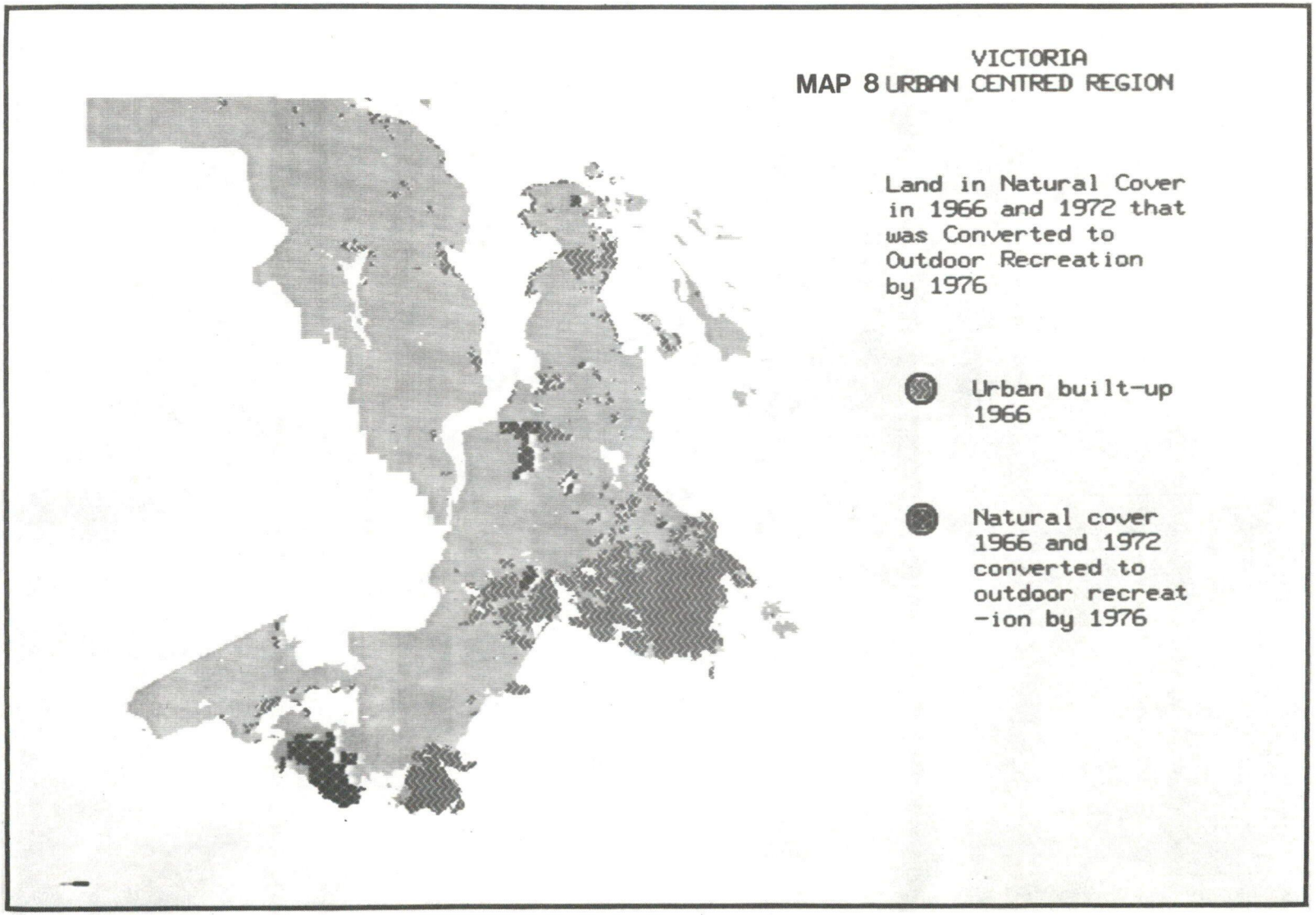
TABLE 24 RECREATION CAPABILITY AND PRIMARY RECREATION FEATURES OF OUTDOOR RECREATION LAND IN 1966 AND 1976

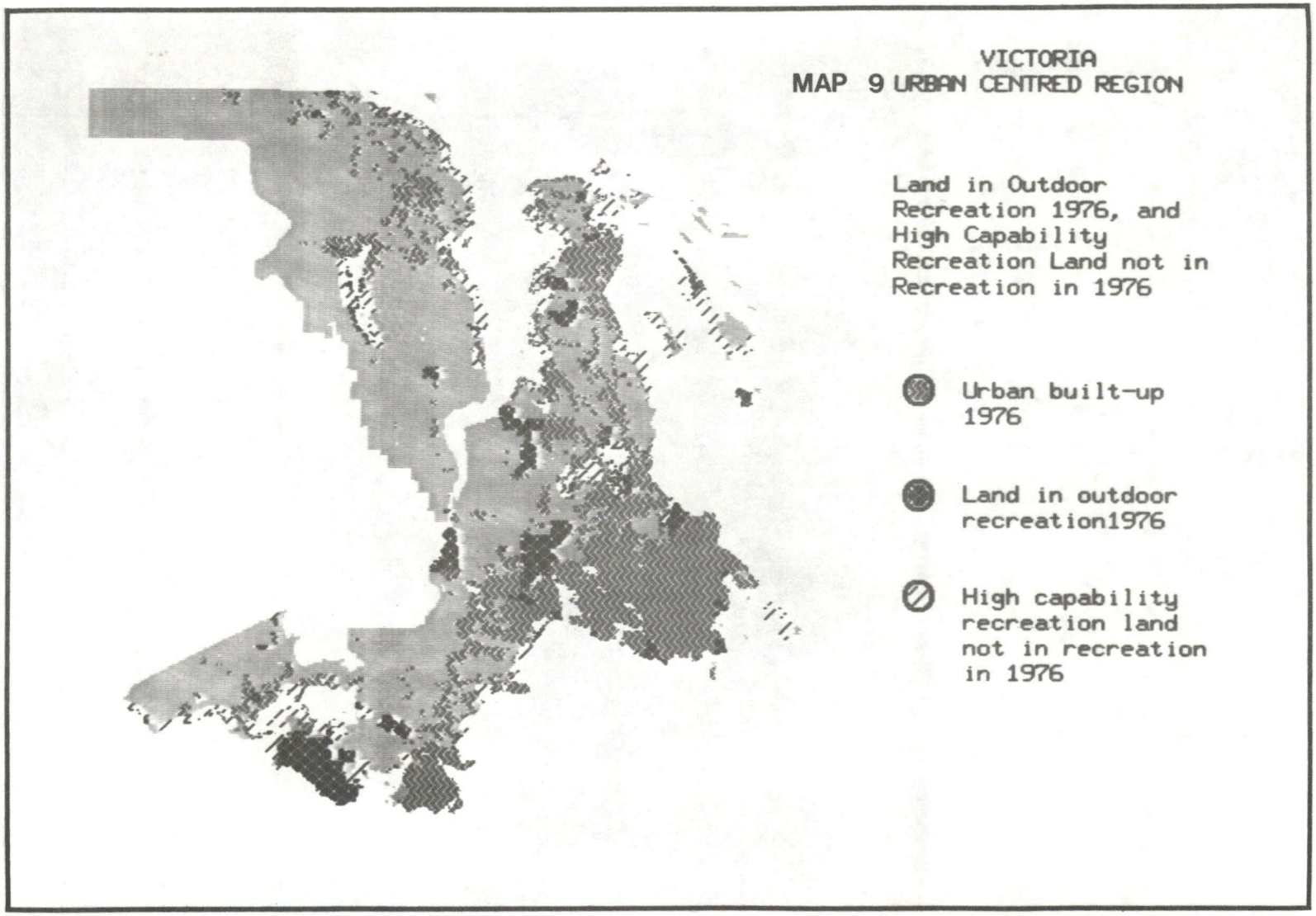
	Outdoor Recreation Land 1966			Outdoor Recreation Land 1976		
Recreation Capability Class	Area (ha)	% Selection		Area (ha)	% Selection	
1	56	1.9		56	1.2	
2	22	0.8	21.7	22	0.5	15.2
3	552	19.0		611	13.5	
4	1 863	64.0	66.3	3 490	77.2	79.4
5	67	2.3		99	2.2	
Unclassified	351	12.0	12.0	246	5.4	5.4
TOTAL AREA SELECTED	2 911 ha (3.3% of study area)	100%		4 524 ha (5.2% of study area)	100%	

	Outdoor Recreation Land 1966		Outdoor Recreation Land 1976	
Primary Recreation Features	Area (ha)	% Selection	Area (ha)	% Selection
Vegetation	1 151	39.5	2 534	56.0
Landscape view	236	8.1	488	10.8
Organized camping	422	14.5	420	9.3
Shoreland recreation lodging	424	14.6	407	9.0
Boating	117	4.0	186	4.1
Beach activities	104	3.6	101	2.3
Canoeing access	72	2.5	72	1.6
Fishing access	29	1.0	33	0.7
Upland streams, lakes	0	0	27	0.6
View of wetland wildlife	5	0.2	5	0.1
Cultural landscape	0	0	5	0.1
Unclassified	351	12.0	246	5.4
TOTAL AREA SELECTED	2 911 ha	100%	4 524 ha	100%

TABLE 25. LAND CONVERTED TO OUTDOOR RECREATION USE BETWEEN 1966 AND 1972, AND 1972 AND 1976 AND ITS RECREATION CAPABILITY

	1966-1972			1972-1976		
Land Use Class	Area(hectares)	% Selection	% Study Area	Area(hectares)	% Selection	% Study Area
Quarries, sand and gravel pits	3	10.7	0	0	0	0
Horticulture, poultry and fur farms	3	10.7	0	0	0	0
Cropland, improved pasture and forage crops	10	35.7	0	18	1.0	0
Orchards and vineyards	0	0	0	1	0	0
Unimproved pasture and rangeland	4	14.3	0	9	0.5	0
Productive woodland	4	14.3	0	1 238	69.6	1.4
Non-productive woodland	4	14.3	0	512	28.9	0.6
TOTAL AREA SELECTED	28 ha	100%	0%	1 778 ha	100%	2.0%
Recreation Capability Class	Area(hectares)	% Selection	% Study Area	Area(hectares)	% Selection	% Study Area
3	16	57.1	0	58	3.3	0.1
4	12	42.9	0	1 688	94.9	1.9
5	0	0	0	32	1.8	0
TOTAL AREA SELECTED	28 ha	100%	0%	1 778 ha	100%	2.0%
Primary Recreation Features						
Vegetation	6	21.4	0	1 407	79.2	1.6
Landscape view	6	21.4	0	261	14.7	0.3
Boating	16	57.2	0	53	3.0	0.1
Upland streams, lakes	0	0	0	27	1.5	0
Family recreation lodging	0	0	0	13	0.7	0
Fishing access	0	0	0	11	0.6	0
Cultural landscape	0	0	0	6	0.3	0
TOTAL AREA SELECTED	28 ha	100%	0%	1 778 ha	100%	2.0%


VICTORIA
MAP 8 URBAN CENTRED REGION
Land in Natural Cover in 1966 and 1972 that was Converted to Outdoor Recreation by 1976
Urban built-up 1966
Natural cover 1966 and 1972 converted to outdoor recreat -ion by 1976


VICTORIA
MAP 9 URBAN CENTRED REGION
Land in Outdoor Recreation 1976, and High Capability Recreation Land not in Recreation in 1976
Urban built-up 1976
Land in outdoor recreation1976
High capability recreation land not in recreation in 1976

In both time periods, lands classified as being used for outdoor recreation occurred on high quality land (Classes 1-3) in greater proportion (22% in 1966 and 15% in 1976) than their general availability (6%) in the study area (Tables 3 and 24). The same was also true for moderate capability lands (Class 4). Map 9 shows the distribution of land in outdoor recreation uses in 1976. The majority of lands classed as outdoor recreation had moderate recreation capability - 64% in 1966 and 77% in 1976.

Changes in the outdoor recreation land use category can be summarized as follows:

1. The amount of land classed as outdoor recreation increased significantly between 1972 and 1976, as a result of the creation of new parks.
2. Of the land that was converted to an outdoor recreation classification in the second period, 98% came from natural cover.
3. Outdoor recreation land use took place primarily on moderate and high quality recreation land.

6. LAND USE PLANNING CONSIDERATIONS

Land use planning is a process for allocating land use based on land capability and a variety of socio-economic, legal and political factors. Ideally, planning should reduce conflicts between land uses competing for the same, finite land supply.

Urbanization is the most significant force of land use change in the Victoria urban-centred region. Map 3 illustrates the urban development pattern for the study area from the mid-1960's to the mid-1970's. Much of the best farmland in the region is in the Saanich Peninsula, and being in close proximity to the Victoria urban core is under intense pressure from steady urban expansion. A comparison of the availability of high quality agricultural lands in 1966 (Map 2) versus their reduced availability in 1976 (Map 10) illustrates this point.

The general agricultural pattern of intensive use of small plots near cities giving way to more extensive agriculture use for larger farms further from urban areas applies to Victoria. However, increasingly, intensive agriculture uses and urban pressures are forcing larger operations, such as dairy farms, both northward and also out of the Saanich Peninsula (Forward, 1969; McFadden and Wittenberg, 1980). Analysis of data in this study indicates that conversion of improved agriculture and unimproved pasture and rangeland to built-up uses together, amounted to 60% of the total land urbanized between 1966 and 1972 (Table 4). Limitations on future development were needed to reduce conflicts between urban and rural land uses.

In an effort to halt the rapid decline of the agricultural resource, the provincial government introduced a form of zoning - the Agricultural Land Reserve. Although this legislation was not actually operative in the Victoria region until June 1974, it appears to have had a significant effect in the second time period under study. Land with agricultural capability classes 1-4 converted to built-up dropped from 76% of the total land converted between 1966-72, to 54% of the total between 1972-76. (Table 7). Conversion of improved agriculture and unimproved pasture and rangeland to built-up, declined by almost half. The use of capability for agriculture information is one example of how physical capability can be used to define suitable areas for specific land uses.

Characteristic of the urbanization process in the Victoria region were the increased numbers of non-farmers residing in rural areas, and unchecked urban sprawl pushing into

farmland. One of the results was haphazard subdivision of farms and a patchwork of residential uses (Forward, 1969). Sequential land use mapping is a useful tool for indicating where these trends are occurring and at what rate. Regional and community plans can help to guide and control the location of such patterns of land use.

In developing the Official Regional Plan for Victoria Metropolitan Area, two factors were considered paramount:

1) need to provide economical patterns of service, and
2) need to preserve valuable agricultural lands.

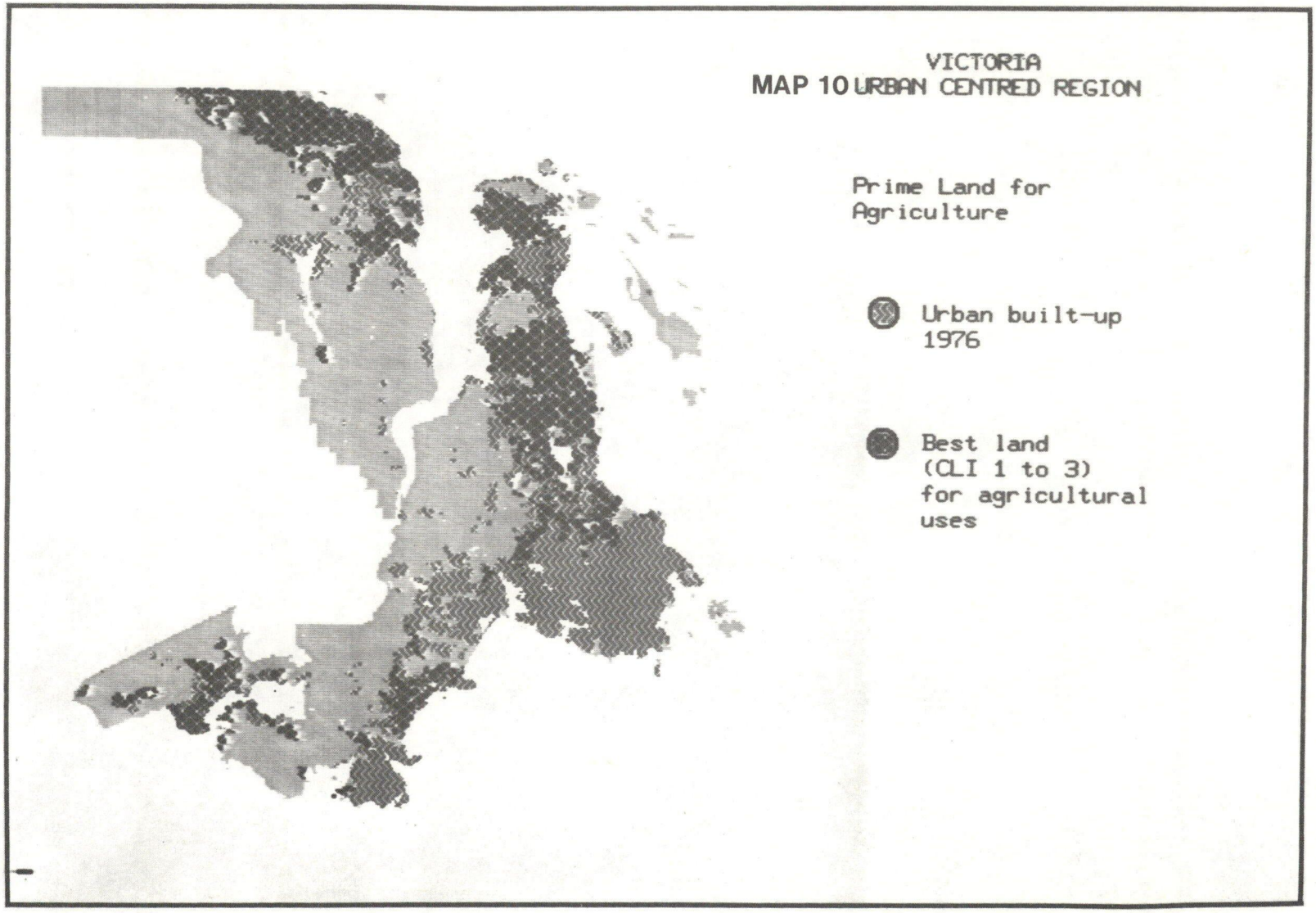
The plan chosen in May 1973 emphasized a shift in development away from Saanich Peninsula towards Langford and Colwood, and stressed development in existing urban areas (Capital Regional District, Regional Planning Department, 1980). This strategy, was reinforced by the ALR plans prepared in 1974.

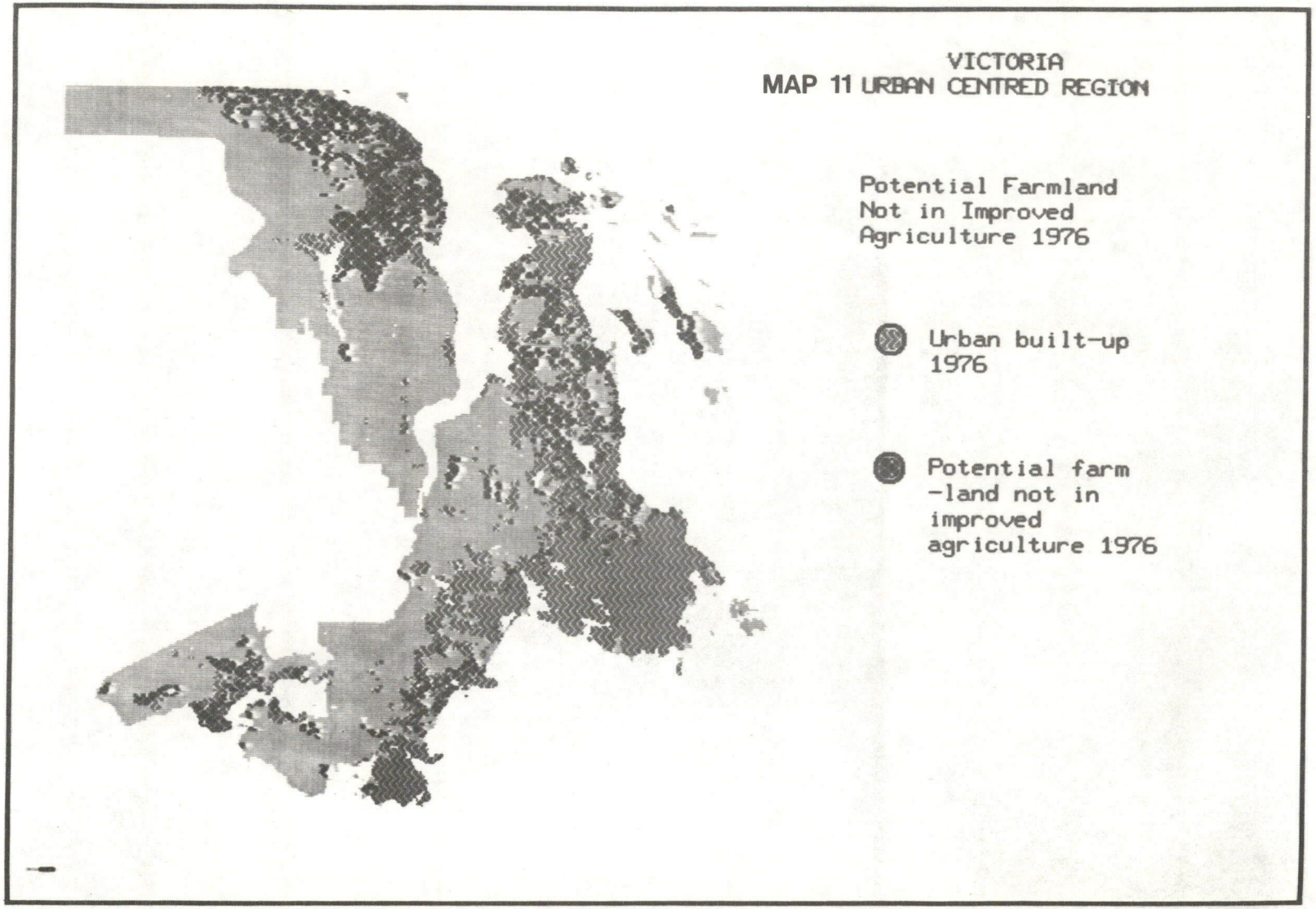
In 1980, the Capital Regional District produced an updated official regional plan for the Victoria Metropolitan Area. The plan's dual thrust is to

TABLE 26. POTENTIAL FARMLAND (AGRICULTURAL CAPABILITY CLASSES 1-4) NOT IN IMPROVED AGRICULTURE IN 1976

Land Use Class	Area(hectares)	% Selection	% Study Area
Unimproved pasture and rangeland	1 814	18.8	2.1
Productive woodland	7 601	78.7	8.8
Non-productive woodland	227	2.3	0.3
Swamp, marsh or bog	19	0.2	0
TOTAL AREA SELECTED	9 662 ha	100%	11.2%

Agricultural Capability Class	Area(hectares)	% Selection	% Study Area	% of Agricultural Capability Class in Study Area
1	5	0.1	0	13.2
2	2 650	27.4	3.1	55.8
3	4 145	42.9	4.8	23.4
4	2 752	29.6	3.3	43.9
TOTAL AREA SELECTED	9 662 ha	100%	11.2%	33.3%


VICTORIA
MAP 10 URBAN CENTRED REGION
Prime Land for Agriculture
Urban built-up 1976
Best land (CLI 1 to 3) for agricultural uses


VICTORIA
MAP 11 URBAN CENTRED REGION
Potential Farmland
Not in Improved
Agriculture 1976
Urban built-up
1976
Potential farm
-land not in
improved
agriculture 1976

encourage compactly deyeloped urban areas, and to maintain a regional green belt extending from the tip of Saanich Peninsula to Sooke Harbour. The concept of Agricultural Land Reserves is supported in the plan.

Map 11 indicates potential farmland (Classes 1-4) not in improved agricultural uses in 1976. This represents 33% of the total amount of Class 1-4 agricultural land available in the study area. In 1976 most was in productive woodland (76%), and a small portion (18%) was in unimproved pasture and rangeland (Table 26). The largest area of potential farmland is in the Cobble Hill-Cowichan Bay area. Significant concentrations of potential farmland are also found in the north-central part of Saanich municipality, Central Saanich, Metchosin and Sooke. These are areas where planning policies might encourage agricultural improvements.

The locations of high capability recreation lands (Classes 1-3) not in outdoor recreation use in 1976 are shown on Map 9. Most of these lands are situated along coastal and inland water shorelines. An exception is Observatory Hill, west of Elk Lake, where the Dominion Astrophysical Observatory is located. This Class 2 area offers opportunities for landscape viewing and general dispersed recreation activities. From a brief review of official regional and settlement plans in the Victoria UCR, it appears that these plans contain policies to preserve the high capability recreation lands shown on Map 9.

7. SUMMARY AND CONCLUSIONS

The nature of land use changes that occurred between 1966 and 1976 in the Victoria urban-centred region may be summarized as follows:

1. The major net land use change was the conversion of other uses to urban uses. Between 1966-1976, built-up land uses increased 80%, and in 1976 occupied 22.8% of the study area.

2. During the 1966-72 period, most urbanization took place on the fringe of the Victoria urban core; in the second period, 1972-1976, the majority of urban growth stretched north from Victoria through the central Saanich Peninsula, and southwest through Langford and Metchosin. Substantial urban growth also occurred in the northwest portion of the study area around Cobble Hill.

3. Between 1966-1976, 14.6% of the study area changed uses. Major changes were:
Natural cover to built-up (34.5% of the change);
Unimproved pasture and rangeland to built-up (20%);
Natural cover to outdoor recreation (14.1%);
Improved agriculture to built-up (14%); and
Natural cover to unimproved pasture and rangeland (8%).

4. Major declines were in unimproved pasture and rangeland (32%), and improved agriculture (20.5%). The land use category occupying the greatest portion of the study area - natural cover - decreased by 12% between 1966 and 1976.

5. Both improved agricultural land and unimproved pasture and rangeland tended to remain as such until they changed to built-up.

6. Less than one-third (26.1%) of the Victoria UCR has high capability agricultural land (Classes 1-3). The high correlation between improved agricultural uses and high quality agricultural land remained consistent throughout the 1966-76 period.

7. Approximately one-half (52%) of the area that became built-up between 1966 and 1976 occurred on high quality agricultural land.

8. The rate of conversion of improved agricultural land uses on high capability (Classes 1-3) agricultural land to built-up dropped by 38% between the two periods: from 34.2% of the total Class 1-3 land urbanized between 1966-72, to 26.4% in the 1972-76 period .

9. Of all the improved agricultural land that was converted to built-up between 1966-72, 75% had Classes 1-3 agricultural capability, and between 1972-76, 90% had Classes 1-3 capability.

10. Overall, the annual rate at which all land uses were converted to built-up increased in the 1972-76 period by 484 ha/year (71%) over the first (1966-72) period. The largest single increase was the conversion of woodland (productive and non-productive) to built-up: by 554 ha/year in the second period.

11. The rate of conversion of improved agriculture and unimproved pasture and rangeland to built-up uses declined between 1972-76 by 23% and 5% respectively.

12. The land area occupied by outdoor recreation uses increased by 55.4% between 1966 and 1976.

13. There is a high degree of correlation between high capability recreation land and land classified as being in outdoor recreation use. Over 15% of all land classified as outdoor recreation occurs on 7.6% of the study area (Classes 1-3 recreation capability). A further 77% of land classed as outdoor recreation is of moderate recreation capability (Class 4).

The amount of land classed as urban built-up in the Victoria UCR increased significantly between 1966-1976. This increase was particularly dramatic between 1972 and 1976 (31%) compared to a population increase of only 11.5% in the same period. Some of this urbanization can be attributed to the growth of shopping centres in suburban communities, as well as malls and associated parking lots, motel and restaurant complexes and highway interchanges on the urban fringes.

High quality, easily serviced agriculture lands immediately adjacent to population centres, especially at major road intersections, are attractive for urban development. Data for the 1972-76 period indicate that the rate of conversion of high quality land in agricultural uses to urban built-up slowed. Despite this slower trend and the introduction of the Agricultural Land Reserve (ALR) legislation, the substantial amounts of Class 2 agricultural land still being converted to built-up, show that high capability agricultural land continued to face considerable pressure from urban and associated development. That this land was allowed to succumb to urbanization may be accounted for, in part, by commitments to develop made prior to the ALR legislation, and by decisions to allow urban infill to proceed on agricultural land surrounded by urban land uses. The success of both the ALR legislation and the Victoria Metropolitan regional plan policies in directing urban development away from the valuable agricultural resources, will be better judged when data from future, sequential land use mapping programs are available.

It is recognized that the parameters used in this study are only some of those reuqired before guidelines for the orderly and effective development of all aspects of an area's land resource base can be prepared. Results from manipulation of the data for Victoria urban-centred region presently incorporated

in the Canadian Geographic Information System (CGIS), are neither complete nor sensitive enough to allow specific recommendations to be made. Other information such as forest capability, Agricultural Land Reserve boundaries, ecologically sensitive areas, hazards lands and soil suitability for urban and associated uses would be required to increase the potential of CGIS's manipulation capacity as a planning tool. Nevertheless, the information contained herein may be useful in indicating general trends and thus may point the way for future, more detailed studies.

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APPENDIX 1

CANADA LAND INVENTORY SOIL CAPABILITY CLASSIFICATION
FOR AGRICULTURE

Map Symbol	Description
1	No significant limitation in use for crops
2	Moderate limitations that restrict the range of crops or require moderate conservation practices.
3	Moderately severe limitations that restrict the range of crops or require special conservation practices
4	Severe limitations that restrict the range of crops or require special conservation practices, or both
5	Very severe limitations that restrict capability to producing perennial forage crops, and improvement practices are feasible.
6	Capable only of producing perennial forage crops, and improvement practices are not feasible
7	No capability for arable culture or permanent pasture
0	Organic soils
8	Unmapped or unclassified area

The above classification indicates that soils in Classes 1 to 4 are considered capable of sustaining cultivated field crops while those in Classes 5 and 6 are capable of sustaining forage crops. Classes 7 and 0 are not considered suitable for crop production.

CANADA LAND INVENTORY LAND CAPABILITY CLASSIFICATION FOR
OUTDOOR RECREATION

Map Symbol	Description
1	Very high capability for outdoor recreation
2	High capability for outdoor recreation
3	Moderately high capability for outdoor recreation
4	Moderate capability for outdoor recreation
5	Moderately low capability for outdoor recreation
6	Low capability for outdoor recreation
7	Very low capability for outdoor recreation
8	Unmapped (unclassified) areas or water

APPENDIX 2

PRIMARY AND SECONDARY AGRICULTURAL LIMITATIONS

LIMITATIONS	PRIMARY		SECONDARY	
	Area (ha)	% Study Area	Area (ha)	% Study Area
Shallowness to bedrock	25 876	30.1	14 389	16.7
Adverse topography	20 698	24.0	26 666	31.0
Undesirable soil structure	13 613	15.8	1 397	1.6
Low moisture holding capacity	11 575	13.4	3 086	3.6
Minor cumulative	7 393	8.6	0	0
Stoniness	3 664	4.3	12 652	14.7
Excess water	3 148	3.7	1 696	2.0
Erosion damage	0	0	140	0.2
Inundation	0	0	33	0
Salinity	0	0	196	0.2
No limitations	95	0.1	25 821	30.0
Unclassified	14	0	0	0
TOTAL AREA SELECTED	86 076 ha	100%	86 076 ha	100%

APPENDIX 3

CANADA LAND INVENTORY PRIMARY RECREATION FEATURES

FEATURE (map symbol)	Area (hectares)	% Study Area
Vegetation of recreational value (E)	52 743	61.3
Landscape view (V)	7 127	8.3
Boating (U)	3 723	4.3
Variety of topography, land and water (Q)	3 413	4.0
Shoreland recreation lodging (N)	2 916	3.4
Fishing access (A)	2 288	2.6
Organized camping (K)	926	1.1
Beach activities (B)	765	0.9
Upland streams, lakes (M)	746	0.9
Cultural landscape (P)	534	0.6
View of wetland wildlife (W)	258	0.3
Rock formations (R)	246	0.3
Landform features (L)	191	0.2
Non-urban man-made structures (Z)	178	0.2
Canoeing access (C)	113	0.1
Unclassified	9 909	11.5
TOTAL AREA SELECTED	86 076 ha	100%